Abstract

This paper draws upon Malcom Gladwell’s notion of The Tipping Point in the context of the development of new broadband services. The new Rudd Labor government has committed $4.7 billion of Australian government capital to assist in the construction of a new national fibre broadband network. Broadband platforms have enabled a different service paradigm from all of their predecessors, and three categories of broadband services are discussed here — called managed, unmanaged, and publicly supported services. Examples of related service innovations are drawn upon from overseas models, particularly The Netherlands and Canada. The notion of the ‘tipping point’ is then examined in the context of three different end –user domains related to broadband systems; namely social networking sites, community ownership models that build community services, and the vexed eHealth service domain. The government National Broadband Network (NBN) tender process appears to have given little attention to what services are likely to be acceptable to, or needed by, Australian broadband consumers in the future. Hence a call is made for the ‘tipping point’ that is so much needed – a new policy framework that will provide constructive consumer participation on key policy decision making.

The tipping point

In his anecdotal book, The Tipping Point, Malcolm Gladwell offers his view of how different processes can influence the way that some products, ideas, and ways of behaving cross a threshold, or ‘tip’, to eventually take off and gain widespread acceptance in market places.¹

Drawing upon the notion of a ‘tipping point’, this paper argues that with the development of new broadband systems, the prime focus in many countries has primarily been on infrastructure choices, prospective stakeholders, investment and regulatory practices but issues about consumers have been relegated to secondary policy consideration. Recently the new Rudd Labor government committed $4.7 billion of government capital to assist in the construction of a new national broadband network. But their present ongoing National Broadband Network (NBN) tender process gives almost no attention to the complexities of the services or the demand side of the broadband equation. Generally speaking, broadband policy makers do not appear to have been influenced much by significant international research which has examined demand factors, consumer behavior and practices, adoption factors and affordability work concerning the end — users and consumers of broadband.²

¹Gladwell, Malcolm, The Tipping Point: How little things can make a big difference, Abacus, 2000. Note that the term is not used in the sense of trend setters where some people matter more than others as ‘influentials’ but rather how demand for a service eventually reaches significant across the board numbers.

So what do we know about the nature of broadband and respective service domains, what related overseas experiences might provide useful insights for Australia, and what are the implications for communications public policy?

**Broadband is not Internet**

The evolution from copper wire to fibre as broadband represents a major shift in terms of the relationship between the network itself, the services that can be offered, and the consumers.

With the early copper networks came the telephone, and consumers were offered one service, and only one — the telephone service. There was direct synergy between the ‘dumb’ copper network and a telephone voice service. So most consumers had pre-awareness of this new technology, and as soon as the copper telephony network became available, the take up of the service came naturally. Broadcasting too, in its early days, could similarly find ready made audiences. And even in the early days of subscription television most consumers knew that it was a service that offered dozens of channels, but on a user pay system. Pay television has been referred to as being analogous to being able to buy a fifth wheel on a car – if you can afford the add on. But with the arrival of the Internet much later, a raft of new consumer choices became available on the new medium as new modes of communication emerged — i.e., e-mail, search, e-commerce, virtual communities. The Internet was the plumbing that facilitated a greater choice of services and diversity of communication through the platform of the World Wide Web.

Broadband platforms have enabled a different service paradigm from all of their predecessors. The potential richness of services is enhanced with the new fibre-based platforms because of the increased capacity that comes with broadband.

Broadband is not Internet — though Internet services can be a part of broadband offerings.

From a broadband supplier’s viewpoint there are two generic categories of services as shown in Figure 1 below: Internet services which are ‘unmanaged’ services i.e, search engine Google is (obviously) Google’s own service delivered ‘free’ via broadband Internet, as opposed to ‘managed’ services, such as World Movies, where the network suppliers offer their own selected additional tiered services, at their determined rates.

![Figure 1 Services: Broadband is not Internet](source: LyseTele, Norway)

- Broadband access and Internet access (IA) are two different things.
- The broadband access carries Managed IP-services while the Internet access carries Unmanaged* IP-services.

* unmanaged from a network operators view

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The obvious commercial imperative for the broadband system supplier is to get as many consumers on their system as quickly as possible. But their margins are better where they can create and market as many popular new ‘managed’ services as possible because the ‘unmanaged’ Internet based services have limited growth potential for them. So when the new fibre broadband network in Australia becomes operational, the suppliers are likely to be searching for as many services as possible for their subscribers to access, and to download — almost certainly with consumer charges closely related to usage patterns. So suppose the preferred network operator is Telstra, and that it is able to offer its own services in an Open Access model (as well as being the network supplier), then the practices we currently see in the marketing of Next G™ mobile services is likely be replicated with the new broadband network.

‘BigPond® will begin streaming horseracing live to Telstra 3G and Next G™ mobile phones from 1 August 2008 through an exclusive partnership with ThoroughVisioN (TVN). Only Telstra mobile customers will have live mobile access to the biggest races from Sydney and Melbourne, including the Melbourne Cup, Cox Plate, Caulfield Cup, Golden Slipper, Epsom Handicap, Doncaster Handicap and many more. In addition, BigPond has the archive rights to TVN Racing, so fans can re-live their favourite racing moments at their leisure. BigPond is already home to Australia’s most popular sports, including AFL, NRL and V8 Supercars. BigPond also has a dedicated weekend sports programme, BigPond Sports Weekend, which streams 18 hours of live sports coverage across Saturday and Sunday, online and on mobile’. ³

If Telstra has a premier place within the forthcoming fibre developments, then subscribers to their existing broadband services, delivered through both cable and ADSL, can stand by for a major marketing blitz to encourage them to migrate to the higher speed broadband network. The issue here is represented generically in Figure 2 below: the commercial and marketing task for the broadband network operators and service providers is to ensure that the large cylinder space on the left can be largely filled by many ‘managed’ offerings which consumers will pay for.

³ ‘BigPond saddles-up to offer horse racing live on mobiles’, Telstra Media Release 1 August 2008

A third category of services is offered in Figure 3 below. Some will argue that broadband is merely another platform that must find its own way in the market place across all of the domains canvassed in this paper. So best leave it all to the commercial providers to find out about how best to interact with the end-users, and consumers will vote with their feet. Yet contrary approaches have emerged from surprising quarters, notably Jonathon Adelstein,
Chairman of the Federal Communications Commission in the USA, a body whose track record has long been to promote free markets and unfettered competition. Adelstein recently argued that the normal rule that the development of ‘a technology should be left solely to the market place does not apply in the case of broadband, which promises an array of social and economic benefits, ranging from distance learning, to telemedicine, to public safety to democracy’.

This is acknowledged in some industry debates about the range and suitability of broadband services that might be come with new fibre based systems. The position has been put to this author by industry spokespersons that they have capability and understanding in terms of building systems, designing and installing equipment and software, but that there are many service domains where they have little sense of what is needed by consumers.

The areas most quoted are shown below in Figure 3.

![Figure 3: Publicly supported services](image)

One of the most innovative international examples of an eGovernment services model is to be found with Canada’s Alberta SuperNet project. By way of preface personal discussions in Canada during June 2008 with stakeholders showed the author of this paper a remarkable model of structural separation where one company, Bell Canada, built the fiber network 2002–2006 but another company, Axia, accepted a self denying ordinance not to compete in the services layer of its own network. Art Price, Chairman and CEO of Axia Net Media Corporation, has advocated that Australia too should ‘put the NGN fibre grid in a no-conflict open access business model by separating ownership.’ He argues that this model avoids potential conflicts of interest by the network operator, with restriction of access to those service providers who might compete with Axia’s own services. Hence the proposed service model is to provide an Open Access – open to anyone, anywhere, at common non – discriminatory rates – to facilitate a plethora of services from multiple competitors.

But five years ago Axia also constructed its broadband plan with eGovernment services integral to its business model because of the strong support from the oil rich Alberta provincial government. Axia claims that the Alberta SuperNet is a broadband network now ‘linking over 4,000 government, health, library and educations facilities in 429 communities across the province at affordable and sustainable costs to the government of Alberta’…

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through ‘a ten year renewable contract with the government of Alberta to provide managed Real Broadband network to Alberta’s schools, hospitals, libraries and government facilities.’

The most significant benefit to date is that government offices can now more readily transfer large data files such as detailed engineering and planning proposals, big accounting files, and provincial maps that need high quality image resolution. Also, new legal service experiments include the use of video conferencing, or telepresence, which link 53 provincial courts correctional facilities, across the big province of Alberta with enabling witnesses and victims to choose to appear from a location closer the their home, and where they prefer not to face the accused in person. The Alberta eGovernment model appears to be one where the fibre network capacity is currently in abundance, the government has a long term financial commitment to the project and a range of constructive innovative publicly funded services is emerging.

To summarize to date. For institutionally based commercial broadband services in the future, most present groups of consumers are likely to migrate from their existing supplier arrangements i.e., from Big Pond to the new post NBN successful tenderer(s), according to how they see the value of making such a change. So from about 2010 onwards the broadband fibre suppliers will have great commercial incentive to generate as much product for consumers within their ‘managed’ services that they can find. This change ought to be a relatively natural ‘tipping point’ to achieve. However, for those ‘non economic’ institutional public services, such as eGovernment, collaborative partnerships are likely to be needed between commercial broadband providers and government to develop and market a more diverse range of broadband benefits to the community.

Now we need to turn to examination of these issues in the context of service domains of different kinds.

**Domain One: the growth of user generated content creating demand for better upload and download broadband speeds.**

One of the most remarkable features of the continuing evolution of the global platform of the Internet is the extraordinary increase in user-access and content diversity as a result of a plethora of new user-centred web sites. The much publicized trio of My Space, You Tube, and Facebook, together with multiple new user counterparts, provide not merely new platforms for people to show their personal videos and photos, but rather they facilitate a deeper set of processes of social networking. Darren Sharp explains:

> The Web has become the habitat for a new media ecology that is remarkably complex, adaptive, and self-organising. At the heart of these fundamental changes are the shifting value networks of media production, distribution and consumption... It has never been easier for people to tell their own stories, express their creativity and form communities of passion. A range of Do-It-Yourself (DIY) Internet-based services now give any user with access the ability to become a producer in a variety of social fields. This has spawned an entirely new understanding of authorship and content production in video (You Tube), games (Second Life), journalism (blogs), radio (podcasting), Web services (mashups), and knowledge production (Wikipedia).

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7 Personal discussions with Axia staff, Calgary, 13 June 2008.
Unsurprisingly these user-led innovations have attracted the attention of arch entrepreneur Rupert Murdoch who acquired My Space in 2005 for US $580 million. Within a year the My Space website, offering interactive user created personal profiles, photos, videos and music, attracted registrations at a rate of 230,00 per day reaching 100 million accounts on 9 August, 2006. Later Facebook, doubled its market share of visits in eight months between September 2006 and April 2007. The collective effect has resulted in visits to social networks overtaking the place of web based e-mail services in terms of the volume of generic service traffic in recent months.9

Little wonder too that the search giant Google acquired the user-generated videosite You Tube for SUS 1.65 billion in October, 2006. In the early months of 2008 You Tube has reached a premier place among these new user sites in terms of its popularity – with more than 100 million videos viewed each day. Tony Warren, Head of Regulatory Affairs, Telstra (Australia ) commented at the CommsDay Summit 2008 that You Tube served over 3 billion videos in the month of January 2008 alone, and that over 8 hours of footage are uploaded to the site every minute! Warren added that You Tube is now estimated to account for 10% of all Internet traffic globally and uses more bandwidth than the entire Internet did in 2000. Clearly the comparatively new user-generated content sites have passed a major consumer ‘tipping point’ threshold.

Though these levels of traffic flowing to the sites obviously create marvelous revenue for the telecommunications carriers, they are actually not yet commercially attractive to the owners of these new sites. In terms of acceptable returns on capital invested for the new site investors, the tipping point is a long way off. Though Google has been commercially brilliant with its re-invention of advertising through its sponsored links with search, its more recent reciprocal arrangement with My Space to place advertisements on its network is not making money. Google’s CEO, Eric Schmidt, said recently that Google – even with more than 100 million videos viewed each day — still had not found the best way to commercialise the site’s audience, stating ‘we have not yet found the perfect monetisation strategy’. And Steve Chen, Chief Technology Officer at You Tube, added that ‘the trouble was balancing the interests of the site’s content producers, the content viewers and the advertisers – or the You Tube ecosystem’.10 Similarly Facebook’s founder, Mark Zuckerberg, has admitted that its social marketing initiative called Beacon has failed. Where these stakeholders stand in terms of future major strategic judgments will be important in shaping the future of this end-user revolution.

And what has this to do with broadband? First up the point needs to be made that so many end users find it difficult to participate posting their own home made videos if they only have access to dial up, or slow broadband. And for end users who merely want to watch You Tube videos on say a 1.2 mbps broadband connection costing $29. 95 a month the experience can be most frustrating. The wait during ‘buffering’ is not only aesthetically annoying but the time taken to eventually see previously broadcast interviews takes about six times as long as the original broadcast time.

The degree of service options partly depends upon the network capacity of different broadband infrastructures, Fttn v FttH. The Telstra chart below shows major network infrastructures, their relationship to new emerging services and the nexus to broadband speeds. Notice how the possible service options are dependent on different speeds;

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9 Goad, Robin , ‘Social networks overtake webmail’, Hitwise Intelligence, 6-11-07.
download digital music at 2 mgps, multi-channel IPTV at 25 mgps and medical transmission at 50 mbps.

Broadband has spawned new ‘kings of connectivity’ who basically sell high speed broadband to give customers a huge choice of service choices. One such company is New York based Dow 30 company company Verizon, which claims to be the leading telecommunications company building fibre-to-the-premises networks (FTTP) in 16 American states — fibre all the way directly to customers homes and to corporate offices. Their focus is on connectivity that leads to demand for greater symmetrical links between upload and download speeds. The Verizon strategy centres not only on delivering a high — quality voice service over the new networks but also on delivering Internet download speeds of up to 50 mbps and uncommon upload speeds of up to 20 mbps. Susan Retta of Verizon argues that ‘our 20/20 FiOS service changes everything by creating an entirely new category of U.S. broadband where ‘fast’ means fast in both directions which encourages applications developers to create even more ways for consumers to benefit from immense upstream connectivity.’ So, she claims, using a 20 mbps upstream broadband connection, a consumer could upload a 250 megabyte file of 200 photos in about 90 seconds, compared with about 47 minutes over a 768 kilobits per second (kbps) upstream connection. A 500 megabyte file, such as 400 digital photos or a medical imaging data set, could upload in fewer than four minutes, compared with about 90 minutes over a 768 kbps connection. A 3 gigabyte (GB) file, such as a one-hour family video shot with a high-definition video camera, can be uploaded in around 20 minutes, compared with more than nine hours with 768 kbps upstream.11

So connectivity is surely a means to an end, and that end will be determined by a range of complex cultural and personal factors of the end users.

Domain Two: Successful models of collective broadband ownership building community services.

An outstanding example of how the forces of social networking are able to find institutional homes with broadband is well seen with one of the most imaginative pioneers of broadband service innovation in the Netherlands. In 2002 the Netherlands Government, in association with several private corporations, constructed an experimental communications model called

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Kenniswijk, which translates as somewhere between ‘knowledge domain’ and ‘smart city’ and which was seen as a vehicle for further energising Dutch society and commerce.

Tenders were called from municipalities wishing to participate in a broadband systems trial, and the first successful submission was from the market town of Nuenen, in the southern Netherlands. Approximately 8,000 Nuenen dwellings, housing around 15,000 people, were connected to a fibre-to-the-home network free of charge, which represented a 96% take-up. The Netherlands government subsidised this experiment for a total cost of €6.4 million (each connection cost €800). Use of the network infrastructure was available to a number of service providers: the Kenniswijk directors considered that it was essential to ensure a separation between the party that operated the network and the parties offering services on the network. Unusually for a telecommunications system, the residents of Nuenen themselves, rather than an internet service provider or a carrier company, own the network: their ownership is formalised within a co-operative society called Ons Net (Our Network). The fibre link operates at a standard 10 mbps in an open network.

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 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. Later 116 submissions were eventually approved and subsidised.13

When the period of free access had ended in this test bed, at the end of 2005, the services became user pays at €60 to €75 per month, depending on bundling discounts. So how did the users respond when they could no longer have access to this system for free? Remarkably at the beginning of 2006, and largely still maintained now, 80% of Nuenen residents chose to continue their broadband subscriptions on a paying basis.

One of the founders of this clever experiment is Kees Rovers, who lives in the Nuenen – famous too because it was Vincent Van Gogh’s home for many years – where Rovers named his business ‘Close the Gap’ on the grounds that to be successful broadband operators ‘must close the last gap between providers and buyers’. Rovers offered (personal interview, November, 2006, Nuenen) his own ‘seven pillars of wisdom’ for anyone who wanted to ensure that broadband worked, for both business investors and communities:

- Build a business model that can be funded.

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12 ‘Fibre to the Home’.
13 Learning by Experimenting, pp. 17–19.
Tipping points for broadband users

- Ensure an ‘US’ feeling with strong emphasis on local ownership.
- Have the ability to offer three basic services – telephony, TV, and super fast Internet.
- Add value through locally generated services and content (local TV, video contacts with doctors, recreation and clubs, churches and schools).
- Develop an extensive ‘communications protocol’ to drive community engagement with individuals, groups, and clubs.
- Focus on customer care with a local emphasis.
- Deliver a high quality network after a rapid build with little disruption to the town.

In August 2008 Roger Darlington, a member of the Ofcom Consumer panel, confirmed the ongoing popularity of this model:

‘Membership of the cooperative costs €20 a month and the full pack age of telephone, television and Internet costs €60 a month. Over 80% of homes are now paying customers of the service.’

Domain Three: Problematic eHealth

Of the many domains where new and valuable broadband services could usefully be developed, electronically based health services (eHealth) are likely to be the slowest to reach any kind of tipping point. In Australia both the Commonwealth and State governments have initiated a raft of constructive experiments and programs in the eHealth domain during the past decade but there is little sense that mainstream programs may soon emerge.

The opportunities for new eHealth services cannot be understood unless they are examined in the context of a complex array of interwoven issues and problems briefly summarized as:

- fragmentation across so many existing health systems
- bureaucratic public policy bottlenecks
- substantial capital investments are required for new systems
- competing entrenched vested interests that wish to maintain the status quo – especially resistance to change by many practising health professionals
- the silo frameworks of so much of the bureaucracy infrastructure
- and, of course, the current lack of widespread availability of high-speed broadband to carry the new health applications

One major problem overrides all of the above – the general lack of trust by patients in electronically based health systems. Clearly, unless patients trust the innovations brought by new technology, little can be achieved. Much of the literature in this field deals with ‘system problems’. Certainly high speed broadband systems have the potential to solve some of important problems but ultimately it will be patients themselves who will decide the extent to which health policies and practices might be widely adopt. The conversations held with people who might be participants in eHealth need to be thorough, systemic, and more far-reaching than the changes it imposes.

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14 R Darlington, ‘How the Dutch Had the Courage To Take Fibre To The Home’, 12/08/08.
15 Summary of key initiatives.
The point ought to be made that some telecommunications based health initiatives could be implemented without necessarily having high speed broadband. Passing reference needs to be made here to two health services popular overseas, but not yet in existence in Australia. First, systems that offer accurate patient records stored in a centralised system, accessible by select health professionals but also available for scrutiny by the person. Second, accessible Internet search health data bases that offer trusted, reliable web based health information which assists self diagnosis.

The benefits from eHealth have the potential to flow to everybody: hospitals, medical specialists, and patients. And distant patients could reap particular benefits to overcome serious disadvantages with high speed broadband.

**Virtual Critical Care Units (ViCCU)**

A successful experiment in collaboration has been undertaken between intensive health care teams at Nepean Hospital in Sydney’s western suburbs and the regional hospital at Katoomba, 60 kilometres away. High speed broadband enables the regional hospital at Katoomba to receive real-time supervision and guidance from specialists at Sydney’s Nepean Hospital. With high speed broadband, real-time consultation between several cardiologists and a patient becomes possible, based on accurate transmission of cardiac ultrasound. Below is a photograph of ViCCU, a Virtual Critical Care Unit developed and installed by the CSIRO, in collaboration with Wentworth Area Health Service and NSW Health.

Its purpose is the real-time management of emergency situations through long-distance supervision from a specialist, and, like other telehealth applications, made possible through high-speed broadband. It is used for various kinds of critical care situations such as the life-saving implications for obstetric emergencies. These kinds of situations share certain characteristics. They:

- are complex
- time-critical
Tipping points for broadband users

- require high levels of patient trust in the system where the focus is on the patient
- require a complex multi-media information space
- involve several members of a team working simultaneously
- need a mode of working driven by broadband application

All of this is achieved through high-quality digital video channels, high-quality audio, vital signs data, written notes, and medical images viewed on well calibrated screens for clear multiple colour recognition. There is a two-way high quality bandwidth video so that interaction is at an optimum. The system is designed to be robust, fault-tolerant, and easy to use in highly stressful atmospheres.16

An assessment of the success of this experiment argues that:

During the first 18 months of using VICCU, 503 patients were treated; the hospital discharge rate increased and fewer patients were admitted as inpatients. VICCU saves beds in intensive care units, where each bed costs as much as $500,000. While large programs like the DCITA/CSIRO CeNTIE program may be able to fund infrastructure for such pilots, others in the research community cannot – a clear indication that a national facility is required.17

Where to go next to reach the eHealth tipping point? The eHealth space provides some of the richest potential for major opportunities and changes that broadband might bring. Gladwell concludes his book by suggesting that the theory of Tipping Points requires that we re-frame the way that we think about the world. ‘In the end, he wrote, ‘Tipping Points are a re-affirmation of the potential for change and the power of intelligent action’. And there is no lack of intelligence within the medical profession who would be able to work with the technologists and other together of good will to take intelligent action to re-shape the health space for the future.

The key tipping point: inclusive public policy

We need new thinking about how to create effective public policy in communications which draws upon understanding how complex social and cultural factors influence the way end users and consumers interact with a wide range of new communication technologies and services. The present communications environment in developed economies has a plethora of information and communications services, of different kinds, that requires difficult advance judgments to be made about the possible acceptability of new products and services by end users and consumers. The best new technologies and services will be those that are created, designed, constructed, and marketed in ways that will be highly adaptive to human needs in user environments of the future. And there are many complex synergies here related to different choices of infrastructure. These dynamics are well understood by many of the telecommunications carriers, potentially new broadband fibre network suppliers, and who are seeking dialogue with, and advice from, informed consumer advocates and applied researchers.

Some will argue that broadband is merely another platform that must find its own way in the market place. So leave it to the commercial providers to find out about how best to market their broadband services and consumers will vote with their feet. But in the context of the

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present NBN tender two questions follow. First, how will the promised $4.7 billion of
government financial support destined to go to the successful tenderer(s) be allocated, and on
what terms? Second, will any of this public capital be used for investigation and development
of potentially valuable consumer services, including those ‘uneconomic’ services such as
eGovernment and eHealth? Present indications are that of the $4.7 billion of public money all
of it is to be invested in broadband network investments, but none of it appears to be directed
to the investigation of broadband services. Why?

And public policy too must also more systematically embrace new understandings of the user
environment and adjust policy settings in user and consumer contexts.

In practical advisory terms the following might be explored:

- Create ongoing specialist working groups with expertise in the communications user
  environment within the principal government department(s) responsible for the
development of national broadband policy.

- One such group should develop and refine a White Paper about National Broadband
  Services Policy, and with special attention to those services that are most likely to need
  public support.

- Such a group should liaise with comparable bodies such as the Broadband Expert group
  (2001+) in the Netherlands, the Broadband Stakeholder Group in the U.K (2001+) to be
  aware of successful services initiatives in other countries.

- Ensure that where tenders are called to build new broadband infrastructure that consumer
  specialists are well represented on such panels.

- Establish an adequately resourced communications consumer peak body, such as the
  proposed the Australian Communications Consumer Action Network (ACCAN) with
  strong expertise in broadband services policy.

Of all the tipping points canvassed here the need to reach out and find the best public policy
processes for inclusiveness may be the most important one of all.