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Three ways to improve the NBN – a broadband policy for the next federal election

Peter Gerrand
Managing Editor, TJA

At the time of writing, the Australia Opposition has agreed that the National Broadband Network will be here to stay. However, if it wins the federal election on 14 September 2013, it proposes to implement the remaining rollout in what it believes to be a more cost-effective way. Given the bipartisan agreement finally reached on the need for an NBN, this editorial suggests three ways in which it can be improved, to the greater benefit of both the community (in social cohesion and inclusiveness) and the national economy – at negligible additional cost to whichever government is in power.

Introduction

The Australian Prime Minister’s announcement of the federal election on 14 September will ensure more interest by voters in comparing the policies of the major political parties. Will broadband be the defining policy decider for victory in 2013 as it was in 2010?

Quite unlikely. The Liberal Party’s manifesto ‘Our plan: Real solutions for all Australians’, launched on 27 January, has carefully minimised its electoral vulnerability by reducing its broadband policy to four dot-points of fairly general principles that can be summed up as ‘we’ll do it better’. The electorate is being reassured that the NBN is here to stay, and the Liberals’ promise is that it will be cheaper and quicker (presumably not in user bandwidth but in installation times). They will ‘roll out super-fast broadband to priority areas’, and ‘end billions of dollars of wasteful expenditure’. No details, but good intentions.

In a spirit of evenhandedness, the purpose of this editorial is to offer all the major political parties – now they are finally all wedded in principle to supporting the National Broadband Network – three ideas for improving the benefits of the NBN. Even better, these three ideas can be implemented at negligible additional cost to the government in power.

1. Reduce the digital divide by extending the future-proof benefit of optical fibre access to much more than 93% of the population – by co-investment.

NBN Co announced on 6 February the welcome news that it will double its satellite and terrestrial wireless access offerings to speeds of 25/5 Mbps downstream/upstream as well as its current 12/1 Mbps offering: the satellite offering in 2015 but its new fixed wireless offering (using 4G wireless technology) by as soon as June 2013. And the new wholesale prices will be pegged to the same prices as the equivalent fibre-based access offerings. NBN Co should be warmly congratulated.
For those living in the more sparsely populated areas of the country, these new broadband speeds will initially be a tremendous boon, especially where broadband services are currently non-existent. Indeed the 25/5 Mbps service will exceed the current pre-NBN maximum speeds available (using ADLS2+) to most premises in the metropolitan areas. But in eight to ten years’ time, when a majority of the population will be taking for granted their daily access to 100/40 Mbps services for teleworking, tele-education, community participation and entertainment – as well as enjoying access to symmetric high definition video telehealth consultations requiring a bandwidth of 10 Mbps each way – the ‘digital divide’ will re-emerge between the areas blessed with optical fibre access and those without it. This new digital divide will significantly limit the benefits of the digital economy to many of those living in rural and remote Australia. Rivalry will inevitably emerge between towns with only fixed wireless and those with superior fibre access, in order to grow their local economies.

It is worth remembering that the Government’s initial NBN announcement allowed for FTTP (Fibre to the Premises) to only 90% of the population; within two years, advances in optical fibre technology enabled NBN Co to increase its FTTP target to 93%. Any further geographical extension of the NBN fibre footprint will presumably reduce the NBN’s Return on Investment to less than the commercially prudent target of 7% – in the absence of co-investment by other parties.

The outcry in mid-2012 by town mayors and even state premiers, who believed their constituents to be inadequately included in NBN Co’s first Three Year Rollout Plan, continues into the present, and will be echoed in another five years’ time by those who have good reason to believe they have been excluded from the benefits available to those with 100 Mbps (and 1 Gbps) access to services via FTTP. And FTTP is the world trend: Stuart Corner’s article in this issue reports that globally an estimated 82% of fibre access solutions during the period 2012-17 will be FTTP, with only 18% being Fibre to the Node.

So the first idea is for the federal government to allow municipalities and state governments (and regional banks and other financiers) to co-invest in the NBN so that their constituents (or clients) can receive 100 Mbps or 1 Gbps fibre access instead of 25 Mbps radio access, thus greatly improving their long-term business opportunities in the new high-speed digital economy. The co-investment amounts to paying the net difference in the cost of supplying FTTH rather than NBN’s fixed radio solution to the target area – which will be small if the town in question is close to an existing transit or backhaul fibre network. Furthermore, in-kind contributions could be included, such as carrying out the necessary earthworks prior to cable laying, under NBN Co supervision.

There are good precedents overseas for co-investment in broadband infrastructure by municipal and regional governments: e.g. in the Netherlands – see (Barr 2006) – and in France (e.g. in the Department de la Manche). Many shire councils in Australia will be motivated to co-invest in NBN infrastructure in order to bring the longer-term benefits of FTTP to their towns and townships rather than the NBN’s lower-bandwidth radio solution. A flexible set of investment guidelines by NBN Co would enable it to increase the penetration of FTTP potentially to 95% or even higher, without sacrificing its overall Return on Investment.

A co-investment policy would increase the utility of the NBN in the second and third decades of its lifetime, benefiting the survival and growth of remote towns and rural businesses, taking further demographic pressure off the large cities. Equally importantly, it will reduce future resentment from those finding themselves on the downside of the digital divide.

Given that the economic life of the FTTP solution is conservatively estimated to be at least 30 years, it would be generally more cost-effective to encourage co-investment at the beginning of an NBN rollout to a new area than to pay to replace radio access by fibre access at a later stage.
2. Upgrade the Universal Service Obligation to include a basic broadband Internet access service, with subsidies to low income households

The Rudd and Gillard governments have made a number of important policy decisions, including ACCC-administered price control of the NBN’s wholesale products, to make the NBN at least as affordable as the current range of medium-speed broadband services, e.g. ADSL2+, available in metropolitan areas.

But the full potential of the NBN to increase social inclusiveness – and to facilitate entry to the workforce via teleworking for unemployed citizens living far from their potential employers – will be hampered if the affordability factor excludes 10% or more of the potentially capable users of the NBN.

Over the past decades there has been bipartisan support for regional subsidisation of the Standard Telephony Service (STS) – and of a telephony-based teletypewriting service (TTY) for the hearing-impaired anywhere in Australia – as well as payphones, via the Universal Service Obligation (USO). Together with the availability of Telstra’s ‘Access for Everyone’ services for people on low incomes, this has ensured a very high level of penetration of telephony across Australia.

Since the Internet became mainstream, there have been calls to recognise the equivalent importance of a basic Internet service to allow full participation in today’s society and in the national (and international) economy, by upgrading the USO to include a basic Internet access service. However submissions of this kind to government reviews in 2003 and 2007 were not persuasive enough to cause any significant upgrade of the USO. Indeed Section 123 of the 2012 TUSMA legislation allows the Minister up to year 2017 before calling for a fresh review of the Standard Telephone Service and other services supported by the USO – even though the underpinning network technology of the NBN is Internet Protocol based.

It is obvious that a basic telephony service alone is no longer sufficient as a communication medium to enable one to fully participate in society, let alone the economy; one needs Internet access. Since 2008 Switzerland, Finland and Spain have legislated for the provision of a Universal Broadband Service, usually at the ‘entry level’ broadband access speed of 1 Mbps. We need this safety-net option here too, to ensure Internet access is available to all citizens, irrespective of their means. A means test can be applied to ensure this option targets those who otherwise cannot afford to use the Internet at home. Once users have access to such a basic broadband service via a tablet or other terminal device, they can immediately take advantage of very cheap Internet telephone services such as Skype. In this ways a Universal Broadband Service (UBS) will simply absorb and replace the Standard Telephone Service (STS) – and will offer far greater utility.

Furthermore the hearing-impaired can use sign language via the screen of any standard terminal – as well as email and other useful text communication services. Thus the Universal Broadband Service can automatically subsume not just the STS but also provide a great improvement on the currently subsidised TTY service.

The economists Joshua Gans and Stephen King have suggested that by making a basic 1 Mbps broadband service available to all households, together with a basic terminal device (connectable to the NBN’s Network Termination Unit) to low income households, the government could use the NBN to reduce its own costs in providing public services. The service could potentially pay for itself by lowering government costs in areas such as social security and taxation. (Gans & King 2010: 183)

So the second idea is for the government in power to commission a cost-benefit study by a competent social economic research group to rapidly check out the Gans-King hypothesis. If Gans and King are right, the provision of a means-tested Universal Broadband Service, including appropriate mass-produced terminal equipment (e.g. a tablet device with WiFi router), could be partly or wholly subsidised by extracting funding from the government...
departments and agencies expected to reap the tangible savings achieved if the large majority of their clients can become accessible online.

Of course the national benefit from getting most of the nation’s poorest households online will be far greater. They will thereby have cheaper access to community organisations, extended families and other support networks; to online education, training and health services; and to potential employers.

It should be pointed out that whereas the current USO has been based on achieving geographic equity of access to standard telephony services between rural and metropolitan Australia, this new proposal for an entry-level Universal Broadband Service is about ensuring that citizens are not excluded from broadband services by poverty, no matter where they live. After all, the NBN itself will be providing universal broadband access: as a free infrastructure connection, but not of course with a free or subsidised broadband service to go with it.

This idea will be fleshed out further at the Australian Communications Consumer Action Network’s Affordability Seminar in Melbourne on 27 March.

3. Accelerate broadband uptake through a national awards scheme to recognise community participation

Marcus Bowles’ paper in this issue, reviewing the results of early field trials of the NBN in Tasmania, Victoria and NSW, highlights the importance of teaching ‘e-skills’, i.e. the essential ICT and digital literacy skills needed to readily access and utilise the Internet, in ensuring that end users can make good use of the Internet to assist both their careers and (where relevant) their businesses.

The Australian Government’s $15.2 million Digital Hubs and Enterprise program, announced in July 2012, is commendably designed to address the current deficiency in e-skills, especially in the regions and amongst older age groups, as well as demonstrating the potential benefits of using the NBN.

One also notes NBN Co’s incentive scheme to increase take-up, whereby Retail Service Providers migrating will be paid $108 for each retail customer that they migrate from the copper-access telephone network to the NBN: a win-win-win situation for the RSPs, NBN Co and the end users.

There is however one potential benefit that seems to have been overlooked in policies aimed at deriving the maximum benefit from the NBN, whether it is the ALP’s large scale project with a 30+ year horizon or the Coalition’s shorter term, smaller budget project with greater emphasis on catch-up: i.e. rectifying market failure in the supply of broadband at current (pre-NBN) speeds. That is the national benefit to be derived from achieving greater social inclusiveness and social cohesion across the nation.

Social cohesion and inclusiveness, as well as economic growth, can be stimulated by greater levels of community participation via high-speed broadband in community projects – whether they be support networks, heritage projects, local history societies, websites for exchanging skills or local produce, or simply encouraging greater use of existing community facilities. Online communication and information flow can augment the precious face-to-face contact and participation that builds a community, especially for those community members who find themselves isolated by either distance, physical or economic disability, linguistic barriers or simply time-poorness through having to give greater priority to family and work commitments.

So the third idea is to augment the current range of Australia Day awards, currently confined to individuals, with national awards for the best online initiatives by community groups that serve to grow their communities and bring them productively together.

In summary, will the major political parties be open to new ideas such as these, seven months out from an election? One lives in hope. Let’s not give up on achieving better
outcomes from our world-leading NBN infrastructure project – what the guest editors for this issue have suggested is another ‘great wonder of the world’.

* * * * * * * * *

This issue of TJA has as its major theme, that of ‘early experience with high speed broadband’. We’ve taken a broad perspective (as usual), beginning with two papers on global developments, then a close look at the cross-Tasman experience, before focussing on the emerging Australian NBN-related experiences with a further five papers. TJA is grateful to John Costa and Mike Miller for serving as guest editors for this important theme; thanks to their efforts, we are expecting a further three papers on early experience with the NBN to appear in our May 2013 issue.

Lastly I want to draw your attention to Liz Fell’s fascinating interview with the ABC’s chairman Jim Spigelman (this Journal devotes a lot of attention to digital media), and to perhaps the most valuable reference paper in this issue, Giles Tanner’s account of the historical evolution of policy on spectrum re-farming in Australia to achieve the hoped for ‘digital dividend’.

References


Liz Fell

The Hon James Spigelman AC was appointed in April 2012 as chairman of the Australian Broadcasting Corporation for a five-year term. Previously, he was Chief Justice of the Supreme Court of NSW and Lieutenant Governor of NSW (1998-2011).

Spigelman was admitted to the NSW Bar in 1976, and appointed a Queen’s Counsel (QC) in 1986. He has served on the boards of a wide range of cultural institutions including: chairman, National Library of Australia (2010-2012); member/chairman, Australian Film Finance Corp (1988-1992); member/deputy chairman, Art Gallery of New South Wales (1980-1988); and president, Museum of Applied Arts and Sciences (1995-98).

When a Labor government with Gough Whitlam as Prime Minister was elected in 1972, Spigelman became Whitlam’s Senior Adviser and Principal Private Secretary. He was appointed Secretary of the Department of the Media in 1975, and was moved to the Australian Law Reform Commission in 1976 after the Fraser government was elected.

Spigelman gained a Bachelor of Arts degree in 1967 (Government and Economics Honours) followed by a Bachelor of Law degree in 1971 (First Class Honours and the University Medal). In 1969, he became President of the Students’ Representative Council, and a Student Fellow of the University Senate. He received a Doctor of Laws (honoris causa) from the University of Sydney in 2004 and a Doctor of Letters (honoris causa) from Macquarie University in 2012.

In 2000, he was awarded the Companion of the Order of Australia (AC) for services to law and to the community in bringing about changes in attitudes to the administration of justice for a more fair and equitable society, and the support of visual arts.


Freelance journalist Liz Fell interviewed Spigelman for the TJA in his ABC office at Ultimo in Sydney in late January. The interview text has been lightly edited.
TJA: Thanks for giving up your precious time for this interview. As I researched your career, I became fascinated by your personal journey from political activism to contributions as a public intellectual. Do you agree with those terms?

Spigelman: I haven’t been a political activist for well over 30 years, closer to 40 years, depending on how you define the term. Public intellectual, perhaps. It’s not a label I’ve used myself I think, but I’ve made a series of contributions to public debate both in speeches and in published works.

TJA: Indeed, you still comment and raise questions in public debates.

Spigelman: Yes, I continue to do that.

TJA: For instance, one of your recent public contributions was to comment on the Federal government’s proposal to include ‘offend’ in the definition of discrimination.

Spigelman: Yes, that’s the most recent contribution I’ve made. In some respects, that represents the hat that I’m wearing in that the ABC has a strong interest in any form of regulation of speech, but obviously it isn’t based only on that. It’s based on my own background and speaking on human rights even before I became chairman of the ABC.

TJA: When did your interest in human rights begin? I’ve read that you started a China Society at Sydney Boys High School to counter prejudice of Chinese students.

Spigelman: That was my first political activity! There was an American exchange student, and the headmaster of the time set up a committee to help him, to make sure he had billets and was entertained by all kinds of families. The school also had a dozen or more Colombo Plan students from various parts of Asia – they weren’t just Chinese, though the majority would have been ethnically Chinese – so I went to the headmaster and said, ‘You’ve never done anything like this for them,’ and he allowed me and some teachers to set up a committee to do the same sort of thing. That was my very first act of political involvement.

TJA: At the University of Sydney in the mid-1960s you joined the Freedom Ride led by Charles Perkins to highlight the racism and segregation of aboriginal people in country towns.

Spigelman: Yes. I got involved in the Freedom Ride partly because Charlie Perkins and I used to sit next to one another in Government 1 classes!

TJA: And I taught him in Psychology 1 classes! Were you involved in student activity opposing conscription and the Vietnam War?

Spigelman: Oh, yes, the SRC [Students’ Representative Council] organised anti-conscription demonstrations. That started before I became President, but continued, and there was a bail function. The most interesting experience was when the Russians invaded Czechoslovakia in 1968, and there was to be a demonstration. I was asked about how much money we should take out of the bank for the demonstration, and I said, ‘We won’t need it. No-one will get arrested at an anti-communist demonstration.’ Well, I was quite wrong. Quite a number of people climbed a wall of the Polish consulate, and we didn’t have any money! But it was the night of the dinner of the Vice-Chancellors’ conference of the British Commonwealth at the old Trocadero, and so we got our Vice Chancellor, Bruce Williams, to take myself and the SRC secretary, Joe Skrzynski – now chair of the SBS – around the Vice Chancellors of the British Commonwealth asking them for cash! We raised a few thousand dollars that night, bailed out the students, and repaid the Vice Chancellors the next day.

TJA: That must have been a ‘heady’ period!

Spigelman: Yes, in those days I was a political activist.
TJA: And at this stage you also wrote a book titled, *Secrecy: political censorship in Australia*?

Spigelman: Yes, that was important for the Whitlam government’s election campaign. It led to Whitlam, in his 1972 policy speech, promising a Freedom of Information Act, and it directly led to a committee of which I was a member, drafting the Act. It wasn’t finished at that stage, but I remember that the first time anyone advocated a Freedom of Information Act in Australia was when I gave a speech at the Australian Institute of Political Science Summer School in Canberra. And the person who opened the discussion criticising my idea was the then Minister of Defence, Malcolm Fraser. Eventually, it was taken up by Bob Ellicott when he was Attorney-General, so the first Freedom of Information Act was passed under the Fraser government!

TJA: Was the use of the term ‘political censorship’ in the title thought out carefully?

Spigelman: Oh, at that age you don’t carefully think out titles. It was an activist title, let’s put it that way.

TJA: And as an activist, were you enthused by Labor’s quest for government after some 23 years ‘in the wilderness’ and the ‘It’s Time’ election campaign?

Spigelman: That’s right. This was a political book, and it was intended to be.

TJA: So when Whitlam won the Federal election in 1972 you became his Senior Adviser and Principal Private Secretary?

Spigelman: Yes. At first, I was number two in Gough’s office and Peter Wilenski was his Principal Private Secretary.

TJA: I have read that the parliamentary offices for you and Peter were located in what Whitlam dubbed ‘the Polish corridor’ because you both came from Polish backgrounds!

Spigelman: That’s right. Peter left just after the 1974 election, and that’s when I became Principal Private Secretary.

TJA: Did you join Whitlam on his trip to China in 1971 before he became Prime Minister?

Spigelman: I wasn’t on the first trip he made as Leader of the Opposition, but I went with him in ’74 when he visited as Prime Minister. That trip was pretty fascinating because the Gang of Four was still in control, and Zhou En-Lai had brought Deng Xiaoping out of house arrest the week before we arrived. Deng Xiaoping was our formal host, the person who took us to the Forbidden City, the Temple of Heaven and so on, although the leader of the formal talks was Zhou En-Lai. That week, one week after Deng Xiaoping was brought out, was the beginning of the biggest transformation in China, a really important period. In retrospect, a crucial period.

TJA: For you, the next step was in mid-1975 as the Secretary of the Department of Media under Dr Moss Cass as Minister.

Spigelman: That’s right.

TJA: What were the major issues for that very short period because of the Whitlam dismissal in November?

Spigelman: Well, the FM decision was made by then, namely, to introduce FM radio. For years, FM radio had been regarded as too difficult with spectrum issues, but that proved to be technically wrong. I remember bringing Brian White [former Macquarie journalist] into the Department, and appointing him to create SBS Radio, which he did. White negotiated the first allocation of SBS Radio time: how many hours for the Greek language? How many hours for Italian? How many hours for Croatians? And it was hard to change those times. It was a bit
like the Church of the Holy Sepulchre in Jerusalem where whoever was there when it was first built had allocations of space, and the Protestants, who weren’t there at the time, had none. It’s changed from time to time, but it’s still a very hard thing to do.

**TJA:** My memory, if it is correct, is that you were very involved with setting up SBS…

**Spigelman:** I did that when I was on Whitlam’s staff. The people who were committed to it, against the reluctance of some members of the government, were myself and Al Grassby. We made sure it was created, obviously acting with the authority of the then Prime Minister, and when I got to the Department of the Media, it was a question of actually setting it up.

**TJA:** As the Departmental Secretary, what other media issues were important?

**Spigelman:** In the media area, probably the biggest change during that period was breaking open the radio spectrum with FM. Australian manufacturers, at that stage, used to make radio sets with the call sign for 2BL at one end and for 2SM at the other, and you didn’t expect any new radio stations to be on air. That all changed with the ability to use less spectrum. It was a big argument, and there were vested interests who didn’t want any new radio stations.

**TJA:** Didn’t the introduction of cable TV surface at one stage?

**Spigelman:** Not really, not yet. People talked about it but nothing happened much.

**TJA:** Whitlam’s dismissal in November 1975 and the election win by the Fraser government must have been a complicated time for you. I think that at the beginning of 1976 you moved to the Australian Law Reform Commission?

**Spigelman:** Yes, I worked there full-time for exactly one year. Bob Ellicott, who became Attorney General, basically said, ‘I’ll find a use for him’. So there was a defamation reference, an insurance reference, things like that, and I wrote something for the Law Reform Commission about sanctions and remedies. But it was basically because I was a Permanent Head, and in those days Permanent Heads were permanent, and Secretaries of Departments couldn’t be sacked! Nobody was prepared to sack me because of the precedent it would form, but I did tell the incoming government at the outset that I was perfectly happy to remain a public servant, that I would wait a year, and if they didn’t find me something that I could do within the year, I would resign. As I understand what happened, nobody was prepared to have me (laughter) and, in the end, I did resign but I stayed on as a part-time member of the Law Reform Commission.

**TJA:** What came next?

**Spigelman:** For three years I travelled around the world writing a book on nuclear energy called *The Nuclear Barons*.

**TJA:** Did you have your ‘activist’ hat on at this stage?

**Spigelman:** No, it wasn’t a pro or anti book. It was a political history about the hydrogen bomb at first and then the political history becomes a history of electricity production. I never got into rockets and strategic theory and that sort of thing. I had a co-author who was a London *Sunday Times* journalist, and we got an advance which was as big as Norman Mailer’s advance to do the book. It took a long time to go around and interview people.

**TJA:** Who was the generous publisher?

**Spigelman:** Holt, Rinehart and Winston, a United States publisher!

**TJA:** Meanwhile, when you began to practise as a barrister at the NSW bar in the 1980s, I think media law was one of your major interests?
Spigelman: Yes, I had a very substantial practice in broadcasting. I think I appeared for and advised all of the major television stations on broadcast policy at some stage.

TJA: Only the commercial stations?

Spigelman: No, I did a lot of work for the ABC as well. I remember a series of internal issues, staffing issues and things like that, but I also represented the ABC in Lange, the political freedom of information case that went to the High Court.

TJA: Did you represent News Limited in the Super League case?

Spigelman: No, I was for the ‘loyal’ clubs, including my own club of South Sydney. I couldn’t possibly have taken a brief against them!

TJA: What about the Network Ten hearings before the Australian Broadcasting Tribunal in the mid-1980s when Murdoch assumed American citizenship. I recall seeing you there at some stage!

Spigelman: Yes, I was at the Tribunal for the hearings and other matters that flowed from that. Before Murdoch became an American citizen, I was a junior Counsel for the Ten Network in its renewal of licence applications in both Sydney and Melbourne and its radio station licence in Mareeba on the Atherton Tablelands. I had to go to Mareeba at least twice, maybe three times, to explain why it was that it hadn’t been sold etcetera, and that there wasn’t a problem. By that time I was a QC, but I had started off as a junior. In the hearing about Murdoch’s control, I represented a group called the Pemberley Trust, which was now controlling Channel Ten, and the issue was whether or not News Limited, and Rupert Murdoch in particular, continued to have some sort of indirect control. I was, as it were, on the News Limited side but representing a parallel interest in that area. In any event, the interest in the Pemberley Trust was sold on and so, in the end, there wasn’t a resolution of that hearing because it was unnecessary.

TJA: Meanwhile, through your membership of the boards of various public cultural institutions, have you built up a body of knowledge about film and television financing and content?

Spigelman: The most relevant one for the ABC was the Film Finance Corporation.

TJA: That must have helped you understand where government funding for production went and what was seen as a good ‘deal’ etcetera.

Spigelman: Well, I understood more. I had been on the Film and Television School board which was ex officio of my still being Secretary of the Department of Media. I just continued in that for some years, and didn’t resign when I stopped being in the Department.

TJA: Your big career move was in 1998 as Chief Justice of the NSW Supreme Court where, during the 13 years there, you produced a large and fascinating body of writing. I’m no lawyer, but I found myself dipping into speeches on widely diverse content like psychology and domestic violence. I think there are about 180 speeches?

Spigelman: Yes, 170 something. There are three volumes, and they’re all online as well.

TJA: The speeches contain a substantial amount of historical research and I have read that history was regarded as a ‘safe’ area for you as Chief Justice. Is that a correct observation?

Spigelman: That’s right. As Chief Justice, what you call ‘activism’ wasn’t an option!

TJA: Well, you revealed your view on aboriginal land rights through a ‘Welcome to Country’ ceremony, and the judges sitting in the court apparently followed suit.

Spigelman: We had a special ceremony on the 175th anniversary of the Supreme Court, and I invited Whitlam to speak on behalf of the bar and Howard, who was then Prime
Minister, to speak on behalf of solicitors. The ceremony was unknown in public life at that stage, although it had happened. I had come across it first in a church, and so I decided that was a good idea. And you could have heard a pin drop. No-one knew what was happening other than the speakers! I cleared it with Whitlam, Howard and Carr [then NSW Premier], who all spoke, and with one of my judges, the President of the Court of Appeal, who knew. But no-one else in the room knew it was going to happen.

**TJA:** Did anyone complain?

**Spigelman:** The law is a wonderfully hierarchical institution: no-one complains to the Chief Justice!

**TJA:** Do you miss the collegiality that went with the job of Chief Justice?

**Spigelman:** I don’t miss the operations of the Supreme Court. I was there for 13 years. That’s enough! I made friends obviously, but it was a demanding routine and it’s very nice to be in control of your own time.

**TJA:** Thinking of your early interest in cultural diversity and racism, I noticed your strategy to set up relationships with judges or courts in the Asian region, especially China. Was that a worthwhile exercise?

**Spigelman:** Yes, I went to China as Chief Justice about five times, and sent eight or nine other delegations of my judges, usually to lecture at the national judicial college in Beijing, and that continues. At the end of my period, I had executed formal Memoranda of Understanding with three provincial high courts to continue the exchanges. I also organised and led the first judicial delegations to Japan and to India from Australia. It’s something I’m still doing. I was recently in Singapore at the invitation of the new Chief Justice to attend the opening of their legal year. That was a trip that was privately paid for by myself. It wasn’t part of the ABC in any way.

**TJA:** Aren’t you involved in serving as a referee or conducting adjudications in other countries?

**Spigelman:** Yes, I have become involved in international commercial arbitration. I’ve joined chambers in London where a lot of this arbitration is done, and I’ve conducted arbitrations in London and in Singapore and had a role in Canada.

**TJA:** How is your ability to speak Chinese?

**Spigelman:** Non-existent, but two of my children speak Chinese, and one is currently in Beijing studying medicine.

**TJA:** Turning to the ABC, when you spoke at a conference staged by Ripe (Re-Visionary Interpretations of the Public Enterprise) last September, you suggested that, in some respects, the ‘very concept of broadcasting’ was ‘under challenge’. Are you optimistic that free-to-air broadcasting will continue to survive?

**Spigelman:** Well, obviously there is a major effort going on now to clear the analogue spectrum. That’s well advanced, the re-stack is going ahead, and the ABC has the money to do it. Whether or not it can all be done on the current timetable is a matter to be seen, but everyone is trying to do it on the timetable. It’s a major investment and, at the end of the day, the government expects to sell the spectrum. All of that is on the agenda.

But that’s not the only issue. For free-to-air television there is no ‘cliff’ of the character of the loss of classified advertising that impacted so quickly on the print broadsheets but there is, nevertheless, a threat of slow erosion in commercial broadcasting and television. If you’re based on selling eyes or ears, as the eyes and ears go off to other places then you don’t have the same numbers, and slowly your revenue will be affected.
TJA: You spoke also about new modes of delivery that enable listeners and viewers to arrange program schedules so they can access them when they choose, but don’t these new modes require payment by the public for bandwidth and/or access?

Spigelman: That may be true, but the only honest answer is that no-one knows where this is going. There are all sorts of business models that have emerged in different areas, and some of them will work and some of them won’t.

TJA: Do you expect that income differences will limit the options open to some viewers/listeners?

Spigelman: One thing that we have which, I think, is a core and traditional policy in Australia, is universal access. That’s the difference between the diversity the ABC can provide in its various networks and, say, a Foxtel subscription system. Now that universal access is completely a gift of the government. Comparatively, it is now cheap to get the ABC through the airwaves. If you are accessing it via other devices, particularly mobile devices, then there is a charge to be paid to the telcos. I think it’s now got to the stage where 50 percent of access to iView is on mobile devices. That’s very quick. I mean, the iPad is only two years old and it’s taken over in so many areas because of its convenience! Only two, and it feels like it’s been here forever!

TJA: In relation to business models, it is interesting to hear ABC radio programmers suggest the audience post their comments online with Facebook, a commercial media platform that delivers this audience to advertisers.

Spigelman: I’m not on Facebook, but that’s its business model. It also delivers information to individuals and to groups of individuals.

TJA: What about Twitter?

Spigelman: I don’t use Twitter. I’ve got other things to do with my time! Maybe I’m just set in my ways!

TJA: You don’t follow some of the ABC twitterers?

Spigelman: No. I know what Twitter does but I just don’t need to know things immediately. I prefer to have time to think.

TJA: Has the ABC commissioned research on these social media?

Spigelman: It’s interesting to see the comparative demographics. Radio National has struggled to get 10,000 Facebook friends but it is over that now, whereas Triple J has shot through 500,000.

TJA: Moving to the controversial issue of a staff-elected member for the ABC board, what is happening there?

Spigelman: It will happen next year some time.

TJA: Next year?

Spigelman: Sorry, this year. I’m not quite sure of the dates but the regulations are being made. It will be for five years.

TJA: And the former staff-elected board directors will not be eligible to stand again. Is that correct?

Spigelman: Yes. That’s in the statute.

TJA: I asked several staff members whether they had ever talked with you about this or other issues and was told that there appears to be some sort of rule or regulation introduced under the Howard government that requires the managing director be present at the same time. Is that correct?

Spigelman: There’s no such regulation. I’ve spoken directly to members of staff at an executive level, and I have met others at functions and had no inhibitions about
Talking to them. There is a board policy – it’s not a regulation, and it may or may not have been adopted as a board policy during the Howard years, I don’t exactly know – that individual directors should not communicate directly on policy matters without the CEO knowing or with his approval. I can’t remember the exact terminology, obviously, but it’s something of that kind.

**TJA:** Do you ever wander into the coffee shop in this building?

**Spigelman:** Yes. I have had chats with people in the coffee shop – quite a number. I don’t go there very often for various reasons, mainly because of the quality of the coffee! But I have had numerous conversations with individual staff members at various ABC functions.

**TJA:** I’m sure you hear complaints or comments about outsourcing and the ABC’s loss of in-house TV production.

**Spigelman:** Yes, I’ve heard some comments of that character!

**TJA:** Are you an ABC viewer or listener?

**Spigelman:** I tend to record things and watch them later. I’m not a reality TV watcher so I don’t need to watch things live, except for sport!

**TJA:** What about listening to radio?

**Spigelman:** With radio, I listened to Classic FM and Radio National over the years. When I was at the court, I would listen to AM and PM virtually every day because I was travelling at those times. It’s a great format.

**TJA:** What about when you are out of the country? Have you been watching Australia Network?

**Spigelman:** Yes, I’ve watched it in a couple of places, particularly Hong Kong and Singapore. As I said, I was in Singapore a few weeks ago, and the comment I got most frequently from some expatriates and other locals who have had contact with Australia was, ‘Can we please have News 24 too?’ The main problem is that there are geo-blocking issues: namely, News 24 does show things from the BBC, for example.

**TJA:** I assume that’s a copyright issue?

**Spigelman:** Yes.

**TJA:** What other observations have you made about the ABC?

**Spigelman:** Well, I didn’t arrive with any agenda so, as I’m learning more, I’m making, perhaps, some suggestions. We have some big issues: the current one is the tri-funding of the ABC and responses to the Convergence Review.

**TJA:** What about the current Senate committee inquiry on the ABC’s commitment to ‘regional diversity’ and ‘increased centralisation of television production in Sydney and Melbourne’?

**Spigelman:** That flowed from the decision to close Tasmanian production. The extent of production outside Sydney, Melbourne and Adelaide is a continuing issue because it’s about how much you do in-house and how much you do by way of contract with the independent sector. There is no right answer as to where the balance is drawn.

**TJA:** When you talk about the ‘independent sector’ I assume you are talking about private companies or, as some would say, ‘privatising’ production?

**Spigelman:** You can call it what you like but, yes, a lot of what we do now by comparison with a decade ago is outsourced, privatised, whatever label you think is pejorative enough for your purpose! (Laughter)

**TJA:** Thank you!
Spigelman: There is still major production work in-house, but the high-end drama is produced under contract.

TJA: Is that all about funding shortages and budgets?

Spigelman: It’s partly funding and budgets, but it’s also quality. You can gear up through external funding and produce a higher level of quality than you can produce internally. That doesn’t mean there aren’t shows that you can do internally. There are quite a number.

TJA: Let’s not continue with the thorny debate on how quality is assessed! Can you explain briefly the impact for the ABC of the policy ideas arising from the Convergence Review and Finkelstein’s Independent Media Inquiry that are still awaiting a Government response.

Spigelman: Well, as I understand it, the Government has had a process underway which will at some stage – I don’t know exactly when – reach a culmination. There will be some decisions made, but we don’t know the extent of those decisions, and it overlaps to some degree in terms of timing with our own tri-funding. We’ll have to just wait and see. But there’s no question that the Convergence Review, and before that the Finkelstein Inquiry, came up with a range of matters that are of interest to the ABC and that may affect our future trajectory. Obviously, also, they involve an impact on virtually every other sector of the media, so we’re all waiting for this to end: but it will end at some point!

TJA: Well, who knows? Rupert Murdoch’s News Limited is not going to disappear tomorrow and his news media, especially The Australian, tend to target the ABC in a whole variety of ways.

Spigelman: Yes, it sometimes becomes quite amusing!

TJA: You don’t bother to put pen to paper or respond?

Spigelman: No, but I may one day.

TJA: A touch of activism, perhaps? Clearly, you are fascinated with the changing media environment.

Spigelman: Yes, and part of the fascination of being involved in the media at this stage is the quite radical changes that we’re going through, in that you cannot predict what’s down the track a few months beforehand. As I said a few moments ago, the fact that the iPad is only two years old is amazing!
The ‘digital dividend’ as a case study in spectrum re-farming

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The re-farming of spectrum (i.e. its reassignment to services with a higher value), triggered by free-to-air television digitisation and the switch-off of analogue TV, represents a significant microeconomic reform. Digitisation has already transformed the television industry, and analogue TV switch-off will yield a ‘digital dividend’ for wireless broadband as well as further benefits to television itself. With soaring growth projections for mobile data traffic creating pressure for further spectrum allocations for wireless broadband, lessons learned from the digital dividend process are liable to influence government approaches to spectrum re-farming in future. This article considers the development, over two decades, of an original policy ‘blueprint’ for TV digitisation in Australia as a case-study in spectrum re-farming. While it is too early to judge its full effects, some preliminary lessons are drawn from the various approaches that have been considered and adopted or discarded along the way.

Introduction

In December this year, the last analogue television transmitter in Australia will be turned off. This unprecedented government intervention in the way Australians inform and entertain themselves is the most visible part of a larger process of micro-economic reform of spectrum use, designed to strengthen the television industry and enable world-class wireless broadband services. The Australian plan for a ‘dividend’ from TV digitisation has already transformed Australia’s free-to-air TV offering and promises to deliver further benefits, including:

- Harmonisation of Australia’s 700 MHz allocation for broadband wireless with the Asia-Pacific Telecommunity (APT) 700 MHz plan, providing more ‘waterfront’ spectrum below 1 GHz for growth of wireless mobile broadband than the US or European alternatives; and
- The ‘six channel block’ configuration for terrestrial TV services, which will make the most efficient possible use of the remaining broadcasting services bands, with long-term advantages for viewers (who will require only one antenna for services) and broadcasters (whose identical coverage areas may assist with future innovation of the free-to-air television platform).

Since the early adoption of AM radio in the 1920s, Australia has been slow to introduce broadcasting innovations. It delayed the introduction of analogue television, FM radio and pay TV for decades after the United States. With the emergence of digital terrestrial television technology, the country rejoined the ranks of early movers and developed, step by step and over an extended period, a digitisation blueprint of its own. Now it is on-track to turn off its last analogue television service only four years after the United States. Its digital dividend plan even provides a blue-print suitable for later-moving economies to copy or adapt, complete with opportunities to leapfrog Australia by adopting more advanced technical standards.
Given the enduring consequences this blueprint will have for our communications sector, what is there to learn from Australia’s experience as an early mover in television digitisation? In this article, I have examined the digital dividend as a case-study in spectrum re-farming.

Figure 1 - Boundaries of Australia's UHF broadcasting allocation, showing the 126MHz ‘digital dividend’ and the location of the APT 700 MHz frequency division duplex (FDD) plan (698-806MHz).

Development of the digital dividend blueprint

Australia's approach to the digital dividend developed in three discernible phases over an 18-year period.

1. **Phase 1** (1993-2000) was exclusively concerned with digitisation of the analogue television service. It was driven by television industry requirements and made detailed provision for the ‘simulcasting’ of analogue and digital television as a prelude to the eventual replacement of analogue.

2. **Phase 2** (2001-2007) was a period of consolidation and learning from experience. Digital television was switched on in most major markets and the government reviewed and adjusted the regulatory settings where appropriate to increase take-up.

3. **During Phase 3** (from 2007) the focus turned to how analogue television might be switched off. It was only at this stage that the nature of any digital dividend resulting from the return of so many television channels received detailed attention, and analogue switch-off came to be recognised as a means to an end and not simply a goal in itself.

The article describes the major developments during each phase and makes some observations about what has been learned along the way. It also considers a couple of alternative paths that were identified but not taken. These highlight the risks of reaching premature conclusions about the ultimate goal and benefits of spectrum re-farming. Lastly it makes some observations about the future, noting that the job of realising Australia’s ‘digital dividend’ is not yet done.

**Phase 1: Digitisation of the analogue television service (1993-2000)**

The ABA Specialist Group

Key planks of the eventual policy for digitalisation of analogue television in Australia were developed between 1993 and 1997 by a joint working party of engineers from the television industry and the federal communications portfolio: the Australian Broadcasting Authority (ABA) Specialist Group on Digital Terrestrial Broadcasting. Membership was limited by
invitation to broadcasters and television equipment suppliers, though telecommunications representatives participated. Findings and recommendations were developed by consensus. Despite publication of a first report for comment in 1995, there is little evidence of interest from other industry sectors (ABA 1997).

1993 is significant as the year licensing of subscription television broadcasting services got seriously underway. The forward to the 1997 Final Report makes the connection unambiguous:

*The terrestrial television industry now faces substantial competition for its audience from subscription based television broadcasters. These new players have the opportunity to use new digital technologies to enhance their service offerings. Eventually, they may be able to marginalise those services which are locked into analogue delivery (ABA 1997, pg. 13)*

In other words, the threat of competition from emerging new platforms was what pushed the Australian broadcasting industry into early adoption of digital technology.

Three findings in particular were to prove both influential and contentious:

- High definition TV (HDTV) would be critical to marketing digital TV, but market-driven development of the service might also require ‘limited’ multi-programming (i.e. multichannel services);
- All broadcasters strongly supported the principle of access to a full 7MHz digital channel for each existing analogue channel;
- The full 7MHz channel was required to deliver HDTV programming for all or part of their program hours (ABA 1997 pp 23, 26).

The Final Report contains little speculation about what might be done with the spectrum handed back after analogue switch-off. As digital TV could use the vacant, interstitial channels required for analogue television operation, introduction of digital television could be accomplished using existing TV broadcasting services bands spectrum, with analogue channels eventually vacated following a period of simulcasting. Some VHF TV Bands were known to be unsuited to digital television and would be available for other uses. Otherwise, the findings imply that it is too soon to decide the fate of vacated analogue channels but that further development of the terrestrial television service would be the likely use (ABA 1997, Findings 16.5 and 16.6, pg 27).

**The first legislation**

In 1998 and 2000 the federal government passed two major pieces of legislation relating to digitisation of the analogue television platform.

The 1998 amendments enacted key recommendations of the Specialist Group, including the offer to existing broadcasters of an entire 7MHz channel at each analogue site (Alston 1998). Other key features included:

- Commercial and national broadcasters required to ‘simulcast’ digital TV in metropolitan areas from 1 January 2001 and in regional areas by 1 January 2004;
- Broadcasters required to achieve the ‘same level of coverage and potential reception quality’ for a digital TV service as is achieved by the transmission of that service in analogue mode (‘the same coverage test’);
- The simulcast period to run for a statutory minimum period (nine years in the case of metropolitan markets) or such longer period as the government determined.
- Explicit provision for the ultimate return of the analogue channel after the simulcasting period.
The government also helped with the cost. As well as paying for the digitisation of the two national networks, it announced a Regional Equalisation Plan, commencing in 2000-01, to provide up to $260 million over 13 years to commercial broadcasters in regional and remote Australia. The sum represented 50% of the estimated costs of digitisation. Though the metropolitan commercial broadcasters were expected to pay their full digitisation costs, the prohibition on new commercial TV entrants was extended until the end of 2006 in recognition of their expensive transition to digital (Alston 2000).

Unlike the smooth ride enjoyed by the Specialist Group process, the Government’s policies were widely attacked by other parts of the media industry. Criticism focused on the extension of the moratorium on further commercial television broadcasting licences and the ‘free’ loan of an entire 7MHz channel to each broadcaster. Much was made of European precedents, where multiple analogue TV services were required to share digital multiplexes and each given sufficient bandwidth only to carry a Standard Definition (SD) TV service. Facing public opposition and lobbying from other parts of the media, in December 1999 the government announced what were in effect two substantial departures from the Specialist Group’s recommendations (Alston 1999b).

First, it tightly restricted how commercial broadcasters could use their 7MHz channels. If HDTV was the rationale for giving them an entire channel each, then HDTV would be all commercial broadcasters would be allowed to transmit. Subsequently, doubts about the effect on receiver prices of permitting broadcasters to transmit in HDTV format alone led to a requirement that the analogue service be transmitted in SDTV format as well. The result was the so-called ‘triplecast’ requirement, with commercial broadcasters required to transmit the same content in three separate technical formats: analogue (PAL), SDTV and HDTV.

The government’s second response was to announce the sell-off of vacant digital television channels to new players, but on very restricted terms. The Specialist Group had found that six digital channels could be planned in each area during the simulcast period. By taking a few short-cuts (notably use of very wide area single frequency networks) the ABA was able to find a minimum of seven channels in all areas: five for simulcasting plus two vacant channels. The government invited potential new market entrants to use the digital channels – known as channels A and B – to provide anything other than commercial television broadcasting services.

The amendments in 2000 of the Broadcasting Services Act 1992 inserted a new Schedule 6 containing a content licensing scheme for ‘datacasting services’. The licences authorised any use of a digital television channel to transmit digital data, subject to a series of prohibitions and restrictions to prevent the service from resembling commercial television. Television programs falling into a comprehensive range of popular commercial genres were prohibited. News, weather and financial or business information bulletins were permitted but only to a maximum of ten minutes in length, with a requirement that the content not be refreshed or updated for at least thirty minutes. The broadcasting regulator was given powers to keep the genre boundaries current.

In the fine detail of the amendments were measures that would, in effect, have extended the moratorium on new commercial TV stations beyond 2007. The legislation created a new type of apparatus licence called a datacasting transmitter licence, designed to authorise services using channels A and B, with a potential tenure of up to 15 years. Sunset provisions in the legislation meant that after 2007 a datacasting licensee could also use the channel for any other type of broadcasting service for which it could obtain a licence. But as there was no legal mechanism to upgrade to a commercial television broadcasting licence, allocation of channels A and B for datacasting would have precluded additional commercial television networks from using the broadcasting services bands for up to fifteen years.

The government promoted the idea that Australia might become a world leader in datacasting applications of digital television transmitters. It identified possible uses, such as electronic program guides, enhancements to television programs, video and audio on demand (or near on demand), broadcast of popular websites, multimedia information and entertainment services, ‘Internet/TV hybrids’ and interactive services such as competitions, shopping,
banking, gambling and gaming (Alston 1999a). The Australian Communications Authority (ACA) started work on an auction of datacasting transmitter licences but the Minister called it off in May 2001, due to factors including a lack of competitive tension (Alston 2001).

An alternative approach to digitisation: the Productivity Commission view

Given the criticism of the government’s policies, it is insightful to examine the most cogent policy alternative advanced at the time to the ideas of the government and the Specialist Group. This is found in the Productivity Commission’s 2000 report on broadcasting regulation in Australia, which among other things recommended radical reform of broadcasting spectrum planning and licensing (Productivity Commission 2000).

The Commission’s recommendations for TV digitisation should be understood in the context of its wider proposed changes to broadcasting regulation. One effect of these proposals would have been the conversion of broadcasters’ spectrum holdings into tradable spectrum licences. A broadcaster would be able to sell its spectrum while retaining its broadcasting content licence – for example, if it found a more spectrum-efficient way of delivering its services.

The Commission rejected the terms of the contemporary debate about whether giving broadcasters an entire channel had been ‘fair’ or whether, as a quid pro quo, it ought to have come with restrictions as to how they could use it. Key features of the Commission’s recommendations for digital were:

- Unfettered rights for broadcasters to use their digital channels, e.g. to provide multi-channels instead of HDTV if they so chose;
- Similarly unfettered competition from new market entrants using any additional channels available during the simulcasting period;
- Within two years of digital commencement in any area, identification and sale of any additional television channels 'suitable for low cost spectrum clearance';
- A firm date for completion of switch off of 1 January 2009;
- Two years prior to switch off, all remaining spectrum used for analogue television broadcasting to be planned and sold, with possession after switch-off.

The Commission’s recommendations were not accepted, although in 2004 the government invited submissions on another recommendation from the report: that responsibility for the planning of ‘broadcasting services bands’ spectrum should be moved from the ABA to the Australian Communications Authority. This process resulted in the 2005 establishment of the Australian Communications and Media Authority (ACMA). From now on, responsibility for both broadcasting spectrum planning and planning for services with competing claims on the broadcasting services bands would be vested in the same expert body.

Phase 2: Consolidation

Learning from experience

Digital television was launched in 2001 with little fanfare, a small range of set-top box receivers and few attractions beyond what could be found in most homes via the analogue service, but the rapid evolution of consumer devices soon changed this. Digital signals looked and sounded better on the new LCD and plasma screens that were replacing cathode ray tubes in shops. Sales of integrated digital TVs overtook set top box sales; analogue-only receivers, though never banned, disappeared from shops because of market forces alone. Viewers were paying for better TV sets, with rising digital penetration an incidental benefit.
In 2004 and 2005 the government undertook statutory reviews into aspects of its original regulatory settings. The upshot was the *Broadcasting Legislation Amendment (Digital Television) Bill* of 2006. To help drive digital take-up the amendments would permit the fuller exploitation of multiplexes originally envisaged by the Specialist Group. In combination, the measures:

- removed remaining restrictions on national service multi-channelling;
- from 2007, allowed the commercial broadcasters’ mandatory HDTV channel to show content different from the SDTV channel (effectively allowing an HDTV multichannel);
- from 2009, allowed commercial broadcasters to offer an SDTV multi-channel;
- made provision for both the HDTV requirement and any restriction on the number of multichannels to fall away at the end of the simulcast period.

The Specialist Group had assumed that carriage of an HDTV channel would require most of the capacity of a digital multiplex – necessary for so-called ‘cinema quality’ HDTV. However two factors had already mitigated the potential impact of mandating HDTV on the ability of broadcasters to carry multichannel services:

- Progressive improvements in compression technology since the 1990s, increasing the carrying-capacity of multiplexes; and
- an earlier government decision to count services with video display resolutions as low as 576p as HDTV, in addition to the more data-hungry 720p or 1080i resolution commonly associated with the format overseas.

Combined with the 2006 amendments, the result was the progressive expansion of the free-to-air national and commercial ‘bouquet’ from the maximum of five services available in analogue to the current 17 services. While some viewers complained that free-to-air HDTV often looked no better than SDTV, allowing multi-channels would increase the competitiveness and audience appeal of the digital TV platform.

**Channels A and B**

Modest levels of commercial interest in the concept of datacasting licences continued throughout the period, with an extended commercial trial of the medium in Sydney. In 2006-07 the government revisited the idea of auctioning channels A and B, this time offering one of
the two licences for either datacasting or, alternatively, for use as a mobile television channel. Changes to legislation clarified that a mobile television service would be permitted to carry pay TV services to mobile receivers. The ACMA began work on another auction instrument but was overtaken by a change of government in late 2007.

**Demand for broadband wireless spectrum**

Meanwhile, the new ACMA was facing the challenge of soaring projected demand for spectrum capacity for wireless access services (‘WAS’), including broadband wireless services. WAS service providers and equipment manufacturers were seeking spectrum in bands that offered wide bandwidth, good building and distance propagation and small antenna sizes. Unfortunately, the bands with varying combinations of these properties (450 MHz – 6 GHz) included most of the more valuable parts of the radiofrequency spectrum, which were often heavily used by existing commercial and government users. In February 2006, the ACMA released a discussion-paper, *Strategies for Wireless Access Services*. The paper invited submissions on candidate bands for WAS and in December 2006 the Authority published its findings in a second paper, *Strategies for Wireless Access Services: Spectrum Access Options*. This paper identified the entire UHF television allocation, i.e. 520-820MHz, as a ‘long-term’ possibility for WAS services.

**Phase 3: Analogue switch-off and the ‘digital dividend’**

The year 2007 is significant as the year the first Apple iPhone was launched in the United States, formally arriving in Australia the following year. Enthusiastic global adoption and emulation of this device would turn the issue of spectrum for broadband wireless services from an esoteric policy problem into a bread-and-butter consumer issue. In Australia, 2007 also saw the election of a new government with a platform of setting firm dates for the clearance of analogue television. Over the next three years, the goal of analogue TV switch-off would first come to be seen clearly as part of a larger process designed to yield the ‘dividend’ resulting from full digitisation.

**Digitisation policy**

In early 2008 the government announced that all free-to-air television broadcasters in Australia would complete the switch from analogue transmission to digital-only transmission by the end of 2013 (*Conroy 2008a*). A region-by-region timetable for the digital switchover followed, with the first market, Mildura/Sunraysia, to switch off on 30 June 2010 (*Conroy 2008b*). Details of how this would be achieved were disclosed progressively in a series of announcements leading up to the Mildura switch-off.

The 2009 budget contained an initial $140 million for:

- practical in home assistance, including the installation of a set-top box and remedial upgrades to household cabling or antennas for eligible households (where at least one recipient of a pension);
- information campaigns; and
- working with industry to allow for a smooth transition to digital TV (*Conroy 2009*).

This funding related to the first four switch-over regions only, but the model – of a ‘household assistance scheme’ offering direct assistance to pensioners and a public information campaign to help other analogue-only households convert at their own expense – would later be extended to the remaining switch-over areas.

A second challenge was how to help viewers in areas with deficient digital signals. Notwithstanding the ‘same coverage test,’ which had ensured that digital coverage matched planned analogue coverage, the different reception characteristics of analogue and digital TV meant that some households who relied on poor or marginal analogue reception would not
necessarily be able to receive, or reliably receive, digital services. A related challenge was what to do with hundreds of self-help terrestrial re-transmitters and analogue ‘black spot’ solutions in small communities around Australia. As these were not directly provided by broadcasters, no one to date had been under any legal obligation to convert them to digital.

Early in 2010, the government announced a new satellite television service for viewers in blackspot areas. Rather than paying to digitalise self-help services, the satellite would offer the same choice of television services as people in the largest cities, including, for regional Australians, re-transmission of local news broadcast within their licence areas. In the 2010 budget, $375.4 million over twelve years was earmarked for the Viewer Access Satellite Television (VAST) service. Viewers who lost access to analogue terrestrial re-transmissions would be eligible for a subsidy towards the cost of upgrading to VAST (the ‘satellite subsidy scheme’). However, some self-help re-transmissions would be converted to digital. Commercial television broadcasters – concerned to prevent migration of their terrestrial audiences to separately-owned satellite services – were free to upgrade, at their own expense, their choice of the existing terrestrial re-transmission sites or install new terrestrial infill sites, on the condition that the site transmitted full suite of digital services (including the national services) (Conroy 2010a).

By June 2010, most of the key measures were in place for the area-by-area switch-off of the analogue television system. However, the decision to go with a ‘big’ satellite solution instead of assistance with conversion of self-help facilities would have a knock-on effect. Since the inception of television in Australia, the smallest regional and remote television markets had typically received fewer TV services than the major cities. The comprehensive VAST service offering placed pressure on the smallest terrestrial services to equalise their terrestrial offerings or face audience leakage to the satellite, and in June 2010 the Minister announced a ‘partnership’ with regional commercial broadcasters to achieve equalisation of services nation-wide, at a cost to the government of $34 million over four years (Conroy 2010b) Thus the historical aspiration of ‘equalisation’ of television services across Australia was fully realised at last.

Re-stack and spectrum reallocation

It is striking how long the Australian policy debate about TV digitisation focused on expanding the supply of digital broadcasting channels. In other early-moving countries, the trend was for the identification and clearance of larger, contiguous blocks of spectrum for uses other than broadcasting, notably broadband wireless communications. The United States moved from very early on to plan and allocate a large block of UHF spectrum in the range 698-806 MHz for a mixture of commercial broadband wireless and both broadband and narrowband public safety uses, a fact even touched on by the Productivity Commission in 2000. Early-moving European countries also sought to clear large spectrum blocks. The earliest, piecemeal identification of nation-specific dividends by individual European states, such as the UK, was to founder on the realisation that greater benefits would accrue if states could agree to a common harmonised allocation across national boundaries; European countries presently converged on the idea of a harmonised UHF broadband wireless ‘dividend’ in the range 790-862MHz.

A rare public acknowledgement of the choices facing Australia can be found in a 2006 paper from an ACMA engineer, which canvassed the alternatives of treating the vacated analogue TV channels in situ as the digital dividend (an option helpfully nicknamed ‘Swiss cheese’), or retuning the digital services so as to pack them together as closely as possible and yield a larger block of vacant spectrum for a potentially wider range of uses (‘Cheddar’) (Gellatly 2006). A limitation of Swiss cheese is that any dividend would be technically configured for digital television only. An advantage of Cheddar is that the larger contiguous blocks would open the door to differently configured uses such as harmonisation with international allocations for wireless broadband.

Over the period 2008-09, the government postponed a final decision on whether to proceed with the allocation of channels A and B while it considered the related questions of how much
spectrum would be required post-analogue for the television system and how much spectrum, and how configured, might be required for other services. In January 2010 it released a Green Paper (DBCDDE 2010) in which it embraced the overseas trend to use broadcasting spectrum more efficiently by reorganising, or ‘restacking’, television services to create a contiguous block of cleared spectrum, thereby expanding the number of potential uses of the cleared spectrum.

Although the paper called for submissions on a wide range of relevant issues, it disclosed the government had already identified a ‘target’ UHF digital dividend of 126 MHz. This reflected the desirability of harmonising Australian planning arrangements with larger overseas markets. The European digital dividend was rejected owing to the different location of broadcasting spectrum in Australia, however the 126MHz figure was the dividend size necessary for Australia to harmonise with the US 700 MHz digital dividend (698-806MHz). Asia-Pacific broadcasting allocations meant that any ITU Region 3 digital dividend configuration was also likely to converge on 698-806MHz. However, the US digital dividend was not optimally configured for broadband wireless. The paper noted:

_The digital television switchover and digital dividend planning process is not as advanced in region three as it is in the United States and Europe. It is therefore possible for region three economies to work together to develop digital dividend spectrum arrangements that maximise the ability to utilise customer and network equipment developed overseas and to facilitate global roaming should dividend spectrum be used to provide such services._

Driven by the imperative of analogue switch-off, Australia was already active in what was then the APT Wireless Forum (since renamed the APT Wireless Group, or AWG) exploring just this opportunity. It was common ground that the only other band plan in existence compatible with the region’s digital dividend, the US 700 MHz plan, was both fragmented and inefficient. From 2009, with significant ACMA input, the APT Wireless Forum began developing an optimised band plan for the 698-806 MHz frequency range that maximised the amount of spectrum available for mobile broadband use while ensuring compatibility with adjacent services. By late 2011 the AWG had agreed on arrangements for two band plans: a time division duplex (TDD) arrangement between 703-803 MHz and a frequency division duplex (FDD) arrangement providing 2 by 45 MHz of spectrum between 703 and 803 MHz, with a 10 MHz centre gap and upper and lower guard bands of 3 and 5 MHz respectively. (The guard bands are to manage the potential for interference with adjacent services. Centre gaps (sometimes referred to as ‘mid band gaps’) are a characteristic of FDD spectrum arrangements permitting simultaneous transmission and reception of signals.) The success of the AWG’s work in developing the APT 700 MHz band plan has since become clear from its wide adoption around the world, not only within the Asia-Pacific region but also in Latin and South America. There is also potential for the APT 700 MHz band plan to be adopted (either in whole or in part) in Africa, the Middle East and even Europe.

The Green Paper also considered the capacity of the remaining broadcasting bands if Australia harmonised with 698-806 MHz dividend, presenting findings from the ACMA and consultants suggesting up to six television services at each site could be accommodated. Channel B was to be sacrificed to reach the magic number of 126MHz.

The Green Paper identified as a broad principle that ‘markets’ were the most efficient way to determine spectrum use. The response from submissions was unambiguous: the mobile telecommunications industry would be interested in purchasing spectrum in the 700 MHz digital dividend. While other spectrum users expressed interest in obtaining more spectrum (television broadcasters, for future technical standards migration) or a special allocation of their own (mobile television) there was no interest in bidding directly against telecommunications companies for spectrum. In July 2010, major elements of the digital dividend policy were embodied in a ministerial direction to the ACMA, including:

- That 694-820 MHz is to be cleared of television services as soon as possible after completion of digital switch-off;
• Provision for 6 television services in each area; and
• Provision of 14 MHz of VHF spectrum for the regional expansion of digital radio (ACMA 2010).

The fine detail of configuring the 700 MHz spectrum licences was settled between 2010 and 2011 via the processes of ACMA consultation with affected incumbents (ACMA 2011a), a final ACMA recommendation to the Minister and a Ministerial reallocation determination confirming the frequency, geographical and chronological dimensions of the new properties (Declaration No. 1 of 2011) as required by the Radiocommunications Act 1992. These processes confirmed Australia would harmonise its 700 MHz broadband allocation with the APT 700 MHz plan for FDD (as shown in Figure 1).

Figure 3 - APT 700 MHz band plan showing Australian lot configuration (outer guard bands not shown). The nine licences (labelled A-I), each consisting of 5MHz paired, will be auctioned in April this year.

The innovative six-channel block configuration for the remaining television bands emerged from detailed ACMA consultation with the broadcasting industry about the planning principles that should govern the re-stack. Commercial broadcasters developed the proposal in preference to the ACMA’s default ‘minimal moves’ model, which would have preserved the existing wide spread of TV frequencies in many areas in the interests of minimising costs and disruption. An account of the pros and cons of both options and the ACMA’s final decision is found in the May 2011 paper Clearing the Digital Dividend: Decisions on planning principles for restacking digital television channels (ACMA 2011b).

While full digitisation of TV is on-track for completion this December, the reallocation and restack processes are not scheduled to finish until the end of 2014. The ACMA has scheduled a combinatorial clock auction of the 700MHz spectrum licences in April this year together with 2.5 GHz spectrum. In relation to the restack, in June 2012 the government announced a budget allocation of $143.2 million to ensure that broadcasters cleared from the digital dividend spectrum in a timely fashion with minimal disruption for viewers. This would pay for:

• A project implementation manager to develop timetables and work with affected broadcasters to implement the restack by the end of 2014; and
• Ensuring that consumers are well informed about any changes in their local area and what it means for them (Conroy 2012a).

As at the time of writing, some details of this program are yet to be announced.

Finally, a number of spectrum planning and allocation issues flowing from analogue television switch-off remain unresolved. These include the future uses of vacated VHF Band I and II spectrum and UHF spectrum in the range 806-820MHz. The ACMA is currently considering potential uses of 806-820MHz as part of a wider review of spectrum in the band 803-960MHz\(^2\).

There has also been no decision on the ultimate use of the planned, vacant ‘sixth channel,’ with the Government most recently (in November 2012) affirming that potential uses would be considered in the long-term ‘in light of the Australian Communications and Media Authority’s assessment of future broadcasting technologies’. In the meantime, ongoing transmission of community television broadcasting services or trial services will continue at a few key sites at least until 31 December 2014 (Conroy 2012b).
Some reflections

In the 1990s, the idea of turning off the ubiquitous analogue TV service seemed almost quixotic. With hindsight, both the means and the ends of the enterprise were only partly apparent at the time.

It is worth recording the high level of parliamentary bipartisanship on most of the major amendments described in this article. Through a number of iterations of policy, three successive governments gradually developed a complex and ambitious microeconomic reform blueprint. That there were some false starts should not surprise. There is also much that with hindsight helped realise the digital dividend sooner (for example, early government subsidisation of the regional broadcasters’ digital roll-out). Where spectrum re-farming is concerned, early moving nations must balance the benefits to industry and consumers of taking up new technologies against the risks of getting too far ahead of, and falling out of step with, other countries. The UK’s false start on the identification of a ‘digital dividend’ block is a case in point. The benefits to Australia of harmonising its spectrum arrangements with larger trading blocs suggest that the perennial Australian challenge with early adoption of technology is to ‘lead from the middle’ rather than get too far ahead.

The risks of moving early to pre-empt the outcome of iterative international processes can be illustrated by some ‘counterfactuals’.

What if all of the UHF broadcasting band had been retained for digital broadcasting?

An apparent expectation of the Specialist Group was that UHF channels freed up by analogue TV switch off would most likely be retained for broadcasting use. Depending on political decisions about the use of those channels, this option could have provided abundant spectrum for major future upgrading of technical standards, including with the use of the simulcast model.

It says a lot for the accelerating pace of change in electronic communications that policy discussion of digital television technical standards evolution is already becoming timely. As a digital early mover, Australia adopted the then world’s best DVB-T transmission standard, from the European DVB family of television standards, and the MPEG-2 compression standard. There has since been widespread global adoption of the more efficient MPEG-4 compression standard, to the point that most TV receivers sold in Australia today are MPEG-4 compatible. The successor standard to DVB-T, DVB-T2, is still relatively new but has already been deployed in a number of countries, including the United Kingdom and New Zealand. Use of MPEG-4 and DVB-T2 would double the carrying capacity of a 7MHz channel relative to DVB-T/MPEG-2.

Retention for television of the vacated analogue television channels could undoubtedly have assisted with the rapid introduction of more advanced standards. That other early moving countries have all chosen instead to free up larger, contiguous blocks of UHF spectrum, mainly for mobile broadband purposes, suggests Australia would have paid a price in terms of the total amount of spectrum available sub-1GHz for mobile broadband. While apparently accepting the demise of ‘Swiss cheese,’ the TV industry has continued to argue for some additional spectrum for future standards evolution.

The digital dividend blueprint constrains but does not preclude future standards evolution, with the ultimate use of the sixth channel a significant future decision-point for government. By removing differential coverage objections to moving content between broadcaster multiplexes, the decision to adopt the six-channel block plan may also increase the long-term options for technical standards evolution. For example, content could be more easily shifted between existing multiplexes, or between these multiplexes and a new multiplex, including as part of a migration to higher technical standards. For a fuller account of these issues see the

**What if channels A and B had been sold for datacasting?**

With seven rather than six digital TV services at each site, harmonisation with the APT 700 MHz band plan would have required major compromises in broadcasting planning. This would have imposed additional costs on broadcasters (e.g. through wide-area SFNs, or reduced multiplex bit-rates) and viewers (e.g. through migration of many more households to satellite). Though not impossible, it would have been very politically challenging.

Conversely, making the broadcasting bands larger to accommodate the seventh channel (while using existing planning parameters) would have required, as a rule of thumb, either an additional 28MHz, or four TV channels, or possibly as much as 35MHz, or five TV channels, to be added to the top of the current proposed UHF upper boundary. 28MHz may be less than a quarter of the current 126MHz UHF ‘dividend,’ but its negative effect on Australia’s ability to harmonise with the APT 700 MHz plan would have been disproportionate. Inspection of Figures 1 and 2 shows that if the broadcasting upper boundary is moved up by 28MHz, six of the current proposed nine, 5MHz ‘paired’ spectrum licences, or two thirds of the UHF digital dividend, would be lost (five if a smaller guard band were tolerated).

There are at present no obvious options for alignment with international FDD wireless broadband allotments that might have made more efficient use of the remainder of Australia’s dividend. (Alignment with part of the APT 700 MHz TDD allocation would have been a possibility. While government and ACMA consultation processes relating to 700MHz have disclosed relatively little interest in TDD, I cannot speculate on the viability of this option had there been no FDD alternative.)

The situation would have been somewhat different had Australia sold one of the two licences for mobile television, as this would impose different planning constraints. However, as a generalisation, the government would have faced the same pressure to expand the minimum amount of UHF spectrum available for broadcasting.

**What if the government had implemented the Productivity Commission recommendations?**

In addition to selling channels A and B, adoption of the Commission’s recommendations would have resulted in further digital TV channels sold as it became possible to clear them. As such, the chances of harmonisation with the APT 700 MHz or any other known plan for wireless broadband would have diminished correspondingly. However, the Commission also recommended that the channels should be sold as fully tradable spectrum licences. Could secondary trading have produced a wireless broadband ‘digital dividend,’ in the likely event that this would have become a more efficient use for the spectrum than a sixth, seventh or eighth digital TV channel? The reasons for being sceptical on this score have to do with the diagram at Figure 4, which shows all digital television channels in use in a key Australian market, with channels A and B included. (In reality, the Commission’s plan would have seen yet more digital services in use as analogue channels were vacated).

Comparison with the APT 700 MHz FDD plan (Figures 1 and 3) shows the very different pattern of spectrum usage between digital TV and broadband wireless. If its goal was to harmonise with part of the APT 700 MHz plan, a notional purchaser of Channel A would acquire only the 7MHz channels marked in red at the sites shown in Figure 4. These properties are obviously not configured for broadband wireless, nor could the licensee trade its way to an allocation suitable for broadband wireless without the cooperation of other broadcasters in the area, including but not limited to a sufficient number of other licensees with a mind also to convert to broadband wireless. If an Australia-wide broadband wireless allocation was desired, the picture would be further complicated by different ownership of
broadcasting channels in different geographical areas. Unaided, markets do not readily produce this kind of outcome.

Figure 4 - Planned television channels in metropolitan and regional Queensland. Channels in green denote channels in use by the five TV networks; channels in red and blue denote the two unassigned channels known as channels A (red) and B (blue). The yellow shaded area shows the location of the 126MHz ‘digital dividend’.

Comparison of the these diagrams highlights a more general challenge for spectrum planning, which is that the different and often incompatible spectrum requirements of different industries will, from time to time, require customised, probably government-mediated, solutions if spectrum is to migrate to its most value-adding use.

Looking forward

Political lessons learned are not easily forgotten. They can cast long shadows over future policy. As early as 1998 the parliament showed a keen sensitivity to one risk in particular – that an ostensibly superior standard might leave many viewers without services because of coverage shortfalls. At the time, the government was already grappling with migration of regional mobile phone subscribers from the analogue (‘AMPS’) platform to digital, which had created exactly this problem in regional electorates. AMPS closure may help to explain the ‘same coverage’ requirement for digital TV, also why the ACMA was later funded to develop a signal measurement program of unprecedented scale. In the end, the decision to fund the VAST satellite has largely if not entirely addressed this issue, by ensuring everyone is able to obtain the same choice and quality of services.

Soaring global demand for spectrum for broadband wireless has been the biggest issue in radiofrequency planning for the past decade. This year’s auction of 700 MHz and 2.5 GHz spectrum licences positions Australia well in what has become an international race to accommodate rising data traffic. Just as AMPS closure conditioned the government response to the Specialist Group report, so future political perceptions about TV digitisation, the reallocation process and the restack of digital TV services can be expected to colour political consideration of future demands for spectrum re-farming in heavily used bands. What will be appetite of future governments to help to bankroll spectrum reform or to endure any political pain if consumers are inconvenienced? As a case study, I expect Australia’s digital dividend blueprint to be of more than academic interest in the years ahead.
Acknowledgements and Disclaimer

The illustrations in the article are taken or derived from ACMA information and presentations. Special thanks to Dean Martin and Alex Kostic for their help with the illustrations.

The views in this article are those of the author and do not represent ACMA views.

References


ACMA, January 2012


Endnotes


3. An account of this work can be found in a speech by ACMA Chairman Chris Chapman to the Latin America Spectrum Conference, Mexico City Mexico, 24-25 October 2012, at http://www.acma.gov.au/WEB/STANDARD..PC/pc=PC_91724


5. R21 The Specialist Group commenced its work under the Keating Labor government and finished it after the Howard Liberal/National government won power in March 1996. Labor (Rudd; Gillard) returned to power in November 2007.

Another great wonder of the world? Early experience with high speed broadband

John Costa
John Costa & Associates
Mike Miller AO
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TJA has invited a number of experts to contribute papers on early experiences with high-speed broadband, as the major theme for TJA’s February 2013 edition. This guest editorial provides the motivation for the theme, and an overview of the eight papers selected on this theme.

The dynamics

Motivated by various mixes of government policy, sectoral needs and consumer demand, major implementations of high speed broadband infrastructures are steaming ahead across the world right now. They are driven by sometimes quite different national approaches but generally have similar objectives and a rapidly growing arsenal of powerful and cost-effective applications.

In earlier, more ‘supply oriented’ days of broadband, national policy development was stimulated, amongst many other considerations, by competitive pressures from OECD broadband penetration rankings, particularly motivating some embarrassed member countries in the lower range of the list. Whilst this competitive pressure remains alive, broadband activation has since turned more to demand mode, driven by the growing need for cost-effective competitive or personal applications across virtually all sectors of society. The demand side has been further fuelled by impressive technology advances and a growing and diverse range of new and emerging applications, including those considered in this issue of the TJA. Whilst economic analysis is clearly desirable, the key focus of this issue is the overall social benefit, whether measurable, anecdotal or otherwise, of early experience with high speed broadband applications, as seen by our authors.

Cost, expectation, benefits and history

Depending on the choice of implementation policy, high speed broadband infrastructure comes at significant cost, but with the expectation of much greater benefits. Reflecting on some of the early great infrastructural wonders of the world, it is unlikely that these projects could ever have been justified if modern cost benefit analyses had been carried out for them. Whilst such early infrastructures or facilities tended to be visionary and unrestrained, a relatively non-financial cost-benefit approach appears to have been adopted for them in most cases. By contrast, in today’s resource constrained world there is now substantially greater cost scrutiny of contemporary projects, and at the same time arguably less scope in them for vision, future uncertainty and other intangibles.
However in various ways the world is very much richer for the Great Wall of China, the Great Pyramid of Giza, the Taj Mahal and numerous other infrastructure projects that are now considered amongst a wider set of great wonders of the world.

A number of those early ‘wonders’ have been possible for reasons that mostly no longer apply, including availability of slave labour, surplus of wealth, and the ‘absolute rule’ of their instigators. Most likely there were also major cost over-runs, and as the Titanic and the Concorde remind us, there have also been some great failures. However the cost over-runs tend to be forgotten for those projects that have become monumental landmarks, greatly enriching the world culturally, socially and (for the modern beneficiaries of cultural tourism) economically.

Whilst imagination, creativity, altruism, longer-term forward thinking and other singularly ‘suspect’ measures by today’s cost-benefit philosophy can no longer be expected to justify massive infrastructural investment, these motivating factors have featured prominently, together with sound engineering design, in some of the early great wonders of the world. However challenging it might be for some economists, history now suggests a much broader mix of considerations to support cost-benefit judgements for such socially important infrastructure as national broadband networks. Good broadband infrastructure is needed to allow ‘a thousand flowers to bloom’ in the form of new broadband applications. The recent history of smart phones and other mobile devices clearly shows that applications don’t always need to be planned in advance, but can be allowed and encouraged to rapidly evolve so as to better serve evolving user needs.

**Papers in this Issue**

Reflecting on Australia’s ten-year rollout of the estimated A$35.9 billion NBN investment in high speed broadband, the following eight papers, taken as a group, look initially at some important international policy initiatives to accelerate the rollout of broadband infrastructure, and then focus on existing and likely new applications that help justify such long-term investment.

**The UN Broadband Commission for Digital Development**

Worldwide exploitation of broadband depends not only on cost effectiveness but also on basic affordability. Paul Budde describes how the UN Broadband Commission for Digital Development is working towards providing affordable broadband in developing countries, and indicates the progress already made and the resulting potential economic benefits. Most strikingly, this UN Broadband Commission is leading a trans-sectoral project aimed at the worldwide eradication of malaria. It will use digital technology such as smartphones to enable cohesive, trans-sector communications. Its work illustrates the power of broadband in sectors such as healthcare, education and e-commerce. It is not widely known that Australia was instrumental in the original establishment of this Commission.

**The politics of speed**

Stuart Corner’s paper ‘The Politics of Speed’ offers a comparison of several leading governments’ approaches to FTTX networks to explore which countries are favouring FTTH over FTTN, or vice versa (or simply relying on growth in mobile broadband access) – and why. Amongst a group of countries with which Australian commentators often like to compare our national NBN Policy, the UK, USA and Sweden are included. Australia and China’s policies of top-down government investment are contrasted with the minimalist EU and US government broadband investment policies; and Spain is included as an example of the very few countries committed so far to a Universal Broadband Service. (For a policy comparison with South Korea, readers are referred to the paper ‘Wireless broadband network policy in Korea’ by Kur and Kim published in the February 2012 issue of TJA.)
NZ’s ultra-fast broadband

As recently as late 2008 a key policy plank of the newly elected New Zealand National Government was a $1.5 billion fund for the rollout of Ultra-Fast Broadband (UFB) to accelerate deployment of Fibre-To-The-Premises (FTTP) to reach 75% of the population by 2019. In ‘Ultra-Fast Broadband in New Zealand - Early Adoption Experience’, Rohan MacMahon and Murray Milner outline the Government's productivity and service delivery improvement objectives with access for priority users in business, schools and health sectors. The paper illustrates several innovative applications and reports on roll-out progress, in the process commenting on the current challenges.

Content, connectivity and control

In her paper ‘Converging on an NBN Future: Content, Connectivity, and Control – A Symposium Overview’, Catherine Middleton helpfully shares with readers the views of thirteen prominent speakers from industry, government and academia, and input from an engaged audience, at a symposium hosted on 12 October 2012 by the University of Canberra’s Faculty of Arts and Design. Part of the symposium considered how Australia’s National Broadband Network is already supporting innovation in the digital economy today. With participants further recognising the potential for change in the scope and scale of the NBN following the next federal election, discussion also focused on the current vision for the NBN as a wholesale-only open-access network, and unpacked this into some interesting alternative possibilities, concluding with a useful summary of recommendations.

Tasmania broadband vision and lifestyle

With a clear view to its future and much to its visionary credit, Tasmania has long been engaged in exploring the potential of broadband, and was made the first Australian state to benefit from the NBN rollout. The stakeholder objectives not only include the economic future of Australia’s smallest, most isolated state, but also on how to capitalise on the comfortable, healthy and natural lifestyle and the availability of well qualified local people. Why would Tasmanians leave all this to earn a living in the high pressure, high density living of many of the world’s major trading centres if ubiquitous high-speed broadband can make this less necessary? In his paper ‘Why I am a Champion for Tasmania’s NBN’, Darren Alexander enticingly and passionately addresses this question, in the process providing some useful examples and test-bed experiences.

The critical role of e-skills in raising NBN adoption and Australia’s competitiveness in the Digital Economy

The readiness of small businesses and regional enterprises to compete effectively in the digital economy by taking advantage of NBN broadband is being limited by their ability to acquire specific ICT skill sets. In this paper, Marcus Bowles describes studies of this problem undertaken in three NBN early release regions of Armidale, Brunswick and Scottsdale. The studies measure E-readiness to adopt and effectively utilise newly available ICT resources. It is concluded that while broadband access is advancing, efforts to ensure the necessary ICT skills of the users are seriously lagging and need urgent public attention.

Telework, productivity and wellbeing: an Australian perspective

Teleworking modes of employment are rapidly changing the workplace scene around Australia as new ICT resources become available. However, Rachelle Bosua and her co-authors point out that no studies have so far been undertaken to explore the effectiveness of teleworking in Australia, particularly from the viewpoints of productivity and employee wellbeing. This paper describes case studies across six government and private enterprise
organisations in different Australian regions. The findings indicate the importance of adopting a new management approach to realize individual and team productivity and cohesion.

**e-Learning: supplementary or disruptive?**

In this paper another broadband champion, Jim Barber, Vice-Chancellor of the University of New England, argues that the rollout of the National Broadband Network in Australia will accelerate dramatic changes in the way that educationalists educate, and that access to education is being provided, since the advent of the Internet. Among the most important of these are the move away from bricks-and-mortar campuses towards global learning networks that share expertise and resources, the blurring of the virtual and the material, and the rise of mobile learning (m-learning). When combined with the proliferation of Massive Open Online Courses (MOOCs), m-learning will result in access to education becoming a universal human right.

**Conclusion**

The important and visionary task of offering high speed broadband quickly and cost-effectively across the diverse geographies and population densities of many different countries is of course extremely challenging, but justified when the social and economic benefits exceed the costs looking to the future. In Australia the Federal Government has reported on average twice monthly over the calendar year 2012 on the launch of significant new NBN initiatives, trials, and associated training. The rollout will never be fast enough to please many, and probably never inexpensive enough for others. However the early application benefits are starting to show that high speed broadband infrastructure can well be considered as a new, great wonder of the world.

![NBN Three Year Rollout map 2012-15 – courtesy NBN Co](image)
Figure 2 - Great Wall of China (Creative Commons Licence)
The UN Broadband Commission for Digital Development

Paul Budde
BuddeComm

High-speed broadband networks are an essential element in today’s society, and access should be available on an equitable basis, worldwide. The infrastructure should have the same fundamental importance as the infrastructure associated with transport, power and water supply. This paper explores how that goal can be achieved, and describes the work being done by the UN Broadband Commission for Digital Development. The Commission is working towards making broadband cost-effective and affordable to all, and towards increasing Internet user penetration in developing, as well as developed, countries. It is currently leading a trans-sectoral project aimed at the worldwide eradication of malaria, which will use digital technology such as smartphones to enable cohesive, trans-sector communications.

Introduction

With the support of United Nations Secretary-General Ban Ki-moon, the Broadband Commission for Digital Development was launched on 10 May 2010 by the International Telecommunication Union (ITU) and the United Nations Educational, Scientific and Cultural Organization (UNESCO).

It is chaired jointly by President Paul Kagame of Rwanda and Mr Carlos Slim Hélu, Honorary Lifetime Chairman of Grupo Carso, with ITU Secretary-General Hamadoun I Touré and UNESCO Director-General Irina Bokova as vice-chairs. They are joined by top-level figures from government, industry and international agencies, as well as those concerned with the content that will be delivered through broadband networks, from education to entertainment.

The job of the Commissioners is to define practical ways in which countries – at all stages of development – can provide access to broadband networks for their citizens, in cooperation with the private sector. They reported their findings to the UN Secretary-General in September 2010, immediately before the summit held in New York that reviewed the work on achieving the Millennium Development Goals by the target date of 2015. With only five years left before 2015, broadband networks were viewed as an essential and uniquely powerful tool for achieving those goals and lifting people out of poverty worldwide.

The author assisted the ITU in setting up the Broadband Commission and was the lead author of the report: ‘Broadband: a Platform for Progress’ (UN Broadband Commission 2011). This report provides definitions and outlines the key policy and technology areas that need to be addressed, as well as the trans-sector approach that should be taken in relation to broadband developments.
The connected society

Broadband connections to the Internet are an essential element in modern society, with wide economic and social benefits. In every nation (not just the richest) these networks should be seen as having the same fundamental importance as transport, power or water networks. This is the message of the Broadband Commission for Digital Development.

According to ITU statistics, more than a quarter of the world’s population now uses the Internet, and that number is rising fast. Many of us have become used to going online for information, entertainment, commerce and social contact. But the Internet delivers much more than that. High-speed, high-capacity networks – what we know as ‘broadband’ – can be used to carry data and services that can significantly widen horizons and opportunities for people everywhere. They can do so across all sectors, and they can do so very cost-effectively.

How does broadband achieve this? There are three main areas where these networks are having a growing impact: services that are visible to individual Internet users; services that enable professionals to provide communities with a better quality of life, and services that control industrial and other processes in the essential infrastructure of society. Here are just a few examples:

- **Infrastructure and industry**: In the electricity industry, broadband networks can show consumers and suppliers how much power is being used in real time, and where. This means that demand and supply can be stabilised as power is delivered or stored on ‘smart grids’. And in ‘smart buildings’ energy is saved through constant monitoring of heating and lighting. The manufacture and distribution of goods can be constantly tracked using broadband networks, which are also the foundation for cloud computing that offers rapid scalability of resources for businesses – as well as flexible access for individuals;

- **Education**: Through e-learning, broadband improves access to digital resources, extending education to more people, of all ages and at all levels of need, and reaching out to previously deprived communities. It also helps in training teachers and linking databases to improve administration;

- **Research**: Using broadband it is now possible for universities and research institutes to share vast amounts of data worldwide, and for students to read books in libraries on the other side of the world. This speeds up work in countless fields, including areas like medicine and agriculture that have an especially important impact on the lives of people in the poorest regions;

- **Environment and emergencies**: One particularly important area of research involves monitoring the world’s environment, through sensors on the ground or data collected by satellite. Broadband networks ensure that data are transmitted swiftly to show, for example, the effects of climate change, crop shortages, or impending natural disasters. Broadband helps again by supporting emergency communications and medical assistance.

- **Transport**: Safety on the roads is improved by broadband delivering real-time information to traffic control systems and individual drivers. It helps to streamline traffic flows, cut fuel consumption and minimise accidents, making it much easier to integrate all types of transport safely and efficiently;

- **Lifestyle**: At the same time, videoconferencing removes the need for travel, and with a broadband connection, people will increasingly be able to work away from the office and while on the move. Whether through a mobile device or at home, they can also enjoy a huge range of content produced by the publishing, music and video industries, for which broadband networks have become a leading delivery channel;

- **Healthcare**: Network-based monitoring of chronic medical conditions and low-cost remote consultation and intervention will be increasingly favoured by medical
professionals, particularly those serving remote communities or ageing populations. Telemedicine, as it is known, will give many more people a better chance of health;

- **Democracy and culture:** By putting information online, local and national governments can not only keep citizens up to date with what is happening; they can also offer immediate and interactive access to services, such as applying for licences or registering to vote. Citizens themselves have a powerful platform on which to create spaces for sharing ideas and for expressing the creativity of their particular cultures.

### A cost-effective platform for progress

At present, millions of people cannot enjoy these benefits because broadband networks are seen as expensive and unprofitable to construct. Even where they do exist access is often prohibitively expensive. Broadband subscriptions cost less than 2.5% of Gross National Income (GNI) per capita in the 40 most connected nations. But at the other end of the scale, in the 30 countries with the lowest level of broadband penetration, subscriptions cost over 100% of per-capita GNI.

And yet a report issued by the OECD in December 2009 (Network Developments in Support of Innovation and User Needs) suggests that broadband networks can pay for themselves within ten years, because of the savings made in delivering services. In Australia, for example, it has been estimated that cost savings in health care alone could pay twice over for the country’s national broadband network. For developing countries, the solution is likely to be found in mobile broadband – using a mobile phone, of which there are now some five billion worldwide, to connect to the information society. By improving education, medical services, trade and more, broadband Internet access can make a tremendous difference. High-speed networks can lead to high-speed growth.

In the same way that the construction of electricity grids and transport links spurred innovation far beyond the dreams of their builders, high-speed broadband networks stimulate greater efficiency and the creation of new businesses. For society as a whole they are a platform for progress, and the Broadband Commission for Digital Development will do its best to encourage government and industry leaders to take action on installing broadband for all.

### Broadband targets for 2015

The Broadband Commission has set four clear, new targets for making broadband policy universal and for boosting affordability and broadband uptake:

- **Target 1:** Making broadband policy universal. By 2015, all countries should have a national broadband plan or strategy or include broadband in their Universal Access / Service Definitions.
- **Target 2:** Making broadband affordable. By 2015, entry-level broadband services should be made affordable in developing countries through adequate regulation and market forces (for example, should amount to less than 5% of average monthly income).
- **Target 3:** Connecting homes to broadband. By 2015, 40% of households in developing countries should have Internet access.
- **Target 4:** Getting people online. By 2015, Internet user penetration should reach 60% worldwide, 50% in developing countries and 15% in the least developed countries (LDCs).

The Commission will report on these targets on an annual basis. The first report was published in 2012: The State of Broadband in 2012, achieving digital inclusion for all. The ITU also contributes its own extensive data-gathering and analytic resources for this purpose.
Example of an important initiative taken by the Commission

Applying mobile broadband to eradicate malaria

In September 2012 UN Broadband Commission for Digital Development decided to support initiatives that would lead to the building a truly trans-sectoral project aimed at the worldwide eradication of malaria. In the meantime this initiative has been expanded to cover a wider range of health initiatives aimed at accelerating community health worker programs in sub-Saharan African countries, scaling them up to district, regional, and national levels to meet the health-related Millennium Development Goals. With the use of the latest communications technology and diagnostic testing materials, these frontline workers link the rural poor to the broader healthcare system of doctors, nurses, hospitals and clinics.

The project was launched in January 2013.

| Malaria is one of the biggest killers of children in Africa. A dozen years ago, all seemed lost – the standard medicine had lost its efficacy as the parasite became resistant; insecticide-treated bed nets were little-used because they had to be regularly re-treated with the insecticide, a practical burden that poor villages could not manage; and diagnosis required that the mother and sick child trek to a distant clinic in the desperate hope the clinic had a functioning laboratory. Progress in eradication has stalled. There were one million deaths in 1990 but very little further progress has been made over the last decade. Clearly a new approach – driven by broadband and smart technologies – is required. |

The lack of proper communication systems in the areas affected by malaria – particularly in the Sub-Sahara – and the need for quick action are critical elements in the fight against malaria. These elements are the main reason there are still 750,000 deaths from malaria every year, mainly children. The disease is not preventable but if diagnosed within 24 hours it can be treated. The medicine itself costs 80 cents and the blood test needed to diagnose the disease also costs 80 cents, so these are no longer factors that prevent society from tackling the disease.

What makes the Broadband Commission an ideal platform to address this issue is the fact that broadband technology can be a catalyst in solving the communication problem, and that the Commission takes a holistic approach towards broadband as a facility to solve problems in relation to healthcare, the environment, energy saving, education and the digital economy. Current efforts towards the UN Millennium Development Goals have been fragmented and silo-based, which stops the upscaling of projects, while many of the issues the Broadband Commission is advocating can be addressed by effective broadband policies.

Smartphones and mobile coverage are needed to address these issues. Already an application has been developed that allows you to put a drop of blood from a possibly infected child onto a smartphone screen, which sends an electronic sample to a laboratory for testing. The results can be delivered back electronically within an hour.

This would, of course, make immediate life-saving treatment possible.

What is needed is for local community workers to be trained (this takes approximately one day) and to obtain a smartphone. Then, as long as there is mobile coverage, the disease can be attacked and basically eradicated.

The Broadband Commission accepted the challenge and it has committed to actions aimed at supplying, within three years, the necessary smartphones – approximately one million of them – and connecting malaria-infested areas to mobile communication networks.
Connecting one million community health workers

Across the central belt of sub-Saharan Africa, community health workers (CHWs) deliver life-saving health care services where it’s needed most, in poor rural communities. In this region, 10 to 20% of children die before reaching the age of five. Maternal death rates are high. Many people suffer unnecessarily from preventable and treatable diseases, from malaria and diarrhoea to tuberculosis and HIV/AIDS. Many of these residents would otherwise have little or no access to the most fundamental aspects of modern medicine. Many countries are struggling to make progress toward the health related MDGs partly because so many people are poor and live in rural areas beyond the reach of modern health care.

Community health workers have been recognised for their success in reducing morbidity and averting mortality in mothers, newborns and children. These workers are most effective when supported by a clinically skilled health workforce, and deployed within the context of an appropriately financed primary health care system. However, they have proven crucial in settings where the overall primary health care system is weak. They also represent a strategic solution to address the growing realization that shortages of highly skilled health workers will not meet the growing demands of the rural population. And, they are a vital part of primary health systems that will last well into the post-Millennium Development Goals period for other health issues like non-communicable diseases.

As we approach 2015, many nations are working towards achieving the health-related Millennium Development Goals. Community health worker programs have been in place for a number of years, through government health programs and other non-governmental initiatives, like the Millennium Villages Project. In addition to providing basic treatment and preventative care, CHWs help keep track of disease outbreaks and overall public health, and offer a vital link between undeserved residents and the primary health care system.

The action plan

The effort begins with the training of national core groups who would be equipped to train others on the regional level, on down to the actual community health workers. While they have limited clinical training, the frontline workers would be supervised by more clinically-skilled members of the health care system. Scaling in this way allows an opportunity to tailor the program to each nation’s particular needs and systems.

At the same time existing community health worker programs operating in countries such as Ethiopia, Kenya, Malawi, Nigeria, Rwanda, Senegal and Tanzania, should be upgraded to become national systems, including deployment of standardised protocols and use of mobile devices such as smartphones to integrate community health practices with national health information systems.

The systems should include ways to monitor progress on key metrics, such as maternal and child mortality, antenatal care rates, fever detection, HIV prevention, tuberculosis and malaria control, and nutrition. They should also include databases of community health workers to help track the program’s progress in spreading better health care to rural areas.

The cost

The new campaign will work with governments and aid agencies to finance and train the cadre of health workers, each of whom would serve an average of 650 rural inhabitants, at an estimated cost of US$6.58 per patient per year. This adds up to an estimated US$2.5 billion, which includes funding already being spent by NGOs and governments on these programs. These estimates fall within projected governmental health budgetary constraints and are within the boundaries of donor assistance already pledged and anticipated.
Smart technologies

Biomedical technology has now produced rapid home test kits for malaria and HIV diagnosis, sputum collection for the detection of tuberculosis by genetic amplification, and pregnancy tests. These innovative instruments have enormous potential for impacting healthcare provision in the developing world, especially at the periphery of the health system and in rural areas.

Broadband access and smartphones can link community health workers to the national health system and allow for real-time disease surveillance, child and maternal health monitoring, mobile training, supply chain management and capturing of vital events.

Arming lay health workers with consistent supplies of life-saving medicines and easy-to-follow treatment protocols guarantees a minimum quality of services delivered to these clients. Active care and disease detection according to rigorous guidelines has greater benefit to the formal health system than the usual passive case detection and referrals to upper levels of care.

Key contributors to the malaria eradication project

The initiator of the malaria eradication project is Broadband Commissioner Professor Jeffrey Sachs, an American economist and Special Adviser to UN Secretary-General Ban Ki-Moon on the Millennium Development Goals. He is co-founder and Chief Strategist of Millennium Promise Alliance, a non-profit organisation dedicated to ending extreme poverty and hunger. From 2002 to 2006 he was Director of the UN Millennium Project’s work on the Millennium Development Goals – eight internationally-sanctioned objectives to reduce extreme poverty, hunger, and disease by the year 2015. Since 2010 he has also served as a Commissioner with the Broadband Commission, from which he is now leveraging broadband technologies as a key enabler for the malaria project.

Commissioner Sachs sees this as a commercial project, not a hand-out, but hopes that the industry will work at cost rather than on a for-profit basis. The funding of the project can be done through combining available investments from the many organisations already involved in the various elements of this initiative.

From his senior international position Jeffrey has agreed to organise the effort with the countries where the project will be launched, together with the World Health Organisation, the World Bank, the African Union, national governments and local and regional health organisations. This will include recruiting and training approximately one million local health workers.

He already has secured the political support of the African Union, as well as that of the Millennium Development Goals Advocacy Group, which is co-chaired by the Prime Minister of Australia, Julia Gillard, and President Paul Kagami of Rwanda. President Kagami is also the co-chair of the UN Broadband Commission and Stephen Conroy the Minister for Broadband in Australia is a Commissioner of the Broadband Commission.

Broadband Commissioner Denis O’Brien, the CEO of Digicel, has taken a leadership role within both the Commission and the broader telecoms industry. His company operates in the Caribbean and the South Pacific, and he also agreed to look after the projects in Papua New Guinea and Haiti, two other countries where malaria is still widespread.

Other critical partners represented by CEOs and Secretary-Generals in the Commission are UNICEF, the United Nations Foundation and, through them, also USAID and the mHealth Alliance. The last two joined forces to form a three-year public-private partnership called mPowering Frontline Health Workers. This public-private partnership is specifically designed to improve child health by accelerating the use of mobile technology by millions of health workers around the world.
The mHealth Alliance, serving as the partnership secretariat, will coordinate and amplify the resources and expertise of ten founding members: USAID, UNICEF, Frontline Health Workers Coalition, Qualcomm, Vodafone, Intel, MDG Health Alliance, GlaxoSmithKline, Prackelt Foundation and Absolute Return for Kids. They are all going to play a key role in the overall project.

All of these close links are making it possible to cut through the bureaucracy and get the project off the ground. Also critical, of course, is leadership from the industry, and Denis O’Brien is clearly on a mission – talking to his colleagues in Africa as well as to the vendors (most of the larger ones are also represented by their CEOs in the Commission).

**Progress by the Commission to date**

The outcomes so far are very encouraging, especially the momentum behind the use of ubiquitous broadband to eradicate malaria. The Commission does not wish to take credit for this success, but it certainly is providing global leadership, especially to those countries and organisations associated with the 4.5 billion people who are currently not yet connected.

The Commissioners are also actively involved in projects and other initiatives aimed at reaching the targets, as indicated in the example below.

Furthermore, the Commissioners act individually as ambassadors to advise, inform and educate governments and international organisations, such as those involved in the UN’s Millenium Development Goals (MDGs).

The role of the Commission is reviewed annually and it is most unlikely that it will continue long-term if it cannot deliver a positive contribution to global digital developments. In principle its role will end if broadband and ICT in general are successfully incorporated into national government policies and in the strategies of the various international organisations with which the Commission works.

If the Commission continues beyond 2015 it will most likely be in a different format, depending on the rapidly changing developments in the broadband and ICT markets.

**Conclusions**

Australia was instrumental in the original set-up of the UN Broadband Commission, and the international lead it has taken in national broadband infrastructure rollout and related digital economy initiatives have been a catalyst to this UN process. It is great to see this United Nations initiative now moving into such important global issues as eradicating epidemics; and the Commission’s work also shows the power of broadband in sectors such as healthcare, education and e-commerce.

The UN Broadband Commission has identified practical ways in which all countries – at all stages of development – can, with cooperation between government and the private sector, provide their citizens with access to broadband networks. Broadband networks are an essential and uniquely powerful tool for achieving the Millennium Development Goals, aimed at lifting people out of poverty worldwide. The Commission has introduced its manifesto and set ambitious targets for 2015.

The Commission has seen a trans-sector approach to infrastructure as being essential, for creating synergies between infrastructure projects and application sectors, to achieve important national goals.

It can be said that the Commission has already helped achieve some notable policy successes. For example, it has succeeded in boosting ICTs and broadband on the global policy agenda, as well as contributing to the outcomes of proceedings at the Fourth United Nations Conference on the Least Developed Countries in Istanbul. It has also inspired enthusiasm for greater engagement with the UN among key business figures and provided the model for the World Health Organization’s Commission on Information and Accountability for Women’s
and Children’s Health. At its latest conference in September 2012 the Broadband Commission launched work groups on empowering women and girls with the help of broadband, plus a malaria eradication project using mobile networks and smartphones. These practical projects augur well for the future.

References


Endnotes

1. See also: http://www.broadbandcommission.org/; and Youtube channel at: http://www.youtube.com/broadbandcommission.
The politics of speed
An examination of national governments' policies for FTTX networks

Stuart Corner

The Australian Labor Government's National Broadband Network plan to fund the rollout of a fibre-to-the-premises network that will serve 93 percent of premises represents a level of government intervention towards achieving a goal of ubiquitous high-speed broadband that almost no other national government has been prepared to make. Its supporters, here and abroad, point to its national benefits and its international leadership. Its detractors, particularly the Australian Parliamentary Opposition, cite the uniqueness of the undertaking and its creation of a monopoly in fixed access infrastructure as evidence of its foolhardiness. This article examines the views of a selection of national governments on the desirability of ubiquitous high-speed broadband and any plans or policies in place to achieve this. It concludes that most governments share the same goal of eventual ubiquitous high-speed broadband access for their citizens, and notes that 82 percent of investment in FTTX in 2012-17 in the world's developed countries is estimated to be in fibre-to-the-home (FTTH). But their current policies reflect their starting points as much as their preferred time frames – and their ideologically preferred means of achieving their national goals.

Introduction

Australia's Shadow Communications Minister, Malcolm Turnbull, has mounted a consistent attack on the Labor Government's National Broadband Network, in particular its plan to build a fibre-to-the-premises (FTTP) network that will connect 93 percent of homes and provide downstream bandwidths up to 100Mbps.

He has attacked on a number of fronts, including:

- there is no hard evidence to suggest demand for this bandwidth in the foreseeable future;
- the timeframe for the network rollout will leave many customers in urban areas who are presently unable to get adequate broadband by either DSL or cable in this situation for several more years;
- No commitment to the multibillion dollar investment required should have been made without a rigorous cost-benefit analysis.

 Instead of an FTTP rollout, he proposes to use fibre-to-the-node (FTTN) technologies to bring improved broadband services to urban areas. This, he claims, would deliver sufficient bandwidth to meet demand for years to come, would be much cheaper than FTTP and would bring improved broadband to poorly-served customers much quicker than the scheduled rollout of the NBN FTTP network.

He backs up his arguments by claiming that nowhere else in the world is any Government intervening in the upgrading of a nation's telecommunications infrastructure on such a grand scale, by citing countries where broadband network rollouts align with his vision for Australia and countries, like South Korea, which have extensive FTTH networks but where, he claims, there has been little demand for the bandwidth they can deliver.
This article will attempt to assess the validity of those claims by examining broadband policies and network deployments in a number of overseas administrations.

**FTTP vs FTTN: A global perspective**

According to research firm Analysys Mason, (Analysys Mason 2012) the bulk of access network investment between 2012 and 2017, globally, will go into FTTH networks.

It predicts that fixed operators in developed economies – Central and Eastern Europe, developed Asia-Pacific, North America and Western Europe – will spend SUS$3.5B on fibre access network rollouts in that period, SUS25.9B in Western Europe alone; and that 82 percent will be on FTTH rather than fibre-to-the-cabinet (FTTC) and VDSL (very high speed digital subscriber line, using copper pairs from the cabinet to the premises).

On the other hand, in what would be music to Turnbull's ears, in April 2012 Analysys Mason issued a report, *FTTx Roll-Out And Capex In Developed Economies: Forecasts 2012–2017*, saying “those countries where the major operators are focusing on FTTC and VDSL will generally have much higher availability of next-generation broadband in five years’ time” and it highlighted “the dangers of a pure FTTH approach at a time when cable and 4G mobile operators are able to upgrade more quickly than telcos.”

Echoing Turnbull's claims, report author, Rupert Wood said: “Sticking rigidly to FTTH runs the risk of delivering next-generation access to a largely urban or well-to-do elite, while delaying delivery to other users and potentially losing customers.”

However Australia's goal of “sticking rigidly to FTTH” – more positively expressed as “striving to provide widespread FTTH” – has come in for strong praise from several industry luminaries. ITU secretary general, Dr Hamadoun Touré, on a visit to Australia in 2011, was reported in *The Age* as having “given the government's national broadband network project a tick of approval.” He was quoted saying:

> “Three to five years from now, Australia will be number one in broadband in the world. A large size country like this can be a test bed for any scenario that could happen anywhere else in the world and I can take that model to share anywhere else in the world.”

Internet pioneer Vint Cerf told a meeting of the Internet Society of Australia (ISOC-AU) in Sydney in January 2011:

> “I am so envious that you have a government that is willing to make the long term infrastructure investment of this magnitude and of this type [in the NBN].”

**National policies**

**The European Union**

Under EU policy on public funding, no government amongst its member countries would be permitted to make an investment on the scale of Australia's NBN, or to limit competition in the provision of access network infrastructure as the Australian Government has done.

Nevertheless the EU's goals for broadband are similar to those for the NBN and the EU is examining its policy on public funding in the belief that these goals will not be met without FTTP and that FTTP rollouts into rural areas are unlikely without public funding.

The EU rules on government subsidies are complex but their aim is to ensure that no aid granted by a member state or through state resources will distort competition by favouring certain undertakings or the production of certain goods.

In July 2012, the EU invited comments ([EU 2012](#)) on the application of these rules to the public funding of broadband networks. The key issue for discussion was how the current
guidelines on state funding could be adapted to the objectives of the EU's Digital Agenda for Europe (DAE).

The DAE, released in May 2010, included a target of Internet access being available to all European citizens by 2020 at speeds of 30Mbps or above, and to have half of all European households subscribing to connections of 100Mbps or higher by that date.

The draft guidelines note that the cost to achieve 30Mbps for all EU citizens by 2020 had been put at €60B, and at €270B to achieve 100Mbps for 50 percent. They state that these objectives “cannot be reached without the support of public funds”, and they note that the Digital Agenda calls on member states to use “public financing in line with EU competition and state aid rules in order to help meet these objectives”.

The draft guidelines allow state aid to roll out FTTP. They state:

“In light of the Digital Agenda objectives, in particular achieving 50 percent penetration to Internet connections above 100Mbps, public intervention would still be possible in areas where existing or planned NGA [next generation access] networks do not reach the end-user premises with fibre networks.”

However there is a view that ubiquitous deployment of FTTH can be achieved throughout the EU by private investment if an appropriate regulatory environment is put in place. Consultancy firm Ventura Team, in a report commissioned by the FTTH Council Europe Financing Stimulus for FTTH - Funding Europe’s €260 billion access fibre upgrade: A rationale and specific recommendations for a new approach by industry, policy makers and governments, claims that the telco industry could fund the switchover to FTTH itself over a period of 25 years with the right regulations.

The study has put the capex cost of providing fibre to every home in the EU at €261B and says that with investment presently running at a mere €3B a year, ubiquitous FTTH rollout will take almost a century.

The study advocates a coordinated program of regulatory change to drive the fibre switchover, claiming there is little incentive for fixed telecom operators to invest in FTTH because the cash keeps flowing from the old copper networks. However in some EU member countries aggressive FTTH rollouts are already underway without Government subsidies or targeted regulation.

**United Kingdom**

In December 2010 the UK's Coalition Government released a policy document, Britain's Superfast Broadband Future, in which it set out the Government's vision that “[Britain] should have the best superfast broadband network in Europe by 2015”.

The UK Government's specific target is to provide 24Mbps to at least 90 percent of premises in the UK by 2015, and to provide universal access to standard broadband with a speed of at least 2Mbps by 2015. 24Mbps is hardly superfast and even if getting this to 90 percent of premises does give the UK the best broadband network in Europe by 2015, that status would likely be short-lived if other EU member states come close to realising the EU’s goal of half of EU citizens being able to get at least 100Mbps by 2020.

However there is no universal definition of broadband, let alone superfast broadband. Wikipedia defines broadband as anything in excess of 256kbps, and has no entry for ‘superfast broadband’ or any other variant. In the US the FCC presently defines a broadband service as one able to deliver, 3Mbps downstream and 1Mbps upstream, but has been reported as reviewing this with a view to increasing the bandwidth.

Given the intense focus around the world on boosting broadband speeds and the fondness of governments for setting comparison-based goals, universal definitions are needed. Britain's Superfast Broadband Future examined the various technology options – fibre, copper and wireless – but made no recommendations. It simply concluded: “All connectivity
uses fibre and/or wireless elements. The only debate is where one finishes and the other begins and that will be driven by the costs.”

The document sets out a series of policies “intended to provide the best possible climate for investment and private sector development of our broadband networks”.

What Britons will actually get is largely what the former monopoly telco, BT, and Virgin Media – operator of a cable TV network – deem to be commercially viable.

Virgin Media’s cable network covers around 50 percent of the UK population, around 13 million homes. It currently offers speeds to consumers of up to 100Mbps. Virgin Media has no current plans to expand its infrastructure footprint substantially.

Openreach, the structurally separated arm of former monopoly telco BT, has a role equivalent to that of NBN Co as provider of a nation-wide wholesale-only high speed access network (but without any restrictions designed to prevent competition at the access network infrastructure level).

Openreach is pushing copper to its limits and its CEO, Olivia Garfield, has been reported saying that Openreach cannot find any applications likely to drive demand for bandwidths in excess of 30Mbps. It is on target to have its FTTN network reach two-thirds of UK homes at a cost of £2.5 billion by the end of 2014. BT has said that this investment is beyond what would be considered normal on a purely commercial basis.

Garfield has been reported saying:

“Our fibre business case has a pay-back period of about 12 years. That is to say we do not get our money back for 12 years, and that is on the assumption that we achieve the volumes of customers we hope to achieve in our business case. That is a long-term investment that most commercial organisations would not tolerate.”

However BT has indicated that, in order to support the Government's policy objectives, it is “willing to spend a further £1 billion or so of BT's capital to match Government funding to do that, to roll it out into the final third, and to get as far as we possibly can into the final third…”

The company is however planning to offer FTTP ‘on-demand’ from early 2013. If the Openreach wholesaler is prepared to provide it, an end user will be able to get a fibre link from the Openreach street cabinet delivering a bandwidth of 330Mbps downstream and 40Mbps upstream. The wholesale price of the service was set initially at £60 per month but cut to £38 per month on 5 December 2012.

BT says that the median distance of customer premises from its fibre termination is 500 metres. CSPs (Communications Service Providers) will be charged £500 for installation and a distance-based component of around £1,000. On this basis the 'cost' to serve the 90 percent of 28 million homes that BT expects to serve with its FTTN network (subject to receiving additional government funding) would be £37.8B ($59.0B).

BT announced plans for the FTTP service in February 2012 and it was formally launched in July, with Openreach saying it would be available in areas served by its FTTN network from the northern spring of 2013.

**£530m funding for rural broadband**

Outside BT’s planned FTTN rollout areas, the UK Government has allocated £530m over four years to “bring super-fast broadband to rural parts of our country that the private sector will take longer to reach”. (UK Treasury 2010)

Broadband Delivery UK (BDUK) was created as a delivery vehicle for these policies. Local governments in the designated rural areas are primarily responsible for calling and awarding tenders for broadband networks. BDUK works with them and allocates funding form the £530m pool.
In April 2011 Fujitsu announced that it would bid for this funding. (Fujitsu 2011). It formed a partnership with Virgin Media, TalkTalk and Cisco saying it hoped to build an FTTP network to serve five million homes in rural Britain. It planned to use underground ducts and poles owned by BT, a strategy made possible after UK regulator Ofcom forced BT Openreach to open up its infrastructure to other companies on fair, reasonable and non-discriminatory terms.

Fujitsu seems to have made little headway against BT's Openreach and its FTTN network. The Financial Times reported in July 2012 that the consortium – one of only two picked to compete with BT for the funding – had failed to win any bids, all of which had gone to BT (FT 2012).

**An alternative vision of UK broadband**

Meanwhile the Government's broadband policy has been given short shrift by the House of Lords Select Committee on Communications, in its July 2012 report “Broadband for all – an alternative vision.” (House of Lords 2012)

The Lords acknowledged that the massive investment needed to achieve the goal set out in Britain's Superfast Broadband Future cannot be made by the Government and instead recommended a number of regulatory and policy initiatives along with limited targeted funding to accelerate progress towards it.

Its vision is aligned quite closely with the Australian Labor Government's NBN, and even goes beyond that in contemplating a network where sufficient dark fibre would be installed to street corner cabinets such that in the future each household could have its own dedicated fibre pair: a point-to-point fibre network.

*(NBN Co is in fact rolling out sufficient fibre to provide point-to-point connections in the future, but this requirement was not specifically set out in Government policy.)*

The Committee called on the Government to

> “bring national fibre-optical connectivity – which would include, as a minimum, fully open access fibre backhaul – within the reach of every community”,

and to ensure that

> “there is a clear path from any intermediate steps which may be taken to the rollout of point-to-point FTTP and that, crucially, these steps will not serve to hinder or hold back any future upgrade”.

It did not however take a position that FTTC might hinder such an upgrade, merely observing that:

> “Critics of FTTC argue that while FTTC is cheaper to install in the short term, it may prove more expensive in the long run to upgrade FTTC to FTTP”.

The Committee made a case for “a national broadband network which should be regarded as a fundamental strategic asset, to which different people can connect in different ways according to their needs and demands”.

The Committee saw no future for copper, saying its capacity “is now being exceeded by demand for more data-intensive applications”. It recommended that Government policy “should be ultimately directed towards universal, point-to-point FTTP as this is a technology not only able to accommodate current demand, but at current rates of growth, will be able to accommodate the UK’s bandwidth demands for many decades to come”.

*(However, the report’s views on the merits of FTTP are open to interpretation. A story on the Delimiter news web site saying that it vindicated Australia's NBN plan provoked a stern rebuke from Turnbull (Turnbull 2012) who claimed: “There are three key takeaways from the study, each an unwelcome truth for supporters of Labor's NBN policy.” And he was able to find quotes from the report to back up this claim.)*
USA

The goal of the US Government as set out in its National Broadband Plan (Connecting America 2010) is that at least 100 million homes should have affordable access to download speeds of at least 50Mbps by 2015, and 100Mbps by 2020.

The 376 page report made no recommendations on what fixed line technologies were preferred to achieve this goal, nor did it suggest any policy initiatives aimed at favouring roll out of any particular fixed access technologies.

However in recognition that market forces alone were never going to enable this target to be achieved in rural areas, the FCC in September 2011 launched the Connected America Fund “to accelerate broadband build-out to the 18 million Americans living in rural areas who currently have no access to robust broadband infrastructure”.

This is to be achieved by transforming the existing Universal Service Fund (USF) into the new Connect America Fund.

**Massive subsidies for rural broadband**

The FCC plans to bring broadband to 400,000 rural citizens in three years, seven million in six years and most of the 18 million by 2020. All up about $US10B in subsidies will be provided over the next five years.

The FCC was scheduled to make a decision on funding distribution by the end of 2012. The ABC Coalition, a coalition of large price cap telecommunications providers, has submitted a pricing model to the FCC, and based on this the FCC has released interactive national maps estimating the cost of build-out by census blocks under two possible scenarios: a model that assumes fibre to the premises (FTTP) (ABC Coalition 2012a) build-out, and a model that assumes fibre to the DSLAM (FTTD) (ABC Coalition 2012b) build-out.

Proponents of each of the two models presented the inner workings of their models and embedded assumptions. Many of these assumptions include key policy decisions that the FCC will need to make once it finalises its cost model. According to a report from the workshop, FCC staff did not reveal information regarding its position on any of these key model aspects.

**FTTH & FTTN growing strongly**

In the US the FTTH Council reported in September 2012 that the number of North American households connected directly into fibre networks had hit the nine million mark and that fibre connections were available to 21.3 million homes.

Rather than major players leading the charge, the FTTH Council said small incumbent telephone companies had been responsible for most of the growth. RVA, a company that tracks FTTH deployment for the FTTH Council, said that only eight of nearly 880 FTTH service providers had more than 30,000 subscribers and that 97 percent of them had fewer than 10,000. Verizon alone serves more than half of the FTTH households in North America and with 18 million households passed is close to stopping further rollout.

Verizon announced its plan for FiOS (a bundled Internet access, telephone and television service which operates over a fibre-optic communications network) in 2004 and launched services in 2005. At around the same time AT&T embarked on an FTTN strategy with its U-verse service. By the end of 2011, U-verse had passed about 30 million homes and AT&T had called a halt.

However, that halt was short-lived. On 7 November 2012 AT&T announced Project VIP, a $US14B three-year wireline and wireless network expansion plan that included $6B to expand U-verse to pass 33 million customer locations. (AT&T 2012). The expansion is expected to be essentially complete by year-end of 2015. AT&T also plans an upgrade for U-verse to speeds of up to 75Mbps with a path to deliver even higher speeds in the future.

Market research and consultancy Ovum commented:
“U-verse played a role in AT&T’s financial strength. Annualised revenues are now $9.5bn, up 38 percent YoY...The wireline portion of Project VIP is largely an expansion and affirmation of AT&T’s existing strategy to push copper as far as it will go...The bulk of [AT&T’s] wireline network will still support lower speeds per household even after the upgrade, in the range of 45–100Mbps. The speeds will be higher than the existing U-verse average range, but AT&T is hardly entering the gigabit era with these speed upgrades.”

It added:

“Customer demand for 50–100Mbps speed tiers has lagged worldwide, especially at a premium price, and instances of FTTH payback are hard to come by. In light of U-verse’s growing revenue impact, network synergy savings, and DSL technology advancements such as vectoring, AT&T’s less-ambitious but incremental FTTN/DSL approach to network upgrades seems reasonable and pragmatic.” (Ovum 2012)

In 2010 Google announced plans to rollout a 1Gbps FTTH service in one US city, to be chosen through a competitive bidding process. Google said it had no intention of becoming a telco but simply wanted to encourage existing telcos to offer higher speed services. In March 2011, Kansas City Kansas was announced as the winner from over 1,100 contenders, and 17 days later Google announced that it would expand rollout to cover Kansas City Missouri – just across the Missouri river from Kansas City Kansas. Services were launched in November 2012.

Thus at the time of writing (January 2013) US telcos have had almost two years to respond to Google’s ‘encouragement’. It seems few have done so. Wired magazine reported on 11 January:

“Google Fiber was supposed to be a shaming exercise. But any shame felt by the country’s big-name ISPs has yet to produce the sort of ultra-high-speed Internet services we’ve all been hoping for.”

Sources quoted for the article attributed this failure to respond to several causes: a focus on short term returns on capex; an absence of “national drive” and “national policy”, despite the existence of a national broadband strategy; and a focus by major telco Verizon on wireless broadband “given the lower cost of deployment and the absolute killing that can be made charging users a significant amount per gigabyte.”

On a more positive note, it seems that Google’s initiative has spurred some of the 1,100 communities that missed out into action. Wired reported:

“Chicago and Seattle, for example, have both announced partnerships with a new broadband provider called Gigabit Squared to bring fiber internet connections to residents.”

Gigabit Squared is not solely a service or network provider. According to its web site, it is an advisory firm offering a range of services to provide

“facilities operators and communities with the expertise required to discover, transform and build digital broadband capacity for civic transformation and competitiveness in the 21st Century global economy.”

**China**

*China Daily* in March 2012 quoted China’s Industry and Information Technology Minister Miao Wei saying:

“The nation needs to improve broadband speed. Our aim is to install fibre-to-the-home (FTTH) broadband connections for 35 million families this year.” (China Daily 2012)
China Daily said this broadband development plan was a part of China's 12th Five-Year Plan (2011-15), which is to increase the country's average broadband speed to 20Mbps by the end of 2015. It reported Wang Xiaochu, chairman of China Telecom, saying that, as the major provider of China's Internet broadband infrastructure, China Telecom would invest 40 billion yuan ($6.13B) in FTTH networks in 2012, and attract 25 million new FTTH users, bringing the total number to 55 million.

Also in March 2012, the Economist Intelligent Unit reported:

“Over the past two years, the [Chinese] government has unveiled plans to spend a whopping Rmb1.6trn ($245B) by 2015 on the construction of a fibre to the home (FTTH) network reaching 200M households. China Telecom and China Unicom, two state-owned operators, have already pledged investments of Rmb150B ($23B) to build 'optic cities' in China that replace older, copper-line systems.”

The EIU added:

“Yet in most areas where FTTH is already available, few homes have signed up to the service. Akamai and Ookla, two Internet traffic monitors, blame prices that are among the highest in the world for the lack of demand.”

However it said:

“Beijing and Shanghai, China's two biggest cities, consumers look quite keen. Of the 4M homes in Shanghai able to get China Telecom's 8Mbps FTTH service by the end of 2011, 1.3m had subscribed to it. The operator plans to cover 90% of homes in the city by 2015, making 16Mbps services available by 2012 and 50Mbps by 2015.

“In Beijing, China Unicom had passed 4M homes by the end of 2011 and signed up about 1M customers to its 8–10Mbps offer. It aims to raise speeds to 20Mbps for most homes and between 100Mbps and 10Gbps for businesses by 2015.” (EIU 2012)

Among the reasons cited by the EIU for low take-up was:

“Many consumers also feel that copper-line DSL services of between 1Mbps and 2Mbps are good enough, and refuse to pay higher fees for a faster connection,”

and somewhat surprisingly

“power-hungry optic modems - which convert light to electronic pulses on customer premises - are potential fire hazards.” (EIU 2012)

Notwithstanding these remarks, the Chinese Government is reported to be ramping up its FTTH initiatives. China Daily reported on 9 January 2013 that from 1 April 2013 all new residences would have to have FTTH if built in an area where a public fibre optic telecom network is available.

That report also contradicted the EIU’s figure for the Government's FTTH connection target. It said the Government aimed to have 40 million households with FTTH connections by 2015.

In a report on China's fixed broadband network plans published in June 2012, Ovum said:

“The Chinese government's national convergence plan is designed to accelerate broadband market growth, principally by raising the level of competition in the broadband market. In particular, cable operators and China Mobile will be allowed to break the broadband monopoly held by the two major fixed broadband telcos, namely China Telecom and China Unicom, in their respective territories.

“To maintain their competitive advantage, China Telecom and China Unicom have been increasing their investments in fibre infrastructure since 2010 and are
committed to increasing fixed broadband network investment in the next three to five years.”

Ovum added:

“While xDSL is still the dominant Internet access technology in China, it is being challenged by FTTx. The year-on-year growth rate of FTTx connections was far greater than for ADSL connections in 2011...The number of FTTx connections in China is expected to overtake the number of xDSL connections in 2016.” (Ovum 2012)

Ovum forecasts that China's FTTx subscriber base will reach 76.5 million in 2015, representing more than 50 percent of the worldwide FTTx subscriber base.

**Sweden**

Sweden boasts of having been one of the few countries in the world to have had a broadband policy since the late 1990s (Broadband strategy 2009), and also to have been the driving force behind the EU's Digital Agenda for Europe. Its current broadband strategy dates from November 2009 (and has been supplemented with the release in December 2011 of a Digital Agenda for Sweden (ICT for Everyone 2011).

The goals set out in the Broadband Strategy are that 90 percent of all households and businesses should have access to broadband at a minimum speed of 100Mbps in 2020 and 40 percent at that speed by 2015. (The goal set by the Australian Government for its NBN is to have fibre reaching approximately 25 percent of premises by mid 2015 and 93 percent by mid 2021.)

Unlike the Australian policy, Sweden expects that its goals will be achieved largely by market forces. The policy states:

“The underlying principle is that electronic communication services and broadband are provided by the market. The Government should not control the market or technical development. Our task is to establish good market conditions and eliminate obstacles to development. This entails ensuring that there is a relevant regulation in place.”

However it plans to promote investment in more remote areas.

The Digital Agenda claimed that this strategy was largely on track.

“A survey of the market shows that the target for 2015 has already been met and that 44 percent had access to 100Mbps by the end of 2010. The expansion has largely been brought about by the market, but the clear political objectives with a high level of ambition have contributed to driving development forward.

“Market investments, together with work by the Government to establish a market that functions well, have contributed to this positive trend. Government efforts to expand broadband have also made a positive contribution.” (ICT for Everyone 2011)

However, the policy has been less successful in bringing broadband to rural areas. According to the Digital Agenda,

“Certain sparsely populated parts of the country in addition have no access at all to a functioning ICT infrastructure...To meet the demand for high-quality broadband, there is a need for large investments in new infrastructure and more efficient technology.”

Under the 2007-2013 rural development programme for Sweden, the government committed SEK100 million ($14.7M) to measures for reliable and robust electronic communications. The Digital Agenda says that, In addition to this, there are other public investments in
broadband that are planned and carried out by municipalities, county councils and regional co-operation bodies.

Paul Schwartz, CEO of Swedish FTTH CPE vendor Icotera, interviewed by the FTTH Council Europe in August 2012, attributed Sweden's widespread FTTH rollout to a mixture of government policy and visionary network operators.

"In order to keep the less densely populated areas attractive and competitive, Sweden decided that a very strong and future-proof IT infrastructure was necessary. Furthermore, service providers were adventurous, offering FTTH as far back as 1998, even before there was a real need," Schwartz said.

Spain

Broadband infrastructure has been a key component of Spanish ICT policy since the release of its first ICT policy, Plan Avanza in 2005. This was superseded by Plan Avanza 2 in July 2010. Both have been subject to an unusual amount of external scrutiny by the OECD at the request of the current Spanish Government. The OECD held a workshop on Plan Avanza in Madrid in November 2009 and Plan Avanza 2 was the subject of a 122 page OECD report, a preliminary version of which was released in May 2012.

According to the OECD report on Plan Avanza 2, Spain expanded its universal service obligations as of 1 January 2012 to include broadband access at 1Mbps, "positioning it as one of the few countries to have achieved the ambitious aim of guaranteeing broadband access through universal service obligations."

The strategy on NBN-type networks however has not been fully articulated, according to the OECD report. It called on the Spanish Government to “provide a clearer interpretation of these targets and spell out what they actually mean in terms of communications infrastructure.”

The OECD report suggested that “One approach might be to draw up a national broadband plan which should specify:

i) the specific quality of service requirements for the targets;

ii) which technologies may meet the requirements for access, backhaul, and backbone;

iii) whether the targets are to be met by market players only or if public funding will be necessary and/or available.

The OECD's views – which were not specific to Spain – align with those of Australia's Opposition party. It said:

“Any public funding of the broadband network to meet the objectives should be clearly underpinned by a sound cost-benefit analysis.”

And it noted that:

“Ultra high-speed fixed broadband networks require heavy investment, especially those that are fibre-based. A high policy priority is therefore to create a legal framework that provides incentives and certainty for investment in fibre broadband networks.”

Meanwhile FTTP networks have been growing apace in Spain thanks primarily to investment by the dominant carrier, Telefónica, and to a lesser extent by Orange. In June 2012 Orange Spain revealed plans to invest around €300M over the next four years in a fibre-to-the-home (FTTH) network to deliver speeds of up to 100Mbps to around 1.5 million homes and businesses in the country’s biggest cities.
Figures released by the Spanish regulator CMT in January 2012 showed that FTTP penetration had more than doubled in a year to 158,204 premises at November 2011, almost all of these provided by Telefónica.

Research firm Point Topic reported in December 2012:

“Sixty one percent of Spanish homes can already subscribe to superfast broadband services delivering at least 30Mbps of bandwidth.

“In fact Spain has wider superfast broadband coverage than any of the other large European countries except Germany, and it is well ahead of the average for bringing superfast broadband to rural areas as well. In terms of the number of homes passed by superfast services, Spain, with 10.2m, is well ahead of Italy and almost equal with France. Nearly 10% of all the EU homes with access to superfast broadband are in Spain.”

Conclusions

From 2012 to 2017 an estimated $US53.5 billion will be spent upon fibre access network rollouts across all the developed countries, of which an estimated 82 percent will be spent upon FTTH.

Table 1 summarises the results of comparing the policy goals (in terms of access speeds or FTTX technologies, and timeframes) and investment commitments of the six different national governments surveyed, together with the European Union’s policies, in this paper.

<table>
<thead>
<tr>
<th>Country/ Region (with population)</th>
<th>Policy Statements</th>
<th>Goals (in terms of dates, minimum download speeds and penetrations)</th>
<th>Government Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia (23 million)</td>
<td>National Broadband Policy (April 2009); current National Broadband Rollout Plan 2012-15</td>
<td>By 2020: 100 Mbps via FTTH for 93% of premises; 12 Mbps via radio access for the rest.</td>
<td>AUD$30B over ten years.</td>
</tr>
<tr>
<td>USA (315 million)</td>
<td>National Broadband Plan (March 2010)</td>
<td>At least 100m homes to have affordable access to 50Mbps by 2015, and 100Mbps by 2020.</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Connecting America Fund (July 2012)</td>
<td>To bring broadband to 19 million unserved citizens in rural areas by 2020.</td>
<td>$US11M over three years to reach 400,000 homes and businesses. Total of $US10B over five years.</td>
</tr>
<tr>
<td>China (1,358 billion)</td>
<td>None available</td>
<td>FTTH to 200m households by 2015</td>
<td>$US245b (unspecified portion through state-owned telcos)</td>
</tr>
<tr>
<td>European Union (503 million)</td>
<td>Digital Agenda For Europe (May 2010)</td>
<td>By 2020: 30Mbps for all and 100Mbps or higher for 50%, using any suitable access technologies</td>
<td>Heavily restricted under EU policy; under review</td>
</tr>
<tr>
<td>UK (63 million)</td>
<td>Britain’s Superfast Broadband Future. (December 2010)</td>
<td>24Mbps to at least 90% of premises by 2015, using FTTC and FTTH</td>
<td>£530M for broadband in rural areas</td>
</tr>
</tbody>
</table>
House of Lords
Broadband for all --
an alternative vision
(July 2012)
Fibre within the reach of every community and a clear path to the rollout of point-to-point FTTP.
No specific recommendations

Sweden
(9.5 million)
Broadband Strategy
(November 2009)
40% premises to have 100Mbps by 2015 with FTTH and 90% by 2020.
No central funding. Unspecified amounts from municipalities, county councils and regional co-operation bodies.

Spain
(47 million)
Plan Avanza 2 (July 2010)
Universal Service Obligation of 1 Mbps, in addition to EU targets.
Not specified

Table 1 – Comparison of national broadband policies and investments

Rapid development of a widespread FTTH network seems to be high on the wish list of many governments but none of those examined except Australia and China, where the investment is being made indirectly through government-owned telcos, has any intention of allocating the massive funding needed to achieve this goal.

Nor do most have policies designed to foster the rollout of specific high bandwidth fixed access technologies by the private sector. Instead most adopt, or advocate, policies that they hope will create a climate conducive to the achievement of their bandwidth goals by private investors and, for example in the UK and the USA, provide limited funding to improve broadband in rural areas where they know that it will not otherwise be delivered by the market.

The most striking difference between overseas policies and that of the Australian Labor Government is the attitude towards infrastructure-based competition. Many governments see encouragement of this as likely to accelerate the availability of FTTH and other technologies, wired and wireless, that will deliver improved broadband speeds. The Australian government is concentrating on competition in mobile broadband access, through the clearing of spectrum hitherto used for analogue TV and analogue radio to make more capacity available to mobile telecommunications operators (the most likely purchasers of the freed-up spectrum).

Even China, which is pumping funding into FTTH rollouts through state-owned telcos, is reported to be encouraging competition from wireless and cable operators. Competition in the provision of access network infrastructure is also a pillar of Coalition broadband policy in Australia.

In the interests of ensuring a return on its NBN investment the Australian Government is determined that its FTTH network will be the only fixed access network in areas it serves. Telstra's copper network will be shut down as FTTH rolls out, the HFC network owned by Telstra and used by Telstra for broadband Internet access and by pay TV operator Foxtel (50 percent owned by Telstra) for pay TV will be restricted to delivering pay TV services and a rival HFC network owned by Optus will be shut down. Furthermore there is legislation in place designed to prevent both Telstra and Optus from marketing wireless broadband services as direct competition to the NBN, i.e. as fixed access broadband services.

However, it would be overly simplistic to cite overseas attitudes alone to argue against the Australian Labor Government's access infrastructure monopoly approach. Every nation has arrived at its current position in broadband evolution from a different starting point.

In the UK, for example the major HFC network is not owned by the former monopoly telco, BT, which was specifically excluded from providing pay TV services when it was privatised in the mid 1980s. BT's access network arm has been structurally separated and the new entity, Openreach, is rolling out an open access FTTx network.
In the longer term Australia’s broadband may well be the envy of many other nations. While others will have a hotch-potch of broadband access technologies and providers, some competing in the same market and some with, effectively, local monopolies, Australia will have a nationwide FTTH network supplemented with integrated fixed wireless and satellite in rural and remote areas, all with common user interfaces, and with full retail competition.

One thing that all the national policies have in common is their acknowledgement of the need for universal access to high speed broadband. The differences lie in the timeframes to achieve this, the extent to which the more future-proof FTTH access technology is seen as critical to meeting this goal, and the extent to which national governments are ideologically willing (and financially capable) to subsidise the rollout of FTTH in order to achieve a perceived higher level of international competitiveness.

References


The New Zealand Government Ultrafast Broadband Initiative has been in progress now for a little over two years. Are its intended goals being achieved? As at December 2012, the rollout is essentially on schedule, even though there have been some challenges. In particular, the Government specified that most priority customers within the candidate areas should be addressed by the end of 2015 and this appears to be on track. Take-up of services by these customers is also progressing well. The paper provides a brief review of three of the ways the UFB is being used to enhance the outcomes for business, education and healthcare. Residential coverage is also progressing, but the take-up is low at this point of time as suitable services are only just emerging from the Retail Service Provider community. Overall it is assessed that the 10 year programme of work is delivering on expectations at this point in time, but there is still a long way to go and there are likely to be many challenges and perhaps a few surprises ahead.

Background

Back in late 2008, a key policy plank of the newly elected New Zealand National Government (Key 2008) was a $1.5 billion fund for the rollout of Ultra-Fast Broadband (UFB). The aim was to accelerate deployment of Fibre-to-the-Premises (FTTP), to reach 75 per cent of the population, across 33 towns and cities (urban New Zealand) by the end of 2019. The Government specified that the focus in the period until the end of 2015 should be to provide access to priority broadband users (being businesses, schools & health services) as well as Greenfields developments and certain tranches of residential areas.

The Government’s objectives were to use UFB to increase business productivity and support improvements in service delivery in key public policy areas such as health and education.

The Government specified that taxpayers’ investment should be made in conjunction with the private sector, and directed so that it should fund wholesale-only, open-access, common infrastructure. Importantly, a company which sold services to end users, such as households and businesses would be prohibited from owning a majority stake in any UFB infrastructure operator.

Public-Private Partnership

During 2009, after public consultation, the Government issued a tender document known as the “Invitation to Participate” (MED 2009), and formed a Crown-owned company, Crown Fibre Holdings (CFH, www.crownfibre.govt.nz) to manage the UFB initiative.
In late 2010, CFH signed contracts with two electricity lines companies: Northpower (covering the city of Whangarei), and WEL Networks (covering the cities of Hamilton, Tauranga, New Plymouth and Wanganui). Together these represented about 15% of UFB coverage. In May 2011, CFH signed a third contract with Enable Networks Limited, a regional fibre optic network operator owned by the Christchurch City Council. This entity will provide coverage for the city of Christchurch and some surrounding townships, or about 15% of UFB coverage. A fourth contract was also signed with Telecom Corporation of New Zealand (Telecom), the country’s incumbent telecommunications company, to deploy UFB across the remaining towns and cities, representing about 70% of UFB coverage.

![Figure 1 - UFB partner coverage areas.](image)

As required by the UFB tender requirements, Telecom took a proposal to its shareholders to “de-merge” into two entirely separate companies. The proposal was overwhelmingly agreed, and in November 2011, Telecom’s former network division called Chorus was listed on the New Zealand Exchange and the Australian Securities Exchange. Under the demerger:

- Chorus owns the former Telecom’s “last mile” copper assets and new UFB fibre assets in each town and city, plus the rural access infrastructure, and
- Telecom Retail (now simply known as Telecom) retains the company’s retail customer relationships, Public Switched Telephone Network, 3G wireless network, national backhaul network and 50 per cent interest in the Southern Cross international cable system.
It should be noted that the demerging of the former Telecom New Zealand into Chorus and the “new” Telecom New Zealand was a relatively straightforward decision for its board and shareholders for two reasons:

- It enabled Telecom to bid for the opportunity to participate in the UFB initiative,
- It released Telecom from the “Operational Separation” regime that it had been operating under since 2006 (Milner 2009).

The latter reason may not appear significant at first glance, but was an enormous issue for Telecom. It stated that the constraints imposed by the operational separation regime were greatly hindering its ability to address the emerging competitive market in New Zealand. It is open to debate, as to whether the first of the above conditions alone would have been sufficient to make the demerger attractive to Telecom shareholders.

**Ultra-Fast Broadband Products**

The Government defines UFB to mean the availability of broadband services at a minimum speed of 100 Megabits per second (Mbps) downstream and a minimum of 50 Mbps upstream. By comparison, according to Akamai (Akamai 2012) the average Internet speed in New Zealand is currently around 4Mbps downstream and less than 1Mbps upstream.

CFH agreed with the industry and tendering parties on the UFB architecture and product specifications. UFB uses a mixture of Point-to-Point (P2P) and Point to Multi-point optical technologies. P2P services are offered on a wholesale basis in both “unlit” dark fibre at Layer 1 and “lit” at Layer 2 forms. The Layer 2 services use either P2P Ethernet or Gigabit Passive Optical Networking (GPON) technologies.

P2P services are mostly intended for Corporate & Government customers, but can be packaged by Retail Service Providers (RSPs) for use by any customer. GPON services are mostly intended for Residential customers, but will also be packaged for use by Small to Medium Enterprises (SMEs).

Layer 2 products range from a basic starter package operating at 30Mbps downstream and 10Mbps upstream through to 10 Gigabits per second (Gbps) symmetrical in the initial release of services. The starter package was introduced to provide a price point in the residential market which is similar to that for current regulated wholesale ADSL based broadband products. All services can have specified “committed” and “excess” bandwidth components (TCF 2011b) to ensure the delivery of any desired quality of service to end users. Service guarantees are also offered on all products, ranging from “basic” for commodity applications through to “enhanced” for critical applications. The network can be upgraded in future to support advances in technology over time, without any known restrictions to date.

**UFB Deployment Gathering Pace**

UFB deployment commenced with trials in Whangarei, using Northpower as the build contractor in late 2010, but did not gather substantial pace until late 2011. It was early 2012 before the rollout ramped up in the larger cities, such as Auckland, Wellington, Christchurch, Hamilton and Tauranga.
During 2011-12 all four of the Government’s partner’s commenced UFB deployment, activated points of interconnect, conducted testing with Retail Service Providers (RSPs), and connected early adopter end customers. A wide variety of RSPs signed wholesale service agreements to sell UFB services, including a number of non-traditional telecommunications firms.

As at 30 September 2012:

- Around 97,000 premises had been passed by UFB, representing just over 8 per cent of the total deployment;
- Around 102,000 end-users such as households and businesses were able to connect to UFB (a higher number than premises because of multi-dwelling units);
- An estimated 19 per cent were “priority” users (businesses, schools & health facilities) and the remainder residential;
- This means that around 14 per cent of “priority” users were able to connect compared with around 7 per cent of residential households.

Deployment continues to accelerate, and by 30 June 2013 approximately 20 per cent of targeted premises are expected to have been passed by UFB. Critically, deployment is on track to reach the vast majority of priority users by the target of year-end 2015.
As at 30 September 2012, UFB customer uptake was at an early stage, with around 2,500 connections in place, about 2.4% of end users who were able to connect. Importantly, uptake is much stronger amongst priority customers at just over 10%, and is weaker for residential households at just under 1%. This is in line with government policy objectives.

The level of uptake reflects the level of market maturity around fibre-enabled products. The telecommunications sector in New Zealand has been oriented around Digital Subscriber Loop (DSL) based products for over a decade, and the move to UFB, while providing new opportunities, is also somewhat disruptive to RSPs and their operational processes.

**Retail Service Provider Readiness**

The New Zealand retail broadband market is dominated by four RSPs. These are Telecom, with around 49% market share of fixed broadband according to the Commerce Commission [ComCom 2012]; Vodafone (including its recent acquisition of TelstraClear) with around 29%; CallPlus (retail brand: Slingshot) with around 9%; and Kordia / Orcon with around 5%. The remaining 8% market share is spread across around 55 other small ISPs.

Of the large RSPs only CallPlus and Kordia / Orcon have so far launched commercial UFB products for the mass market. These operators have acquired a modest number of high-value new customers through being in the market at an early stage. Telecom and Vodafone (including TelstraClear) remain in customer trials at this stage. As these two companies account for close to four in five retail connections today, any major migration to UFB will depend on their active participation.
Taking a longer-term viewpoint, UFB supports a transition to mainstream use of the Internet for content streaming (triple play/ quad play), application service provision, cloud computing, home automation and the like. These services provide the means for RSPs to grow Average Revenue Per User (ARPU) through differentiated offerings, which offer unique customer value. RSPs choosing to take up the challenge to explore these opportunities may be rewarded in future with enhanced revenue growth and customer loyalty, although this potential first mover advantage has yet to be proven in the New Zealand market.

Northland Leading the Way

Whangarei (pronounced “Fung-ar-ay”) is New Zealand’s 12th largest city, with a population of just over 50,000. The Ultra-Fast Broadband program has made strong progress in Whangarei, as the Government’s partner, local electricity lines company Northpower, commenced rolling out Fibre-to-the-Premises prior to the UFB scheme. With the addition of co-funding from the Government, Northpower has accelerated their rollout and as at October 2012 more than half of Whangarei can access FTTP.

Whangarei’s head start over other cities in New Zealand is already showing interesting examples of high-speed broadband usage & applications emerging. As indicated above, this development has started with the priority customer base, which is aligned to the Government policy objectives. Following are some examples of priority customer adoption (some of which are also highlighted in short videos at http://www.crownfibre.govt.nz).

Magnetism – An innovative software development company

Magnetism is a software development business, with 22 staff located in offices in Whangarei and Auckland. The firm commenced operations in Whangarei five years ago, and has rapidly expanded, so that it now relies heavily on high-speed symmetric broadband to service clients around NZ, as well as Canada and the United Kingdom.

Magnetism (http://www.magnetism.co.nz/) is a Microsoft CRM partner, offering Microsoft Dynamics CRM, software integration, cloud computing solutions and IT training. They are advocates of the “Scrum Agile” software development framework, to deliver rapid, efficient software development, tailored to customer needs. They achieve this outcome with intense collaboration across their own and their clients’ sites, using virtual collaboration tools over
UFB. Magnetism saves time with live business interactions, sharing screens in video by teleconference and using tools such as Microsoft Lync (Microsoft 2012). Through this virtual collaboration both internally and with clients, Magnetism saves money because staff time is used efficiently from their desktops and they do not need to travel or work offsite at a client’s premises.

Figure 5 - CEO of Magnetism using the remote collaboration tools via UFB.

Magnetism can often move 30GB in a single file load. They have stated that without a UFB connection they simply could not operate. The UFB connectivity Magnetism enjoys has been one of the factors enabling it to reach a global marketplace. As a provider of IT services, it foresees that businesses of all sizes will begin to move data such as payroll and accounts to the cloud, enabled by UFB.

**Manaia View School – The first of a new breed of schools**

Manaia View School is a primary school in Raumanga, a suburb of Whangarei, and was the first school to formally use UFB through its connection by Northpower in late 2010. The school is rated as “Decile 1”, meaning that average incomes in the local community are in the lowest 10 per cent in New Zealand. It also has a very high Maori to European pupil ratio. Improving education outcomes for schools with these characteristics is a policy goal for the New Zealand Government.
Notwithstanding these challenges, the school was an acknowledged leader in the use of ICT prior to the arrival of the UFB, which is a major tribute to the local community. Since its connection to UFB, Manaia View has formed a UFB buying cluster with five other local schools. Together they specified common requirements (including software and hardware) to prospective Retail Service Providers, and invited tenders to select the best provider.

Manaia View and the other schools in the area are now using UFB for new forms of e-learning, with an increased number of Apple devices such as the iPad and iPod Touch provided in schools. Pupils have “digital desktops” so that parents can look over their work, alongside their teachers, creating much increased engagement by parents in their children’s learning. They record, upload and share video such as their whakapapa (a recited genealogy which is an important part of indigenous Maori culture).

Large file downloads, which would have previously taken hours are also now completed in minutes or seconds. Whereas a 10GB file would previously have taken more than five hours to download, it now takes around 10 minutes. The improved speed has positively contributed to an increase in overall student engagement, which in turn has helped to reduce truancy and lateness levels, which previously have been problems in this and similar schools.

**Northland Dialysis Service - A new model of care**

Northland is an area of New Zealand where there is a high prevalence of diabetes, with a subsequent high rate of kidney failure. Hence dialysis is an essential treatment routine for a number of patients scattered throughout the Northland region. At the same time, Whangarei Hospital has limitations in terms of qualified renal clinicians to undertake this work. The innovative approach being adopted to address this model of care dilemma is to use a single qualified renal clinician to manage the delivery of dialysis to multiple patients geographically scattered throughout the Northland region, using high-resolution videoconferencing facilities.

Dialysis machines can be deployed at a number of Integrated Family Health Centres located throughout the Northland region, so that they are close to where the patients need them. The set up and operation of the dialysis machines is done by suitably qualified nursing staff, under the watchful eye of the remote renal clinician, who is physically located in Whangarei hospital. The renal clinician spends time with each patient to assess current conditions prior to, during and after each dialysis session, to ensure that there are no irregular conditions arising. In this manner, a single clinician can manage several dialysis sessions simultaneously with patients located around the region. Two satellite facilities are currently in operation.
Integrated Family Health Centres located within the Whangarei city are connected to the Whangarei hospital via UFB. Those located in outlying towns are connected via the Rural Broadband Initiative (Treloar 2012) which provides fibre connectivity for schools and selected health facilities outside of the 75% urban UFB coverage area. In order to properly manage patient safety and privacy, the connectivity is delivered under the Connected Health (NHITB 2012) virtual private networking umbrella.

**Residential Take-up**

As indicated in the introductory material, the government identified the need to service businesses, educational institutions, health facilities and other government entities as a priority within the UFB rollout. As can be seen from the examples described above, the early focus has definitely been placed on these entities. However, in parallel, there is a need to deliver the benefits of UFB into residential premises.

Residential take-up has been slower than priority customer take-up, as this has been dependent on the deployment of a GPON based layer 2 capability onto the fibre infrastructure. In most areas of the country this capability has only been deployed in scale in recent months. CFH’s partners and RSPs have found a few “teething” issues with this equipment, and have been working to improve their offerings. In addition, the cost of provisioning residential customers has been challenging.

As in most countries where fibre has been rolled out to residential customers, the initial delivery of service into residential homes has faced process difficulties, and so the initial cost per connection has been high. The last six months has been focussed on improving the provisioning process into residential homes across the UFB deployment areas; there is still a lot of learning to be done. Industry collaboration on a common approach to the provision of operational support capability for UFB is being supported by the Telecommunications Carriers Forum (TCF) (TCF 2011a).

It also needs to be noted that to date, the services that are being provisioned are quite simple, being broadband access and Voice over IP type services. While residential uptake so far has been modest, it can be expected to grow in 2013. In the longer term it is expected that entertainment video services for home consumption will drive residential uptake, but this component of the market is immature today and will take some time to evolve.
Overall innovation in terms of applications which drive UFB uptake in the residential market is at an early stage of maturity. Data Caps have been steadily increasing and various forms of storage are beginning to be bundled with the broadband connectivity packages. RSPs are experimenting with offering UFB plans with low national & international contention ratios to deliver improved end-to-end broadband speeds. However, there is still a long way to go before we see real service innovation emerging in the residential UFB market.

**Achievement of Policy Objectives**

The UFB rollout in New Zealand is some 18 months into a nine-year program of work. Fewer than 10% of the premises expected to be passed as part of this initiative have been delivered. Given the ramp up period required to achieve scale deployment of the fibre infrastructure, progress to date is on track to achieve the government objective of passing 75% of the New Zealand population by 2019. Looking ahead, extension of UFB coverage beyond 75%, while possible, would go beyond current Government policy, potentially requiring additional taxpayer funding.

Take-up of the UFB services was always expected to lag behind the deployment of premises passed, as RSPs need a mass of customers to address before they can economically deliver services. In the priority market segment, the required market scale is beginning to emerge and RSPs are beginning to address these customers enthusiastically. As illustrated, some of the expected innovation is starting to emerge in terms of the business, education and health sectors of the economy. It is still early days and the current suite of applications can only be considered as indicative of what is expected to follow. However, the progress to date is promising and supports the Government’s policy expectations.

The progress to date in the residential market is somewhat less certain. It is too early to tell how uptake is going to emerge. The next three to four years will be important in providing a more definitive story. Eventually it is also hoped that take-up in the residential market will complement that in the priority market sector, and the synergies between the two will provide a further boost to economic growth. This is yet to be determined based on current experience.

**Conclusion**

The Ultra-Fast Broadband Initiative in New Zealand was established as a primary policy plank of the National government in the 2008 elections. By the end of 2009, Crown Fibre Holdings was established and during 2010 and into 2011, the private entity partners to deploy the fibre were selected through a competitive process, forming a type of Public Private Partnership. During the second half of 2011 through to now, fibre deployment has been ramped up across urban New Zealand and over 100,000 premises have now been passed.

The take-up of UFB services over this new infrastructure has lagged behind the deployment by a few months, but is now gaining traction, especially in the priority segments. This is in alignment with the intentions of the Government’s policy. Several innovative examples of the use of the UFB have been illustrated, which demonstrate the potential economic value expected to be derived through this joint public and private sector initiative.

There is still a long way to go! We are at the beginning of the journey, and progress to date is meeting expectations (Adams 2012). At the same time, we are discovering the many challenges associated with this type of national deployment. The next few years will continue to present some challenges and without doubt a few unexpected surprises.
References


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Converging on an NBN future
Content, connectivity, and control – a symposium overview

Catherine Middleton
Ryerson University
Sora Park
University of Canberra
Matthew Allen
Deakin University

This paper provides an overview of presentations and discussion at the October 2012 “Converging on an NBN Future” symposium held at the University of Canberra. Key themes explored in the paper include recognition of the importance of Australia’s National Broadband Network as an enabler of the digital economy (noting the importance of network ubiquity and reliability as well as speed) and its central role as platform for innovation and new service delivery. The paper outlines challenges in selling the NBN and notes the need for increased digital literacy across society, industry and governments. Policy issues arising in developing next generation communications infrastructure and services are discussed. The paper concludes with symposium participants’ recommendations for advancing the NBN.

Background

In October 2012 the University of Canberra’s Faculty of Arts and Design hosted a public symposium on the topic of “Converging on an NBN Future: Content, Connectivity, and Control.” Featuring thirteen speakers from industry, government and academia, with input from an engaged audience, the symposium raised and discussed a variety of critical questions relating to the National Broadband Network (NBN) as it commences widespread operations in Australia. This paper provides an overview of symposium presentations, organised around common themes, and concludes with a summary of recommendations that emerged from the insights of presenters and the audience.

While the symposium participants recognise the potential for change in the scope and scale of the NBN once the next federal parliamentary election has been concluded, discussion at the symposium focused on the current vision for the network, as a wholesale-only, open-access network providing fibre-optic cable connectivity to 93% of Australian premises, with the remaining 7% to be served by fixed wireless or satellite connectivity (Wong and Conroy 2010). At the time of the symposium the reference document guiding the development of the NBN was the 2012-2015 Corporate Plan (NBN Co Limited 2012). The government’s vision for realising the benefits of the National Broadband Network is set out in the 2011 National Digital Economy Strategy (Australian Government 2011).

Connectivity will enable the digital economy

There was strong support for the NBN vision from symposium participants. If rolled out as planned, the NBN will deliver better connectivity to all Australians, enabling economic growth and social sustainability. Speakers confirmed the frequently cited benefits of the NBN as a platform for improving access to health, education and local government services but also emphasised its potential as the primary mechanism for delivery of television and other entertainment content, such as games and music, in future. Rather than viewing the NBN as
simply a project to build a faster Internet network, speakers affirmed that the NBN was important for its ability to deliver innovative telecommunications services to users independent of the Internet. From this perspective, raw speeds and technical specifications are less important than the development of ubiquitous, reliable and affordable broadband infrastructure. Robin Eckermann (Robin Eckermann & Associates) and Rosemary Sinclair (University of NSW) reiterated the importance of reliability and cost when extending improved connectivity to regional Australians (Sinclair chaired the 2011-2012 Regional Telecommunications Independent Review Committee and Eckermann served as a committee member).

As fixed broadband infrastructure, the NBN offers enormous scope for new models of service delivery. While the NBN model has been criticised for eliminating facilities-based competition among fixed broadband network providers in Australia, Catherine Middleton (Ryerson University, Canada) noted that facilities-based competition between cable and incumbent telephone providers in the United States and Canadian markets has yet to result in competitive higher speed broadband offerings. Data from both countries\(^2\) indicate that only about 15% of households have a choice of service provider for broadband speeds greater than 30 Mbps, allowing for the conclusion that facilities-based competition will not quickly deliver Americans and Canadians the same quality of broadband connectivity as being rolled out by the NBN. Participants emphasised the importance of this insight, as it demonstrates that competition between facilities-based broadband providers is not always sufficient in improving connectivity.

Service-based competition on the NBN will enable innovation and choice in service delivery. NBN Co’s Sean Casey noted that households will be able to get a variety of services from multiple providers, enabling them to choose different suppliers for Internet, public services, home monitoring, and entertainment. Geoffrey Heydon (Australian Centre for Broadband Innovation) suggested that there are many models of service delivery yet to be developed, noting that to date the focus has been on building the delivery platform (the network) rather than exploring innovative business models for using it. Heydon and Middleton noted the opportunities that arise for developing services that do not use the commercial Internet, but instead make direct connections over the NBN. For instance, closed networks could be developed to control delivery of educational content to students, and local networks could deliver services within communities.

Recognising that connectivity is central to accessing services in a digital economy, many speakers highlighted the need for improved mobile services. The NBN is a fixed network, but demand for connectivity and services in a digital economy is not limited to fixed locations. While acknowledging that, at present for many Australians, mobile access offers a supplementary service rather than a primary form of access,\(^4\) and noting the limits of wireless service delivery, participants made a strong case that the connectivity enabling a digital economy should not be location dependent. Ubiquitous, affordable and reliable access must be available to mobile users, not just at the fixed locations served by the NBN. In particular, the need for better mobile service in regional Australia was highlighted.\(^5\) The implicit conclusion is that two related markets exist, and that since historically private-sector delivery of broadband has concentrated on mobile access leading to comparatively better services in that domain than in fixed-line provision, it is entirely appropriate for Australia to develop the NBN along with further mobile services. Neither will overmatch the other, and both will contribute materially to exploiting the social and economic opportunities of digital computing.

**How is the NBN supporting innovation in the digital economy today?**

The Department of Broadband, Communications and the Digital Economy's (DBCDE) *Digital Hubs* and *Digital Enterprise* programs are getting underway in communities where the NBN is operational or construction has begun.\(^6\) These programs are helping local governments, small and mid-size enterprises (SMEs), and not-for-profit organisations learn to operate in and benefit from the digital economy. Importantly, participants believed that the
NBN was helping to make these benefits more widely known and available even given the fact that there has been more than 15 years of Internet access in Australia for such ventures. Not only does the NBN offer the ubiquity, reliability and speed necessary for these benefits to be exploited (especially given the patchwork quilt of existing broadband connectivity), but the investment of funds in education programs enables people to shift their thinking to transform their activities for digital network engagement, rather than simply transferring existing approaches online.

DBCDE’s Keith Besgrove noted early successes in using the NBN for government service delivery (e.g. City of Onkaparinga, SA) and provision of youth mental health support services (e.g. Kiama, NSW). He also noted the potential for implementing emerging assistive technologies that work on faster networks to improve opportunities for social and economic engagement for those with disabilities. The EduONE program (New England region, funded by the Digital Regions Initiative) is demonstrating ways that the TAFE sector can offer rich, interactive learning experiences to students across the country through NBN-enabled virtual classrooms.

Besgrove also emphasised the profound economic benefits to be realised through increased uptake of cloud computing, a service that will be easily accessible to SMEs across the country through the capacity of the NBN. Increased uptake of teleworking is another benefit of the NBN, allowing for flexible working arrangements and making a contribution to achieving the digital economy goal of improving environmental sustainability. As the NBN extends to regional and remote Australia, it will provide increased and improved employment opportunities through teleworking.

Innovation will be driven by broadband users and service providers as the NBN deploys more broadly across Australia. The NBN is already enabling service providers to enter new markets and deliver new services. For instance, NBN Co’s Casey noted that the vast majority of Australia’s Internet service providers are now qualified as retail service providers on the NBN, allowing them to offer faster, more reliable broadband connectivity to their customers. Additionally, companies that previously only offered services using one type of technology (e.g. satellite broadband providers) are now able to offer services across all three of the NBN’s technical platforms, allowing them to expand their customer base and offer new products. Casey also noted that higher-speed plans are more popular than anticipated, confirming the founding premise of the NBN, that customers understand and want the better services that come from faster connections. He emphasised the role that educators and universities can play in developing new services. AARNet (Australia’s academic and research network) is using the NBN to facilitate linkages among educational institutions and could provide educational services to homes using the NBN.

Challenges and opportunities

Participants agreed that the NBN has great potential, but there are also many challenges that must be addressed in order for Australians to realise the full benefits of an NBN-enabled digital economy. Digital literacy is a central concern, not only for consumers but also for SMEs and local governments, especially in regional and remote areas where there has been limited experience with high-quality broadband connectivity. As noted above, DBCDE is implementing programs to help SMEs and local governments learn about the digital economy and to develop and use digital services in ways that create economic benefits. Sinclair noted the Regional Telecommunications Review recommendation that the Digital Hubs program be extended to communities across regional Australia that are not current NBN release sites. She stressed that people need to learn that they should not wait for the NBN to come to their communities before thinking about the digital economy.

Research by the Australian Communications and Media Authority (ACMA) is instructive in understanding the current state of digital literacy among Australians, offering insights on connectivity, capability and confidence in the online environment (Australian Communications and Media Authority 2012a). Consumers do not always fully understand the
digital services they are using (Australian Communications and Media Authority 2012b), and many Australians lack confidence in using online tools and report concerns about security risks (Australian Communications and Media Authority 2011). Noting programs like Cybersmart (targeted at youth, parents and educators), ACMA’s Lesley Osborne discussed how the Authority is actively responding to these concerns. She noted that the ACMA provides advice for consumers to protect themselves from spam and to stay safe online.

Gwang Jae Kim (Hanyang Cyber University) and Sora Park (University of Canberra) suggested that Australia can learn from extensive research into digital literacy in Korea, adapting to the Australian context practices that have proven successful in Korea. Strong government-driven policies enabled a widespread penetration of broadband. However the second level digital divide is still potentially an issue. Due to this gap in access and skills or usage, there has been considerable increase in reports of cybercrime and other negative activities. New policies are attempting to address such issues. For example, the Korean Communications Commission (KCC) states in their 2012 Annual Report that user welfare, effective competition and cyber security will be the core policy drive of the future BcN² policy. KCC is aggressively introducing cyber ethics program to schools and coming up with preventive measures to keep cyberspace safe and secure. The concern for some is that the current focus on technical development of the NBN, even given the programs run by DBCDE, risks leaving a skills and knowledge gap which might be hard to fill once the NBN is completed.

Symposium participants noted that there are serious non-technical barriers to overcome to enable Australians to understand the NBN and what it means, not as a technology but as a socio-technical change. Matthew Allen (Curtin University) reminded participants that the potential of using broadband networks to deliver improved educational, health and government services has been understood and promoted for decades. He noted that many services that have been promised for years and are now understood to be feasible because they will be deployed over the NBN can in fact be delivered today, using existing broadband networks. The problem is not inadequate broadband, it is that services have not been developed in ways that are compelling to users or that meet the needs of service providers. In other words, the NBN, while improving and extending reliability to all Australians, will not of itself miraculously make people change their perspectives and habits; at the same time, as evidenced by the rapid development of unexpected network innovations in the 1990s and 2000s (such as the use of SMS on mobile networks and the rise of Facebook, Twitter and other social media), the NBN will produce an enormous potential for unanticipated change, whose benefits cannot yet be predicted accurately.

Digital service delivery necessitates changes in business processes. Process change can be complex, often requiring engagement with multiple stakeholders. Digital service delivery may challenge existing business models by changing the relationships among service providers and service consumers. For instance, a TAFE college can develop virtual classrooms to deliver services anywhere in Australia, thus raising questions as to how state governments might continue to fund the TAFE sector. Likewise, investments in health care services by one level of government may realise benefits for another level, making existing funding models unsustainable. Such disruptive effects have already been felt in commercial sectors such as gambling, where the delivery of services online has decoupled the benefits realised from the locality in which costs are incurred.

The Regional Telecommunications Review committee recommended establishment of a National Digital Productivity Council of Experts in regional service delivery. This council would bring together representatives of Commonwealth and state/territory governments and industry to “address systemic barriers to the adoption of national digital productivity initiatives” (2011–12 Regional Telecommunications Independent Review Committee 2012, p. 79), including telehealth and e-learning.

Changing service delivery methods can also force change upon those using the services. Not only do Australians need sufficient digital literacy to access online services, they also need to be open to changing their mindsets as to how certain services are delivered. Casey gave an
example of ‘flipping’ the classroom, meaning that students could access course content at
home by watching videos and online lectures, and then do their ‘homework’ at school with
the assistance of their teachers. The move to teleworking enabled by the NBN offers another
example of significant change, employees and even clients facing new ways of managing
interactions and providing or receiving services; see for example Bosua et al. (2013). As an
audience member observed, there is a real need to work out how to use new services. It was
also suggested that there is a need for a debate about the practice of replacing offline services
(i.e. local, in person services) with online services.

Several participants commented on the scale and complexity of changing large social systems,
especially in the health and education sectors. Sinclair noted that large systems do not deal
well with exceptions, meaning that applications that can serve critical masses of users across
all types of connectivity must be built to the lowest technical common denominator. As the
NBN is rolled out, however, it will provide a sufficiently robust connection to support a wide
variety of services even for those accessing the network by satellite.

Heydon compared the NBN to a road, noting that to date much of the effort has gone into
designing and building this road rather than thinking about what to do with it. As the
construction of the road continues, the focus must shift to thinking about what can be done on
this road. Heydon suggests new business models will develop, resulting in transformation
across all sectors of the economy and fragmenting the ways that revenues flow between
consumers and suppliers. The focus will soon need to shift away from the technology of the
network towards the development of easily used devices and applications, as has occurred
with tablet computers.

Provocatively, Heydon argues that the “digital literacy of the future will be complete
ignorance,” but the challenge is that “we’re not there yet.” From this perspective, digital
literacy must be addressed from two directions – by increasing skills and knowledge, while
also decreasing complexity. In this scenario, innovations in how digital network experiences
are created, packaged, sold and sustained could prove the most profitable use of the NBN. As
Allen noted, ‘selling’ broadband has always been a tricky business for both governments and
commercial entities – perhaps the selling of experiences might prove more effective.

Kim and Park described Korea’s plans for building an ‘ultra-broadband convergence network
(uBcN).’ It is projected that by 2015 about 20% of the broadband homes will be connected
with speeds greater than 1 Gbps. This network will offer 10 Gbps service by 2016, with the
goal of widespread use of these speeds by 2020; this approach suggests Australia should also
expect some lag between the deployment of the NBN and the commencement of its
transformative uses. Driven by ICT policies that have successfully fostered e-government, e-
learning and e-commerce, broadband in Korea has, however, demonstrably enabled social
connectedness. There are opportunities for Australia to learn from Korea how to develop
integrated ICT policies to foster use of broadband networks, and to understand how ever
increasing network speeds can be harnessed to provide value to citizens, not through speed
itself but through the richer social engagement between people mediated by networks capable
of near-instantaneous interactivity for social, commercial and political events

Putting television on the NBN will offer many Australians their first experience of an NBN-
enabled service that is not the Internet. Gerard Goggin (University of Sydney) observed that
the multiplicity of devices now being used to access television content is creating new
ecologies of television driven by users and changing the ways that Australian stories are
consumed. Television is available on a whole range of platforms (including mobile, internet,
and digital over the air), and consumers are much more able to watch what they want, when
they want it. Television and sharing of audio-visual content is no longer just a broadcast
activity–people are able to contribute content to be shared with others and can join common
conversations while watching TV, raising questions as to the roles of trusted intermediaries
and brands. Broadcasting has been not at the forefront of policy discussions around building a
digital economy, so there are many issues to consider as content creation and delivery is
established in this new technological environment.
Selling the NBN

Symposium participants are keenly aware that the vision for, and the potential impacts of, the NBN are not well understood by many Australians. Participants suggested that there has until now been too much focus on the technical details of the network rollout of the NBN. Middleton noted that the central message of government policy is that the NBN is critical infrastructure, a point often overlooked in marketing which largely centres on faster internet connections. There has been insufficient focus on the value of improved connectivity in extending coverage to underserved regions, increasing reliability, and allowing for services not possible with today’s business models of service provision. However, as Allen discussed, selling the NBN is a complex matter, in part because of tensions and contradictions inherent in messages that try to reassure users that the NBN is just an upgrade to technologies people are already familiar with, while simultaneously setting out a vision of the NBN as something offering an exciting new future.

Allen explained that selling the NBN involves more than the political sale of the current vision of the NBN. Selling is also about commercially selling the high-speed connections now on offer by retail service providers, and it is about systematically selling the idea of change. Ultimately however, it is about creating a long-term understanding of the NBN across a diversity of stakeholders, an understanding that will emerge and evolve as the network is experienced and ultimately taken for granted. The selling of what the future of the NBN ought to be will give way to what it becomes, as its possibilities (many unanticipated) are discovered, demonstrated and entrenched. History suggests that users will define the ways that broadband connectivity offers them value, regardless of corporate or government visions of a broadband-enabled future.

Australia’s broadband future may change as a result of the 2013 federal election. It can be assumed that a Labor victory would result in the NBN rollout continuing according to the existing plans. However, Shadow Minister for Communications and Broadband Malcolm Turnbull has indicated that a coalition government would favour fibre to the node infrastructure rather than the NBN’s current fibre to the premises approach, and would also reprioritise plans to upgrade services in areas it has identified as being in most urgent need of improved broadband connectivity (Turnbull 2012).

Turnbull recently stated that “we in the Coalition believe the NBN will again be an important election issue in 2013” (Turnbull 2012). As the election campaign is yet to unfold, assessments of whether or how broadband will influence the outcome are speculative. What is clearer however, as discussed by Tony Eyers (Tektel), is that most Australians have very little information on which to develop an informed opinion about the network and its benefits. Despite this lack of information, Australians will be making a choice about Australia’s broadband future when they vote in the September 2013 election.

Eyers argued that the language of the NBN Co and Federal government websites (http://nbnco.com.au and http://nbn.gov.au) makes both sites inaccessible to the general public. For instance, NBN Co’s description of the NBN begins by stating “The NBN is Australia's first national wholesale-only, open access communications network that is being built to bring high speed broadband and telephone services within the reach of all Australian premises.” (NBN Co 2012) The government’s site explains that “The National Broadband Network is a next-generation broadband network designed for Australia’s future needs. The network comprises of three technologies - optic fibre, fixed wireless and next-generation satellite – and will provide more reliable, high-speed broadband access to all Australians.” (Department of Broadband Communications and the Digital Economy 2012) As Allen observed, “Messages that resonate with everyday consumers aren’t the ones being used.”

While both NBN Co and DBCDE websites offer videos and fact sheets explaining ways that the NBN will benefit Australians, Eyers argued that current information is insufficient and is not creating engagement with the general public. He noted the government’s NBN Facebook page has fewer than 2000 ‘likes’ (by the time this article went to press, it had about 2050 ‘likes’, in comparison, Qantas had close to 315,000 and Telstra customer service almost
NBN Co’s most popular video on YouTube has been viewed about 40,000 times, but most of its videos have been viewed fewer than 2000 times. Further, there are not yet enough customers connected to the NBN to share their experiences in a way that will have an impact on general public opinion about the network. Additionally, he suggested the media could be more effective in explaining the differences between the government and opposition views on broadband. Eyers has developed his own site, at http://broadbandexplained.com, to offer a ‘simple explanation’ of the NBN and provide links to consumer information and NBN technical documents, but notes that like the other sites, without word of mouth or advertising to drive traffic to this site, it remains difficult to reach those who might be interested in learning more about the NBN and alternatives.

Policy issues

What about mobile? The NBN is designed to deliver fixed broadband services to Australians. Evidence from the Regional Telecommunications Review and data collected by the Australian Bureau of Statistics demonstrate enormous demand for mobile communication services, but it was noted there is no equivalent approach to the NBN to address market failure in the delivery of mobile services in regional and remote Australia. Several symposium participants stressed the need for policy to address the provision of mobile communication services across the country. If, as the government states, broadband is essential “to improve Australia’s productivity and economic prosperity, assist the nation’s fight against climate change, improve service delivery in the critical areas of education and health and ensure the connectedness of our regions,” (Government of Australia 2009, p. 6) then surely such benefits should not be realisable only when and where fixed broadband connections are available. Likewise, the objectives of developing broadband as “a significant piece of Australian critical infrastructure that will underpin the provision of a range of essential services to the Australian community” and ensuring “access to affordable, high speed broadband” (Wong and Conroy 2010) should not be location dependent.

What about television? Goggin called for debate and discussion on a policy framework to guide the development of television services on the NBN. He identified a real disconnect between the current policy environment and the emergent user driven dynamics that are creating new varieties of television. Television must be considered as a central component of a unified policy framework, a framework that also covers the development and delivery of fixed and mobile networks and services.

Heydon observed that as the quality of television and video content continues to improve and increases the number of bits presented on the screen, it will no longer be possible to deliver television content by means of over the air broadcasts. High-capacity fibre networks will be needed to deliver the next generations of television. Furthermore, even if continuing to broadcast television over the air were technically feasible, Heydon argues that the spectrum used today for television broadcasting will become too valuable for television, and will need to be reallocated, helping to solve the need for fast mobile network connections. These observations reinforce the need for a unified policy framework that can ensure the telecommunications and broadcasting infrastructure meets the needs of Australians as services converge onto a single digital platform, accessible through wired and wireless networks.

What about policy evaluation? Franco Papandrea (University of Canberra) offered some thoughts on the application of policy evaluation tools to assess the NBN. Questioning why the government has ignored standard evaluation policy tools, he noted that enormous social welfare losses can be generated by policies that lack proper analysis. He noted the need to clearly define the problem for which the NBN is a solution, and called for the development of measures to assess the benefits of the NBN as compared to the status quo (e.g. what are the incremental benefits in increasing network speeds from 12 Mbps to 100 Mbps? what demand is there for higher speed connectivity?). He also called for assessment of the decisions to implement equal pricing across the country, and to structure NBN Co as a monopoly network operator and noted the importance of tailoring connection strategies to the needs of consumers.
In discussion, Casey reminded the audience that the NBN is an investment in national infrastructure. Participants noted that the long time frame for the NBN roll out make cost-benefit analysis difficult. They argued that a credible methodology for conducting cost-benefit analysis for the NBN has not been offered by anyone, and countered with examples of successful large scale public infrastructure projects that did not undergo cost benefit analysis. There are challenges in assessing demand based on current broadband uptake patterns, but it was noted that more could be done to promote the positive impacts of NBN applications and services already in use in locations where the NBN is now operational. The development of the Internet to this date also shows a trend by consumers to always seek to exploit the benefits of new and faster connectivity.

Conclusions and recommendations

Symposium participants offered a variety of perspectives on the development of the NBN. There was fairly broad consensus as to the benefits the NBN can bring, coupled with informed discussion about the complex challenges that must be addressed in order to fully realise the network’s potential as an enabler of the digital economy and a means to enhance social connectedness in Australia and beyond. This section summarises the main themes discussed at the symposium, and offers recommendations for advancing the NBN.

The NBN is not just about speed. The NBN is often described as a project to bring faster broadband services to Australians. Symposium participants agreed that the real value in the NBN is in the connectivity it will offer, connectivity that is affordable, ubiquitous and reliable, and enables service delivery. The NBN will provide faster broadband (especially important in regional and remote areas that have limited availability at present), but must be understood as a national communications infrastructure that enables service delivery rather than just a fast network. Structuring the NBN as an open-access wholesale network ensures competition among service providers, allowing the focus of innovation and investment to be on service delivery rather than on building competing fixed broadband infrastructures.

Speed is significant for what it can do for new services dependent on faster datastreams; however in many cases it is the ubiquity of the network that makes it most valuable, allowing businesses and governments to assume connectivity will exist. Broadband should not be merely regarded as a type of a network infrastructure but rather as an ecosystem that includes both the supply and demand components, including networks, services, applications and user demand.

The NBN will be an enabler of Australia’s digital economy, but action is needed to ensure this outcome. Participants discussed a variety of programs that are in place to foster digital literacy, among individuals, SMEs and local governments. These programs require ongoing support to ensure that Australians have the capacity to benefit from digital service delivery and the skills to innovate and discover ways to use a national broadband infrastructure that improve quality of life and increase economic opportunities. Businesses (especially SMEs) and governments have an opportunity to develop new digital goods and services that meet citizens’ needs, and will benefit greatly from initiatives to help them share their successes, understand the challenges of process and business model change and learn how to overcome barriers that constrain widespread participation in the digital economy. Emphasis should be placed on moving away from trials of services in favour of rolling out services available to all. Lessons can be learned from countries like Korea that have been successful in developing policies to foster e-government, e-learning and e-commerce.

Better information is needed to explain the benefits and costs of the NBN to the public. Australians will face a choice of two broadband futures in the 2013 federal election. Some participants suggested that neither the NBN Co nor the DBCDE efforts to inform Australians about the purpose and value of the NBN have been very successful in capturing the general public’s interest. It is difficult to foster a national conversation about the benefits of the NBN or the experiences of connectivity it enables when there are currently so few Australians actually using the network. In an environment where many Australians are supportive of
efforts to improve broadband services across the country, it is important to help people understand the differences between the Labor and Coalition plans for Australia’s broadband future. The media and independent observers have an important role to play in offering objective assessments of the two approaches.

**Mobile connectivity is key.** There was strong consensus at the symposium that participation in a digital economy should not be constrained by location. Mobile connectivity is essential in realising the benefits of a digital economy, and is a critical component of a national digital infrastructure. Efforts must be made to address lack of reliable, affordable mobile connectivity in regional and remote Australia. There are two elements of broadband networks that are not necessarily consistent with each other. One is the connectivity that high capacity networks can provide and the other is the ubiquitous access - the “always on” feature. Mobile technologies complement fixed broadband by enabling true ubiquity.

**New business models require new policy discussions.** The NBN will offer many opportunities for disruption of existing business models, changing the relationships among stakeholders and in cases like television, shifting more control to the users. Television was highlighted as an area that requires reconsideration of existing policies, as patterns of use and modes of access change in the digital environment. Increased demand for spectrum for use in providing telecommunication services and limits to the quality of television service that can be delivered over the air will lead to calls for shifting television away from over the air transmission and onto fixed broadband networks. Policies governing broadcasting and telecommunications must be reassessed as the provision of content shifts to a digital form, accessible on demand over fixed or mobile networks.

**Next steps.** The symposium organisers (Sora Park, Matthew Allen, Catherine Middleton and Chun Liu of Southwest Jiaotong University, China) thank all the participants for their insightful contributions to this discussion on the future of the NBN. This article acts as a record of the forum, and provides the basis for further debate and discussion around the general themes addressed by participants. We hope that local champions, industry leaders, and governments will help in advancing the issues raised, and take steps to implement recommendations suggested here. We encourage academics to continue to offer critical analysis of the NBN and the development of Australia’s digital economy. We will be following up ourselves with new initiatives that continue to explore the development of digital literacy among Australians and the evolution of the policy environment that is guiding the development of Australia’s digital economy.
Converging on an NBN Future: Content, Connectivity, and Control

Public Symposium at the University of Canberra, October 9th, 2012

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### Endnotes

1. The list of speakers, noting their affiliations and topics, is provided at the end of this paper.

2. This paper does not outline the details of the National Broadband Network as they have been discussed extensively elsewhere, including in this journal (e.g. Horsley and Gerrand 2011). The Department of Broadband, Communications and the Digital Economy maintains a webpage with current information on the NBN at http://www.dbcde.gov.au/broadband/national_broadband_network and the NBN Co website is at http://www.nbnco.com.au.

4. For instance it was noted that 94% of data downloads are done on fixed rather than wireless networks (Australian Bureau of Statistics 2012).

5. Sinclair provided an overview of the recommendations of the Regional Telecommunications Independent Review Committee (see 2011–12 Regional Telecommunications Independent Review Committee 2012, for details), with Eckermann reiterating the need for anytime anywhere access to information.


7. Broadband Convergence Network (BcN) is the name of Korea’s next generation network, delivering at least 100 Megabits per second.

Why I am a champion for Tasmania's NBN

Darren Alexander
Autech

Much has been written about a reported high cost of the NBN. This paper looks at some of its benefits that are helping to make Tasmania potentially as much a centre of the economic world as London, New York, Sydney or Melbourne. Beyond economics, and significantly for Tasmania, it looks further at how NBN makes it possible to share in world trade from this environmentally rich part of the world with its wealth of quality human resources eager to fully exercise their worldly skills within the comfortable, relaxed and healthy natural lifestyle that Tasmania wishes to preserve.

It's not about politics

At the outset, this writer must admit to being passionately pro-Tasmanian first and foremost. I am not known for political preferences, and I do not support any particular team in politics. The National Broadband Network (NBN) rollout should not be about politics – it is about our local economy's health and Tasmania's future. In my eyes, we are collectively here all part of Team Tasmania, and if the ship sinks economically, we all drown. The same goes for the rest of Australia. Today, regions and countries compete for economic wealth. If people are the lifeblood of an economy, efficient modern communications will be the oxygen to fuel its performance and competitiveness.

Inferior and sluggish telecommunications infrastructure can only weaken the relative health of any economy. The people are our community, and for them to be happy and enjoy well-being and prosperity we need businesses and commerce that successfully employ, feed and sustain us. The Government's role is to provide the best infrastructure to facilitate opportunities for our businesses. In the world today, healthy communities need leadership, strong economies and a consistent, well thought out future strategy. A vibrant digital economy offers new opportunities for every existing community.

A future for Tasmania

Some 'ultra green' Tasmanian friends still think that pursuing economic wealth is akin to greed and business immorality, and that we can all live next door to virgin forests, on self-contained farms creating an shipwreck of local produce. The hippy dream that we can barter our surplus produce for that of our neighbours and remain economically self sufficient independent of the outside world or of generating globally tradeable currency is a noble but self-defeating dream. It is the hallmark of a number of third world countries.

It is true that Tasmanians live on a beautiful island of abundance. There is premium seafood, plump beef, fat lambs, choice fruit and fresh vegetables, pure water and probably the cleanest air anywhere in the habitable world. Throw into that life-style mix exceptional cool climate wines, and a relatively small but well-educated population. There is also room for almost
anyone to own several acres of land, there are clean beaches, deep rainforests beautiful golf courses, and we consequently enjoy a great life-style.

So, why in Tasmania, is there any need to worry about the benefits of a National Broadband Network? Amongst the top ten contributors to Tasmania's economy information communication is currently ranked tenth, well behind processed metals of zinc and aluminium, tourism, manufactured goods [especially boats], wood and paper, mineral ores, seafood, meat, dairy products and other food and drink1. This is at large a rural economy of only half a million people.

As international agencies increasingly tell us, the rest of the world continues to pollute and populate – and grow richer – while its lifestyle options are changing. The number of millionaires and billionaires is growing in places like New Delhi, Mumbai, Shanghai and Beijing, places where the sky cannot easily be seen due to choking pollution. From such places very wealthy people are looking to emigrate to virginal shores overseas, to places with breathable air and drinkable water. They are increasingly seeking healthy places offering a good lifestyle and from where their businesses can be remotely run using modern communications. Places also where local citizens with limited employment opportunities may be employed as gardeners, cooks, housekeepers and domestic servants.

This is not the future that NBN champions want or see for Tasmanian children, working for rich new over-lords who see into the future and plan to exploit it at the cost of all others.

Around the world telcos and other digital financial giants are doing well. The world's two richest men, Carlos Slim Helu and Bill Gates, have both made their money from the digital economy. Our paradise is changing. Working in mines, on farms, and in forests owned by billionaire foreigners is not the idea of a future for most Tasmanians. Neither is working in tourist ventures owned by overseas organisations.

Not long ago nearly all Tasmanians could afford their own homes. However, mainlanders and foreigners seeing our ideal lifestyle and cheap housing began to move to our shores, and soon our home prices rose. Now they are around parity with the mainland. Weekly rental for a Tasmanian working class family continues to rise. Already, many can no longer make ends meet. This is why this writer is a champion for the new digital economy. I understand the difficulties of running a small business and of living in regional Australia. I have been working in Information Communications and Technology now for 15 years, and it has provided my family with a very good living.

**Broadband around the world**

The announcement of the NBN was the realisation of the single most important piece of infrastructure in this country's history. Not only nation building – it is transformative for regional Australia and especially the two million small businesses across our country. I have been lucky enough to travel the globe extensively. Some 12 years ago, I visited Dallas, Texas, a city which back then had the vision to invest in fibre optic infrastructure. Today it is known as the 'Silicon Prairie' and has one of the highest concentrations of billionaires anywhere in the world. It is named for the high concentration of semiconductor manufacturing, telecommunications, and other information technology related companies in the area. Economies utilising technology can be profitable.

*Before my eyes, two giant nations, India and China – not long ago considered third world rural agricultural countries – began to invest in the new digital economy. Simultaneously, they began embracing both capitalism and globalisation. The world economy is being transformed as a result.*

In 1991, India was flat broke and China was crippled by communism. Globalisation has clearly benefited both India and China, lifting 200 million Indians and Chinese out of poverty and catapulting tens of millions more far ahead into middle class life.
As an example, in 2004 the Indian Government formulated its broadband policy. From 2005 onward, the growth of broadband sector in the country attained acceleration. The Indian Government declared 2007 as 'the year of broadband'. As of December 2011, India had the world's third largest group of Internet users (over 121 million users, of whom the majority only access the Internet via mobile devices); and as of February 2012 there were 155 Internet Service Providers offering broadband services in India.

Mobile Internet subscriptions, as reported by India's TRAI in Mar 2011, increased to 381 million. To compete with international standards of higher broadband speed the Indian Government took the aggressive step of proposing a $13 billion national broadband network to connect all cities, towns and villages with a population of more than 500 in two phases targeted for completion by 2012 and 2013.

Telecommunications is supporting the socioeconomic development of India and playing a significant role to narrow the rural-urban digital divide. It also has helped to increase the transparency of governance with the introduction of e-governance in India. The government has pragmatically used modern telecommunication facilities to deliver mass education programs for the rural folk of India. ²

When only a few years ago I saw Australia not investing in fibre optics infrastructure and not even ranked amongst the top 50 OECD countries with such infrastructure, I knew we must change. Investing in the future of a nation is above politics, and should positively benefit the next generation and the one following that. How important is a positive outlook on the future? And what can an investment in digital technology accomplish? Steve Jobs helped build Apple Corporation in 1978. In 1985 a more conservative Apple Board dismissed Jobs from his managerial responsibilities and he resigned. Jobs, the visionary, returned to the failing company in 1997 and that year he opened the first online digital store. It was tied to a new build-to-order manufacturing strategy. His vision was in the creation and investment in new infrastructure.

*A local example of what digital infrastructure can do*

- In 2005, Steve Jobs invested in his "smart" digital technology infrastructure
- In 2008, Apple opened their online applications store. By Mar 2012, 25 billion apps had been downloaded around the world.
- Apple earned over $100 billion in 2011.
- In 2012, according to Apple's CFO Peter Oppenheimer, there are 550,000 apps in the App Store, including 170,000 for the iPad.
- Apple has paid out $4 billion cumulatively to iOS app developers through the App Store.

Tens of thousands of third-party iOS app developers now make a living off developing Apple apps and accessories for iPhone and iPad. My Launceston company is one of them. Our products sold in the Apple store to a world market bring direct overseas dollars into the Tasmanian economy. A new industry has grown up around Steve Jobs' vision of a digital economy.

*Other examples*

The NBN infrastructure will likewise allow new industries to grow – and there will be new industries where none exist today. Who could have predicted the social digital media revolution? Tasmania needs fast speed access to markets. For too long, regional Tasmania has lagged behind the cities; and the closure of banks and post offices to the detriment of rural
towns has changed the very fibre of our State, and also many parts of regional Australia for the worse. In a digital economy, modern online banking and telecommunications reverse much of that damage.

Small businesses and families returning to these remote locations overcome that old 'tyranny of distance' through instant connection and communication. Families and friends across Tasmania and elsewhere will be able to communicate with each other via high-definition video conferencing and to share video files and digital photos in real time. And people living in remote Tasmanian areas will have better access to medical specialists without having to travel long distances. Broadband allows for a telehealth program which allows clinicians to assess patients via videoconferencing.

The Department of Justice and Attorney General will be able to enhance its services with virtual and online courts saving rural people lost time from work and travel and accommodation costs.

Small digital economy based businesses can do business in the connected remote parts of Tasmania as easily as they can from anywhere else in the world. But we need connection. Then more Tasmanian jobs will be created in areas such as electricity, irrigation, health and transport by investments in smart technologies supported by broadband. Utilising 'cloud computing', companies will be able to access their information from anywhere and reduce costs. There will be more export opportunities for small businesses and greater access to local markets for first timers opening up new markets and ways of conducting business.

Businesses will save money on travel and reduce their carbon footprint by running businesses from home using high definition videoconferencing, as improved access to online services better facilitates finance and banking. Access to a range of Tasmanian Government Services will be made easier as agencies online allowing instant connection, information and payments through E-forms and filing (for example, tax submission) and renewal of business and trade licences.

The digital economy offers the rebirth of regional Tasmania. What does it mean to my regional small business? I have spent hundreds of thousands of dollars in the past when travelling for days to attend a single appointment. Seven years ago, when Nippon Paint in Shanghai asked for face-to-face real-time high-definition video conferencing with me and my staff in Launceston, I had to apologise, and admit that we were still somewhat backward; and I had to make old fashioned and expensive long plane trips with staff to China. Which country was third world? With 100 Mbit/s broadband speed my company in Launceston can join and level that international playing field, and host training and education sessions online, using cloud services, thereby reducing my company's overall costs – while increasing our productivity, gaining new customers, and delivering Real Rich Media to clients.

**Broadband testbeds**

Tasmania's Premier, Lara Giddings, said at the iAwards in July 2012 that in 2015/2016 Tasmania will be the first state in the country to be fully connected to the NBN, and it is critical that we make the most of this first-mover advantage. The NBN roll-out will not only create more than 800 on-the-ground jobs here in the final phase of construction, but will also open up new business opportunities for the future. It will enable innovation and improved productivity in food production, education, health, tourism and other industries. The Tasmanian Broadband Taskforce has set up broadband technology 'test-beds' to research and test the next generation of applications and content in areas such as smart metering, education, housing, health and small business.

One example is the University of Tasmania's HIT Lab AU and CSIRO's ICT Centre in Hobart and their collaborative world first SenseT program, which is set to drive economic, social and environmental benefits for Tasmania.

Their Magic Map enables users to access and interpret environmental sensor data as part of the SenseT project.
SenseT is one of the test-bed experiences being generated by the NBN in Tasmania. It is another good example of the potential Tasmania has to demonstrate to Australia and to the rest of the world how with innovative thinking and the NBN we can transform our economy, our communities and our lives. Its goal is to establish a world-leading 'sensor and knowledge' management network to drive economic, social and environmental benefits; firstly in Tasmania. It will establish and maintain an efficient and effective core infrastructure of sensors.

The use of sensors is not new. But networking existing and future sensor networks federated in a single system offers broad scale, cost-effective benefits. Sensor deployment can obviously assist and optimise functions such as when to irrigate or fertilise on the local farm. On a wider scale, when connected, they can report temperature and rainfall, and fire and flood warnings. These same sensors can provide supermarket customers with information about the origin of their food in-store. As new networks are enabled and integrated in the future, a new paradigm will be created in supporting better decision making in how we manage our resources and the environment.

In urban environments, applications like Magic Map help people to reduce their power consumption by allowing them to monitor energy usage online and switch off appliances remotely. Southern Water's Development of a project management tool to manage the roll-out of up to 52,000 water meters in southern Tasmania is now providing near real-time updates. The ability to better manage infrastructure in the future is obvious. Consider how in times of crisis, such as experiencing poor water pressure when fires burn into residential areas during bushfires, the immediate relief gained through the focusing of resources where needed.

The potential is limitless. As a real world laboratory, Tasmania is perfectly situated as a test bed to demonstrate the potential benefits of geo-located, real-time information because of its size, and the island's spread of urban, rural and wilderness areas. Tasmania also has a thriving research community and the highest per capita number of scientists of any state in Australia. Of comparable size to the republic of Ireland, West Virginia in the USA and Hokkaido in Japan, here is a test case for the world. Its success will see other regions follow, and eventually the potential of global connection.

Globally, it recognised that as our population grows, greater pressure will be placed on every aspect of our natural resources. This not just an opportunity to take agriculture to a new level of innovation and production. Governments, state agencies, businesses and individuals will need more efficient and effective ways to analyse data about population increases, human habitation and its movement and the planning of new infrastructure; and how to best integrate this with agriculture and wilderness assets. As both population and pollution grow, in the not so distant future an integrated global plan for the survival of our planet will become necessary. Long journeys begin with first steps.

In education, the St Peter Chanel Catholic School in Smithton Tasmania is one of the schools that have successfully used technology to adopt new ways of teaching. The school was one of the first in Australia to connect to the network (in November 2011) and it uses the Internet to share field trip experiences with other schools in remote parts of Australia in contact with Aboriginal communities. Remote learning and remote access to specialist teachers can be accomplished, plus collaborative networks for special interest/research groups and high-speed transfer of large data files.

**Why am I a digital economy champion?**

The answer is simple. I believe in small business and I enjoy living in clean air with beautiful green natural surrounds. My table overflows with local produce, wines and friends. A strong Tasmanian digital economy will allow me and my family and friends to continue living the dream and more importantly – gain direct entry into the growing digital world economy.

In 2015/2016 direct fibre optic connection to the premises will be available almost everywhere in Tasmania and we will no longer be located at the end of world – but rather slap
bang in the middle of it. The digital economy can increase Tasmanian productivity, ensure Tasmania's continued global competitiveness and improve our social well-being.

You know when people ask "Can Australia really afford such large investment?", rolling out the optical fibre to over 93% of the nation, I reply "how can we not afford to invest in this generational nation building project". I like the analogy of the Sydney Harbour Bridge and take my hat off to the architects, town planners and political leaders, who did not build a bridge for the day when it was opened in 1932 – they built a bridge that 80 years later, sees over 160,000 vehicles cross the bridge each and every day.

That was visionary, as is the NBN. Like everything else worthwhile in the world. It requires hard work, some risk-taking, and investment. NBN and digital technology have demonstrated very strong potential to grow our businesses and not only help Tasmania save its farms, orchards and wineries, but in particular help build a strong and healthy Tasmania for the future. With some broadband hindsight already, and a little imagination and hard work, its many benefits are all within our reach.

Endnotes


The critical role of e-skills in raising NBN adoption and Australia’s competitiveness in the global Digital Economy

Marcus Bowles
Digital Economy and Regional Futures research project, Institute for Working Futures and the Australian Maritime College, University of Tasmania

This paper reports initial findings from two of the latest research projects commissioned by Innovation and Business Skills Australia. Studies into digital literacy and adoption of information technology and broadband services at three of the earliest NBN release sites, Armidale (NSW), Brunswick (Vic) and Scottsdale (Tas), show that the readiness of small businesses and regions to compete in the Digital Economy is affected by their ability to acquire specific ICT skills.

Whilst the study results are not unexpected, and although priority skill sets are identified, the backdrop to these studies is likely to be of most interest. It is argued that while national effort to address affordable access is being advanced, efforts to raise the skills necessary to effectively utilise the opportunities on offer are not always keeping pace with demand. This has important implications for the National Digital Economy Strategy, as effective competition in the Digital Economy is primarily a function of two factors: affordable access to ICT, and, critically, the skills to effectively use the technology and services.

Introduction

Australia has undertaken an aggressive national agenda to place it at the forefront of the race to be competitive in the global Digital Economy. The agenda has generated enormous hyperbole and commentary by political parties, business and social groups, focussed predominantly on the efficacy of investing more than AUD$43 billion on the construction of a National Broadband Network (NBN) to provide high-speed broadband to all Australians, with optical fibre to the premises for a large majority (93%).

The hype has tended to obfuscate the fact that the NBN is one part, albeit the most significant part, of the Australian Government’s National Digital Economy Strategy (NDS) (NDS 2011). The NDS outlines eight 'Digital Economy Goals' that the NBN will enable:

1. increased number of Australian households connected to broadband
2. increased percentage of Australian businesses and not-for-profit organisations using online business opportunities
3. smart management of Australia’s environment and infrastructure
4. more effective and efficient delivery of health care
5. expanded online education
6. increased teleworking
7. improved uptake of online government service delivery and engagement
8. greater digital engagement in regional Australia (NDS 2011:2).

Attaining the Digital Economy Goals has significant potential economic benefits. In economic terms, the NDS is anticipated to generate an additional $4 billion per annum and some one trillion dollars in revenue from ICT industries by 2050 (IBIS World 2012:8), and add $12.76 billion per annum to Gross Domestic Product for every 10% of the population gaining access to high-speed broadband for the first time (Bowles 2011). In conjunction with the economic outcomes, leveraging the NBN is intended to deliver substantial social benefit. The high-order outcome of universal access to the NBN promises an equitable capacity to participate in the Digital Economy for all people, urban and regional, as well as enterprises. In this manner, effort can be made to eliminate the digital divide adversely affecting groups with traditionally low access to high-speed broadband infrastructure and low digital literacy. These groups include Australians who:

- have low incomes
- lack tertiary level education
- are older, aged over 55
- live in rural and remote areas
- have Aboriginal or Torres Strait Islander heritage
- have a disability
- have non-English speaking backgrounds (based on AISR 2006:6).

Research from 2009 to 2012 suggests small businesses might belong to this list of groups. Research from Sensis® eBusiness Reports (Sensis 2011 & 2012) shows that only about one in five small businesses have a formal digital business strategy. This is reinforced by research commissioned by Innovation and Business Skills Australia (IBSA) that consistently shows fewer than 15% of businesses employing fewer than 20 people have any plans to leverage the NBN (Bowles & Wilson 2010; Bowles 2012a; Bowles 2012b). However if, as the Executive Director of the Council of Small Businesses of Australia (COSBOA) believes, the NBN will ‘create a level playing field’, then small businesses will have the opportunity to more effectively compete in the Digital Economy (Strong 2012). Given the fact that these businesses contribute more than half of industry employment and more than one third of Australia’s GDP (Clark et al 2011:3-4), closing the digital divide for smaller businesses holds enormous social and economic advantage.

This paper presents early insights, which suggest the desired socio-economic benefits that the NBN and attainment of the Digital Economy Goals can produce for end users and businesses are under threat. The threat lies in providing access without the ICT skills required to use or derive benefit and opportunity from information technology and high-speed broadband.

**An ICT Development model and E-skills**

As part of its national responsibility to provide advice to governments and other stakeholders on skills needs and workforce development priorities, IBSA completes an annual industry environmental scan (eScan). To more accurately anticipate ICT workforce development needs, a systematic approach has been developed. This model accommodates variations in the business cycle, new technologies and applications and the Australian Government’s Digital Economy strategy, including the rollout of the NBN and prevalence of other high-speed broadband platforms.
THE CRITICAL ROLE OF E-SKILLS IN RAISING NBN ADOPTION AND AUSTRALIA'S COMPETITIVENESS IN THE GLOBAL DIGITAL ECONOMY

Figure 1 - ICT Development Model for determining the impact of ICT in the Digital Economy

The ICT Development Model (Figure 1) was derived from comprehensive analysis and research into global practices (Bowles & Wilson 2009a:17), in particular by the European Commission and International Telecommunications Union (Teltscher et al 2009: 14; ITU 2010) and work in Europe that extended beyond the Australian research into business readiness and ability to adopt e-commerce (e.g. by the Australian Electronic Commerce Centre) (Catteneo et al 2009; CEDEFOP 2008 & 2010; Kolding et al 2009). The Model has provided insights into how ICT maturity and e-readiness (existing intensity of use and capacity) can be increased by targeting skills that provide the capacity to more rapidly adopt ICT. As developmental maturity increases so does the positive impact achieved through ICT adoption, deployment and, subsequently, innovation (e.g. through gains in productivity, economic growth, market share, reduced costs, employment, social wellbeing, closing the digital divide, speed of technology and diffusion).

The early insights presented in this paper are possible because, for the first time since investigative research was commissioned by IBSA in 2009, an ICT Development Model has been employed. This Model can trace anticipated readiness and ICT skills demand. As a consequence, the latest research has moved beyond prediction to an evaluation of the impact on enterprises and regions that have had access to the NBN for more than a year. Thus it has been possible to determine that early signs indicate that the effort to address digital literacy of users, and the essential ICT skills, or so-called e-skills, for enterprises, is failing to keep pace with demand. Moreover, skilling strategies intended to support NBN adoption are, apparently, failing to adequately address the demand for the required ICT skill sets and competencies that businesses and experts have validated.

E-readiness

E-readiness is ultimately determined by examining access coupled with the physical capacity to use ICT and the desire to adopt ICT. As part of the ICT Development Model, an E-readiness Audit was developed to provide a common framework for the identification of current levels of ICT access and adoption comparative to those required to effectively participate in the Digital Economy. This enabled primary users – households and businesses, and groups of users they may belong to, such as organisations, regions, professions and industries – to rank themselves and produce a scorecard benchmarking comparative maturity.
across **access** and capacity to use or **adopt** ICT. Overall ICT maturity and progress is then reported and mapped onto a matrix. This permitted comparison with other scorecards and more accurate prioritisation of strategies to address immediate needs (the e-readiness tool is accessible at [http://ereadiness.com.au](http://ereadiness.com.au), or for an example of a completed industry E-readiness Audit tool see Bowles 2012a).

**E-skills**

The ICT Development Model requires e-skills be applied more broadly, as any study of digital literacy for people, enterprises and regions is not just about the foundation skills required to use information technology and the Internet (so-called end-user skills, Bowles 2009a; Bowles & Wilson 2010; Smith & Anderson 2010). Study of e-skill must also address adoption and use of technology by people competent in an existing role who are seeking to enhance their productivity or to plan and manage business adoption or innovation at a strategic level. Skills at all levels deliver the digital literacy necessary to ensure that people across all industries, occupations, sectors of the economy and locations can equitably participate in the Digital Economy (digital inclusion).

![Figure 2 - Types of e-skills](image)

Figure 2 depicts the three types or levels of e-skills: **foundation** or entry level tied to foundation digital literacy; **extension** where existing ICT skills extend occupational skills or further enhance digital literacy; and **strategic** where the user may seek to manage ICT adoption for a group or deploy high-end ICT skills to the advantage of an organisation, community or industry. The descriptions for the e-skill levels are provided in Table 1 together with the corresponding levels in the Australian Qualification Framework (AQF).
### E-Skill Levels*  

<table>
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<th>Description</th>
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| **Foundation E-skills 1**  
(AQF 1; Certificate 1) | ICT skill sets at this level will be required by people wanting to gain the essential digital literacy skills in the routine use of a personal computer, software applications, the Internet and digital devices.  
| **Foundation E-skills 2**  
(AQF 2; Certificate 2) | ICT skill sets at this level will be required by people wanting to advance on their foundation user competencies to gain digital literacy skills sufficient to understand appropriate methods, tools and applications and perform a range of routine activities using communication technologies, the Internet and software as well as the basic range of applications and functions associated with standard digital devices.  
| **Foundation E-skills 3**  
(AQF 3; Certificate 3) | ICT skill sets at this level will be required by people wanting to advance their foundation user competencies to gain digital literacy skills sufficient to apply a methodical approach and understanding, and to perform a broad range of work, sometimes complex and non-routine, in a variety of environments.  
| **Extension E-skills**  
(AQF 4-5; Certificate 4 & Diploma) | ICT skill sets at this level will be required by people wanting to extend existing occupational competency to include advanced digital literacy skills required to improve productivity, or to review and deploy information and communication technologies consistent with standard methods, tools and applications within a specific context.  
| **Strategic E-skills**  
(AQF 6+; Advanced Diploma and above) | ICT skill sets at this level will be required by people wanting to extend digital literacy skills required to review requirements, assess resource requirements, build vendor relationships and deploy information and communication technologies to enhance capabilities that meet the strategic requirements of a business or community.  

*While aligning to AQF the levels are respectively consistent with Skills Framework for the Information Age levels 1, 2, 3, 4 and 5-7 ([www.sfia.org.uk](http://www.sfia.org.uk)).

### Insights, Observations and Principles for enhancing e-skills and ICT adoption

The ICT Development Model has instilled a strong realisation that raising digital literacy and targeting priority e-skills can positively influence e-readiness and the capacity of enterprises and regions to adopt ICT. Once adoption is accelerated, a virtuous cycle is encouraged whereby outcomes and innovation ensue, which positively influence maturity. Having outlined this broader development milieu the following section moves on to outline findings from two investigative projects completed at the end of 2012: an investigation into digital literacy and e-skills ([Bowles 2012c](#)) and an investigation of e-skills in demand by small- to medium-sized enterprises (SMEs) in three of the earliest NBN release sites—Armidale (NSW), Scottsdale (Tas) and Brunswick (Vic) ([Bowles 2012b](#)). This latter study also included reference to the Willunga site in South Australia.
As findings have not been presented to the IBSA Board for approval, this paper will present findings as a series of insights, observations and principles:

A. Insights into digital literacy and e-skills in demand
B. Observations on post-NBN impact on business skills
C. Principles for e-skills training and education interventions

A. Insights into digital literacy and e-skills in demand

The following insights are based on a consultative process that reached more than 100 people with 35 nominated experts and stakeholders completing a feedback questionnaire and another 40 individual experts and business owners or their employees directly involved in consultative forums. When using the questionnaire, experts were asked to rank demand for e-skills; competencies ‘bundled’ into 16 skill sets that have been validated by previous research. The option also existed to report new or modified skill sets or competencies. Figure 3 shows the overall ratings received from those providing formal responses.

![Figure 3 – ICT skill set priority needs ranked by median response](image)

The first thing to note is that the statistical significance of the variance between skill sets is low. While statistically the sample size is small (n = >35), the overall median response of 4.191 indicates expert respondents agree somewhat or strongly that all skill sets require development. This is much higher than any of the three previous national e-skills surveys in which median scores did not exceed 3.581 (Bowles & Wilson 2009 & 2010; Bowles 2012a).

Furthermore, in statistical terms, analysis of data for reliability yields Chronbach’s Alfa coefficient of 0.895, indicating a very high reliability level of the data set. Further analysis using a hypothesis test was conducted to examine if the mean feedback for each question is significantly larger than the ‘neutral’ value of 3. All p-values are far less than 1%. This strongly supports the conclusion that the surveyed population strongly agreed with the proposed skill needs.

The findings show a continued trend that, irrespective of region, industry, business type, size or other variable studied, indicates:

1. The identified skill sets and units of competency previously identified as essential in promoting adoption and use of ICT remain valid and reliable indicators for assessing and addressing e-skills and related digital literacy needs (see Attachment 1).
2. The e-readiness and capacity of small business to adopt and use the NBN, particularly in regional locations, is not advancing even after 12 months of access. This is indicated by the continued high demand for the validated skill sets even where training in two of the early-release sites being studied had been available for more than 20 months.

3. The preconditions for potentially widening the digital divide are present. Indications suggest a direct correlation exists between digital literacy and e-skills. Feedback from experts and business participants show that regional small businesses and groups with traditional low digital literacy (e.g. indigenous communities, low income, people with a disability, older Australians, and those from non-English speaking backgrounds) are less likely to adopt the NBN and related technologies as rapidly as urban Australians who have had prior access to high-speed broadband and who have the requisite skills to use it. With indications that at least one third and, in some cases, more than half of the population in some regional NBN early-release sites have never had a high-speed broadband connection (Bowles 2012c:33) digital literacy levels will form a greater hurdle to adoption in some locations and with some groups than is currently anticipated.

4. Demand for digital literacy spans all three levels (foundation, extension and strategic e-skill). However it is noted that potential exists to extend skill sets and units of competency at the Extension Level (AQF 4-5) to cover new digital media and content businesses and at the Strategic Level (AQF 6+) to cover gaps resulting from emerging demand from those planning regional and business Digital Economy strategies, those with new digital business models, and entrepreneurs and innovators taking digital media and products to market. The new skill sets initially validated include:

- Digital information literacy
- Commercialising a digital technology product, design or idea
- Promoting virtual access to 3D digitised cultural and community assets
- Promoting digital literacy skills in the local community/group
- Developing online sales, service and marketing strategies
- Serving and interacting with customers online in real time
- Developing online sales, service and marketing strategies
- Managing telework
- Working with others in a virtual/off-site/telework team

The two new qualifications initially validated included:

- Diploma in Innovation and Commercialisation (digital technology products, designs or ideas)
- Graduate Certificate in Management (digital technology product, design or idea commercialisation)

5. There was additional concern that momentum behind existing language, literacy and numeracy programs and related digital literacy educational imperatives may be at risk. ‘Coalface’ ICT educators in the public system indicated funding may be severely reduced from 2013 in the three most populous states. This reduction in funding is apparently occurring in foundation digital literacy qualifications and skill sets from Certificates I and II in information technology. This could place disadvantaged groups – in particular people from non-English speaking backgrounds and people with a disability - at increased risk of exclusion from participation in the Digital Economy.
B. Observations on Post-NBN Impact on Business Skills

The following observations are derived from interviews with businesses owners, operators and employees. While these largely anecdotal and qualitative issues fall outside the parameters set for the study, they do inform the need for a more systematic approach to ICT development and support for NBN adoption by small businesses.

1. **A vacuum exists with regard to a single entity coordinating consumer adoption of the NBN.**

   Beyond the skilling issue and an enormous optimism and desire to leverage the NBN, most people interviewed expressed severe dissatisfaction with the level of support relating to implementation and installation of the NBN service. Most prominent is the apparent fragmentation of government support for implementation of the NBN in a region. While an alphabet soup of Australian Government agencies (not least of all ACMA, DCBDE, DIISRTE, DEEWR, AWPA) and State or Territory agencies play a primary role in skills strategies, there seems to be an absence of coordination, particularly at enterprise level implementation.

   Secondly, individual householders and business users are apparently having difficulty identifying who is responsible for specific activities after the subscription is available (e.g. consumer support, faults, advice and training). Consistent feedback suggested some Retail Service Providers (RSPs) were providing very poor customer support and thus many business owners in regional Australia believe NBNCo or Telstra will remain the main source of help when they experience poor service performance. This is unrealistic given that the NBNCo has been legislatively restricted to a wholesale-only role and Telstra’s responsibility for end user problems does not reach beyond its own retail customers. It is also not apparent whether the industry regulator (ACMA) or the co-regulator (CommsAlliance) has developed adequate guidelines by which end users can resolve service disputes in a multi-provider service delivery situation (Gerrand 2011).

2. **There is an absence of access to meaningful, culturally appropriate learning and content that increases the capacity of people to effectively use ICT in a contemporary business context.**

   The feedback indicates that while programs funded to specifically support local NBN adoption and skilling across households and businesses – Digital Enterprise and Digital Hub – are generally doing some things well, the relevance and quality is highly variable. An examination of the three targeted early-release sites directly and three others indirectly indicates duplicate investment in content development and curriculum design that all too often lacks contextual relevance (e.g. rural, small business, or to an indigenous culture). This may well be less to do with what the courses offer than those accessing their services lacking the means to tie individual needs with what is being offered.

   This matter is related to the funding being directed towards recreating training content or learning delivery solutions and platforms (e.g. learning management systems) that already exist. Worse still, this duplication has a great propensity to generate solutions inferior to those already developed and which are known to work well. To avoid duplication of effort and investment and to accommodate the huge diversity of learners, their context and possible future ‘business’ models, a core set of online, open learning content and an learning management platform that can offer a high-quality learning experience on the NBN ‘backbone’ are recommended (e.g. the DE Hub located at Armidale, [http://dehub.edu.au](http://dehub.edu.au)).
3. **Infrastructure is required to enhance the capacity of regional participants and business groups to form communities.**

Communities play a vital role in the Digital Economy. Nevertheless those interviewed in NBN early-release sites consistently requested easier access to open source tools, collaborative applications, file sharing or shared services that could assist businesses and community groups form and participate in social networks or collaborate within and across NBN rollout site.

The sense of community was central to why many users who lacked high levels of digital literacy adopted the NBN. As Prime Minister Julia Gillard stated, the investment in high-speed broadband and the Australian Government’s overall Digital Economy strategy ‘...is about people and keeping it personal because technology, I have realised, is just a tool and what it really does is strengthen relationships...’ (Gillard 2012:7). This was particularly the case in rural regions (Armidale, Scottsdale and Willunga) and was supported by feedback from experts working in remote indigenous communities (Bowles 2012c:30-32).

The sense of sharing and communicating seems to be core to engaging people, particularly those with historically low literacy skills. For instance, some businesses owners felt a greater affinity to similar businesses in other regions than to dissimilar businesses in their own region. In such cases the drive was to share knowledge and enable people to learn from each other using short audio-visual case studies explaining how they successfully leveraged the NBN. In one indigenous community, early adoption was spurred by sharing media files covering cultural events and festivals with family members located in another community.

4. **Shift the marketing that targets businesses in newly connected NBN sites from an emphasis on speed to an emphasis on utility.**

The promise of speed is appealing and certainly attracting massive attention. However, the ‘appeal’ of such marketing to many early adopters was less important than reliability, quality and affordability. Having faster email or browsing seems to have limited enduring appeal. In particular, review of Twitter™ accounts and blogs from subscribers recently connected to services using the NBN show the ‘promise’ often fails to justify the additional cost for those users satisfied with standard ADSL2+ or standalone home telephony services. Many of the interviewees and, given the tweets, other NBN subscribers, found many of the services commonly used for file sharing or entertainment were on much slower networks (e.g. iTunes, iCloud, iView, Google Apps, Flickr, DropBox).

5. **There is a growing gap between the new business models, innovation and commercialisation activities fostered by the NBN and available high-level qualifications.**

It was apparent some enterprises that had moved to or were already located in an early-release site invested in new businesses models or innovative products and services. While multiple business types, technical and financial needs and a range of products were reported, the common need expressed was for more education and support to assist in undertaking high-level commercial activities such as patenting and licensing, IP protection, marketing and sourcing capital. But there is a growing lag between the emerging models for leading and doing business in the Digital Economy and current strategic level education programs (AQF 6+, particularly postgraduate level) (AIIA 2012; Shorten 2012; Koppi et al 2012).

6. **Without a Digital Economy strategy many regions have few or no formal mechanisms for either coordinating business activity or measuring progress.**

From a top-down planning perspective, participants in some rural locations expressed a disconnect between Councils and regional decision makers and the needs and priorities of the business community. This was not only about an individual business; it was more concerned with promoting the NBN rollout to
better support a coordinated approach to industry development strategies in sectors such as tourism, health, retail, agriculture and creative industries. Only one of the regions studied had a formal regional Digital Economy strategy or development plan; however, it is evident where such plans and strategies have been developed the foundations exist for prioritising development, coordinating state and Australian Government initiatives, targeting skills development strategies and preparing the region to leverage the NBN (RTIRC 2012; Gregg & Wilson 2011).

7. Given that ubiquity of access is one of the main NBN policy imperatives it is essential for consumers to be able to access a third-party, independent guide or branding regime (e.g. ‘NBN tested and approved’) that spells out what hardware and software will function on different NBN connections.

Throughout the consultations, ‘trust’ and ‘risk’ emerged as ongoing, related issues. Interviewees frequently expressed concerns about the additional cost incurred by having to invest in new hardware and update software to optimise their new NBN connection. They also cited frustration that such investment often resulted in something incompatible with the NBN or unreliable to the point of affecting business continuity. Anecdotal evidence was reported from numerous sources on this matter including RSPs supplying modems or drivers that were incompatible with the NBN connection; vendors selling incompatible hardware or software updates; and subscriptions to services that were incorrectly configured or unavailable on the NBN. In addition local IT service companies or the businesses themselves complained about the onus falling on them to undertake a range of testing and configuration activities to assure that standard devices or software updates were compatible with the NBN.

C. Principles for E-skills Training and Education Interventions

Throughout the consultation and investigation, the feedback from digital literacy experts and educational and businesses users located in early-release NBN sites strongly emphasised the need to improve ICT skills development interventions. One of the main problems was perceived to be the use of unaccredited providers. This eroded the control over quality standards and any ability to tie learning to the skill sets being validated and recognition of competency standards and qualifications. The following principles appear to be the five most important learning design principles:

1. Training for adoption of the NBN has to be less about the technology and more about what it can do for a defined user.

Overwhelming feedback was received that ‘training’ supporting ICT adoption was more about knowledge than skills. While those with lower levels of digital literacy openly acknowledged their weaknesses they were unhappy available training was more often about the technology or software, rather than how it could be applied to outcomes they found meaningful.

2. Training interventions in a region must be consistent and systematically target all e-skills levels.

The smaller the size of the community, the less effective narrow-skilling strategies (promoted by discrete, funded programs) proved to be. For instance, Digital Hub initiatives have a huge task of advancing digital literacy (Foundation Level e-skills) for older Australians, and underprivileged and disadvantaged groups. But the learning offered through such programs typically excluded business owners and/or members of Council. In small communities, that overlooked citizens engaged in work-related activities. Yet many business owners and Councillors reported that the Digital Enterprise or digital-ready programs targeting Strategic Level e-skills were too esoteric and technically specific. Hence, enterprise participants strongly reinforce their demand for Extension Level e-skills and work-
based approaches to delivery that allowed them to selectively engage in acquiring lower or higher level e-skills contingent upon need.

3. **One size does not fit all and customisation to individual levels of readiness must be encouraged.**

   There is a huge diversity of business typologies and levels of ICT capacity in any community. A standardised, supply-driven approach that offers generic ICT qualifications will not improve the situated capacity of a business to adopt ICT. Any skills strategy therefore has to first establish a baseline whereby the community’s or the regional, enterprise or individual business participants’ current e-skill levels and access to ICT are established. A training plan and course offering should be customised to fit the level of ICT maturity and resulting priority needs.

4. **Learning and assessment has to be based on vocational, business-related outcomes.**

   Small business owners are typically time-poor and operating on thin margins. Face-to-face courses in business hours or courses longer than 90 minutes in one day neither encourage engagement nor are likely to achieve learning. Despite extensive research on training design for SMEs, publicly funded ‘business courses’ supporting NBN adoption still failed to adhere to simple design principles: one course required business owners to spend up to six hours in two three-hour sessions morning and evening on the same day; another two-day course purporting to be about ‘attracting online customers’ actually taught participants how to use a software package to build a website!

5. **Learning strategy and delivery has to create a meaningful, enriching and relevant learning experience.**

   There is significant evidence that highly variable learning design is occurring. For many of the providers there is no imperative to ensure that newly developed content is based on solid research, national guidelines, business input or reference to institutions with a successful track record in the field (e.g. Australian Communications and Media Authority resources site, http://www.acma.gov.au; ForwardIT, http://www.forwardit.sa.gov.au; Tasmanian Electronic Commerce Centre, http://www.tecc.com.au).

   Moreover, national funding is promoting the development of this new content and ignoring the significant public investment in existing solutions. As a minimum requirement emphasis in small business–related ICT learning design must return to effective, quality educational practices that encourage learning from others, peer mentoring and coaching, use of multimedia more than text-based content, flexible and distance learning, learning by doing, and attainment of competency outcomes that tangibly enhance an individual’s adoption and use of ICT.

### Conclusion

Early indications suggest that demand for the skill sets and competencies considered essential for increasing the capacity of enterprises and regions to adopt the NBN and compete in the Digital Economy is not being met. The ICT Development Model has been examined to show that a systematic approach to research anticipated and now reinforces the wider importance of this conclusion. Without enhancing specific e-skills, it can be expected digital literacy will not be improved, thus jeopardising any effort to further develop the capacity of individuals and businesses to adopt ICT and achieve beneficial outcomes.

It is not unexpected that different regions, enterprises and individuals would move at a different pace to adopt the NBN, or other high-speed broadband technologies. Building the NBN infrastructure was a deliberate ‘step change’ intended to enhance Australia’s ICT capacity. Such changes have a disruptive impact. However the early insights and resulting
observations and principles reported herein can inform national decision making. In particular, consideration must be given to:

1) Broaden the NBN marketing emphasis away from speed to focus on case studies of consumers using high-speed broadband in ways that deliver benefit;

2) The need for a single entity to coordinate end-user adoption of the NBN and provide guidelines by which standards and procedures are established for resolving service problems and disputes;

3) Systematically integrating NDS with an ICT development approach that not only sets regional and business Digital Economy priorities, opportunities and outcomes, but is based on an accurate assessment of current ICT maturity;

4) Improving access to tools, content and learning platforms that can promote ICT adoption and use by consumers or enterprises across all e-skill levels; and

5) Tying investment in digital literacy and ICT training to competency and educational outcomes that are nationally recognised and assessable in terms of the learner’s attainment of e-skills in either an end-user or business context.

The surprise is not that demand for ICT skills outstrips supply; rather it is the lack of coordination and precision surrounding training interventions and strategies intended to support NBN adoption. At best, such efforts are targeting general citizens with foundation-level digital literacy skills or businesses with existing, high levels of ICT maturity. This study indicates two important issues:

1) more effort is required to target the validated e-skills at all levels, and

2) higher-quality learning must be provided to those with low levels of digital literacy.

These actions are essential if small businesses and regional Australia are to transition to the point where they have equity of access to the NBN and the skills required to gain the socio-economic outcomes that participation in the Digital Economy can produce.

References


Endnotes

1. The Australian Dollar is the value reported unless otherwise stated. The 2050 target IBIS World anticipate enhanced ICT and high-speed broadband and online information capabilities industries will deliver the Australian economy.

2. World Bank research suggests this is the gain Australia can expect from connecting every additional 10 per cent of the population to high-speed broadband.

3. Australian Communications and Media Authority, Department of Broadband, Communications and the Digital Economy, Department of Industry, Innovation, Science, Research and Tertiary Education, Department of Education, Employment and Workplace Relations, Australian Workforce and Productivity Agency.

4. For sites where this has been made available see http://www.dbcde.gov.au/digital_economy/programs_and_initiatives/digital_enterprise_program.

5. For sites where this has been made available see http://www.dbcde.gov.au/digital_economy/programs_and_initiatives/digital_hubs_program.
## Attachment 1 Validated ICT skill sets

<table>
<thead>
<tr>
<th>Existing ICT Skill Sets</th>
<th>National competencies forming the e-skill set</th>
</tr>
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</table>
| 1. eCitizen – Essential skills                                                          | ICAICT101A Operate a personal computer  
ICAICT102A Operate word-processing applications  
ICAICT103A Use, communicate and search securely on the Internet                                                                                                                   |
| 2. IT users digital literacy – Essential skills                                         | BSOHS201A Participate in OHS processes  
ICAICT101A Operate a personal computer  
ICAICT102A Operate word-processing applications  
ICAICT103A Use, communicate and search securely on the Internet  
ICAICT105A Operate spreadsheet applications  
ICAICT106A Operate presentation packages                                                                                                                                            |
| 3. Internet technology and social networking – Essential Skills                        | ICAICT104A Use digital devices  
ICAICT108A Use digital literacy skills to access the Internet  
ICAICT103A Use, communicate and search securely on the Internet  
ICAU1213B Conduct online transactions  
ICAS2243B Detect and protect from spam and destructive software  
ICAWEB201A Use social media tools for collaboration and engagement                                                                                                                  |
| 4. Small office and home office equipment and network set-up – Essential skills         | ICASAS202A Apply problem-solving techniques to routine IT malfunctions  
ICASAS203A Connect hardware peripherals  
ICASAS205A Maintain IT system integrity  
ICASAS206A Detect and protect from spam and destructive software  
ICASAS207A Protect and secure information assets  
ICASAS208A Maintain IT equipment and consumables  
ICASAS209A Connect and use a home-based local wireless network                                                                                                                      |
| 5. Digital content development and collaboration – Essential skills                    | ICAWEB201A Use social media tools for collaboration and engagement  
ICAICT204A Operate a digital media technology package  
CUFDIG301A Prepare video assets  
CUFDIG302A Author interactive sequences  
CUFDIG304A Create visual design components  
ICAWEB303A Produce digital images for the web  
ICAGAM302A Design and apply simple textures to digital art                                                                                                                           |
| 6. Web development Essential Skills                                                    | ICAWEB302A Build simple websites using commercial programs  
ICAWEB303A Produce digital images for the web  
BSBEBU401A Review and maintain a website  
ICAWEB403A Transfer content to a website using commercial packages                                                                                                                    |
| 7. Small office and home equipment and network set-up                                  | ICASAS303A Care for computer hardware  
ICASAS304A Provide basic system administration  
ICASAS306A Maintain equipment and software  
ICASAS307A Install, configure and secure a small office home office network                                                                                                           |
| 8. Small office and home network equipment and set-up                                  | ICANWK401A Install and manage a server  
ICANWK405A Build a small wireless local area network  
ICANWK406A Install, configure and test network security  
ICANWK407A Install and configure client-server applications and services  
ICANWK410A Install hardware to a network  
ICANWK416A Build security into virtual private networks                                                                                                                              |
| 9. Establish business communications solutions and systems security                    | ICANWK406A Install, configure and test network security  
ICANWK403A Manage network and data integrity                                                                                                                                                                                                 |
10. Sell products and services online
- BSBITU305A Conduct online transactions
- BSBEBU401A Review and maintain a website
- BSBCUS402B Address customer needs
- BSBMKG413A Promote products and services
- BSBMKG416A Market goods and services internationally

11. Manage business communications solutions and systems security
- ICANWK501A Plan, implement and test enterprise communication solutions
- ICANWK510A Develop, implement and evaluate system and application security
- ICANWK511A Manage network security
- ICANWK513A Manage system security

12. Develop a business case and select appropriate IT strategies and solutions
- ICAICT509A Gather data to identify business requirements
- ICAICT510A Determine appropriate IT strategies and solutions
- ICAICT511A Match IT needs with the strategic direction of the enterprise
- ICAICT507A Select new technology models for business
- ICAICT508A Evaluate vendor products and equipment
- ICAICT512A Plan process re-engineering strategies for business

13. Manage business ICT change project
- ICAPMG501A Manage IT projects
- ICAICT601A Develop IT strategic and action plans
- ICAPMG608A Manage IT project systems implementation

14. Set up an e-business capability
- BSBEBU501A Investigate and design e-business solutions
- BSBEBU502A Implement e-business solutions
- BSBMKG513A Promote products and services to international markets

15. Manage virtual or out-sourced ICT services
- ICAICT602A Develop contracts and manage contracted performance
- ICAPRG603A Create cloud computing services
- ICAICT706A Direct outsourced ICT services

16. Establish sustainable and Green ICT business goals
- ICAICT713A Manage IT services
- ICASUS701A Plan and manage virtualisation for IT sustainability
- ICASUS702A Conduct a business case study for integrating sustainability in IT planning and design projects

Digital information literacy
- CULINS401A Assist customers to access information
- CULINS403A Search library and information databases
- CULINS501A Research and analyse information to meet customer needs
- CULINL601A Extend own information literacy skills to locate information

<table>
<thead>
<tr>
<th>Additional</th>
<th>Suggested new inclusions</th>
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<tbody>
<tr>
<td>BSB07 Intellectual Property Strategic Management Skill Set</td>
<td>EXISTING ENDORSED SKILL SET</td>
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<tr>
<td></td>
<td>BSBIPR501A Manage intellectual property to protect and grow business</td>
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<tr>
<td></td>
<td>BSBIPR601A Develop and implement strategies for intellectual property management</td>
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<tr>
<td>Promote virtual access to 3D digitised cultural and community assets</td>
<td>Capture, manipulate and store 3D images of cultural and community assets (NEW)</td>
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<td></td>
<td>Prepare catalogues and inventories for digitised cultural and community assets (NEW)</td>
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<tr>
<td></td>
<td>Create a virtual community or cultural exhibit (museum or gallery) (NEW)</td>
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<td></td>
<td>Curate an online community or cultural exhibit (NEW)</td>
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<td></td>
<td>Print digital assets in three dimensions (NEW)</td>
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<tr>
<td>Develop online sales, service and marketing strategies</td>
<td>Develop an online sales and service strategy (NEW)</td>
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<td>Develop a multi-channel marketing and communications plan (NEW)</td>
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<td>Manage brands online (NEW)</td>
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<tr>
<td>Serve and interact with customers online in real time</td>
<td>Engage, interact and transact with customers online (NEW)</td>
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<tr>
<td></td>
<td>BSBRKG404A Monitor and maintain records in an online environment</td>
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| Develop online sales, service and marketing strategies | Develop a multi-channel marketing and communications plan (NEW)  
Develop an online sales and service strategy (NEW)  
Manage brands online (NEW) |
|----------------------------------------------------------|-----------------------------------------------------------------|
| Manage telework                                           | BSBMGT404A Lead and facilitate off-site staff (IMPROVE TO FOCUS ON LEADING VIRTUAL STAFF - really too big and needs to build into the new Diploma level competencies recommended below)  
BSBEBUS508A Build a virtual community  
(NEW)Lead a remote/virtual/telework team  
(NEW) Prepare job profiles for off-site/remote work  
BSBOHS603B Analyse and evaluate OHS risk  
BSBOHS601B Develop a systematic approach to managing OHS |
| Work with others in a virtual/off-site/telework team       | ICAW2011B Work individually or as a team member to achieve organisational goals  
(NEW) Complete work duties from a remote location using digital technology |
| Training Skill set                                        | Noted |
| Promote digital literacy skills in the local community/group | TAEDEL301A Provide work skill instruction (Coach others)  
TAEDEL402A Plan, organise and facilitate learning in the workplace  
TAEDEL404A Mentor in the workplace |
Telework, productivity and wellbeing
An Australian perspective

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Developments in networking and collaboration technologies offer new opportunities for employees to telework. Even though studies indicate that teleworkers can be more productive when working away from the office, results are mostly self-reported. Additionally, no studies have yet explored telework in terms of productivity and wellbeing from both a managerial and employee perspective in Australia. We followed a qualitative research design to explore telework, productivity and wellbeing, as well as a quantitative component to measure daily experiences of workers on telework and non-telework days. Findings indicate that 1) productivity is a management concern and requires a different management approach to yield productive outcomes; 2) high-level IT support is required for workers to be more productive; and 3) the ability to telework fosters wellbeing, which in turn contributes to productivity.

Introduction

Recent developments in networking and collaborative tools such as Web 2.0 and mobile devices are rapidly changing traditional workplaces around the globe (Bayrak 2012). For example, work can now be conducted from anywhere without the need for face-to-face communication. Telework, or ‘telecommuting’, is defined as

“...a flexible work arrangement whereby people work in locations, remote from their central offices with no personal contact with co-workers, but the ability to communicate with co-workers using ICT” (Di Martino and Wirth 1990).

This flexible mode of working has been around for a long time, yet has only recently become a new and attractive way of conducting work due to recent developments in mobile and handheld devices.

A 2009 forecast indicates that the existing 43 million teleworkers in the USA may increase to encompass 43% of the US workforce by 2016 (Shadler 2009). There are currently no recent
comparable statistics on telework in Europe or the UK, but in 2005 the Czech Republic was the EU country with the highest number of workers (15.2%) who telework a quarter of their time or more (EirOnline 2010). In comparison, 17% of the Australian workforce was engaged in one or more forms of telework in 2008 (NSW 2012).

Considering the economic, organisational and social benefits of telework, large distances between capital cities in Australia and contributions that regional and rural business make to the Australian economy, it is important to explore factors that may foster the adoption of telework in Australia. With the ongoing rollout of the National Broadband Network (NBN), the Australian federal government is actively encouraging the growth of telework opportunities across Australian organisations (Government of Australia 2012).

From a management perspective, the inherent difficulties associated with measuring the productivity of teleworkers may be a barrier to telework adoption (Pyoria 2011; Weisberg and Porell 2011). In collaboration with Cisco and IBES (The Institute for a Broadband-Enabled Society at the University of Melbourne), we conducted a study from April to November 2012, to explore the link between telework, productivity and wellbeing in a number of industry sectors across Australia.

The next section sketches background literature on telework and productivity, followed by a section that describes our research questions, research methodology and key findings. A discussion then follows with a summary of key themes arising from the research as well as avenues for further research.

Background literature and research questions

Literature on productivity in the context of telework is scant and mostly self-reported, with a few authors highlighting the complexity of measuring productivity for teleworkers (Baker et al. 2007; Blok et al. 2010; De Menezes and Kelliher 2011; Neufeld et al. 2005). Claims on productivity gains relating to telework are unanimous, with some indicating that telework could boost both organisational and individual productivity (Pyöria 2011; De Menezes and Kelliher 2011). However, claims about higher productivity are often made without careful consideration of how managers perceive individual and team productivity. A study by Westfall (2004) proposes four factors that need to be incorporated in a productivity measurement equation: amount of work, intensity of work, efficiency of work and adjustments (i.e. additional organisational costs required to telework).

This framework formed a starting point for our discussions with teleworkers regarding their productivity. However, claims about higher productivity are often self-reported and made without careful consideration of how managers perceive individual and team productivity. For the purposes of this study, we took the view that productivity can relate to an individual or a team and is a measure of how effectively and efficiently assigned tasks are completed over time. More specifically in terms of telework, it can be described as the attainment of measurable goals within time and on budget.

An accurate measurement of productivity in the context of telework is not easy, considering other factors that may positively impact on an individual’s productivity. Examples of such factors include social interactions with managers, team members or family members, as well as the organisational culture, situational resources, distractions in a workplace, and general wellbeing (Baker et al. 2007; De Menezes and Kelliher 2011; Neufield et al. 2005). It was hoped that the research would provide some useful insights into the complex phenomenon of productivity and provide a starting point for future research efforts in this regard.

Prior studies on wellbeing argue that the level and combination of certain job-related characteristics (e.g. difficulty and stress levels, level of autonomy, demands of tasks and workplace social support) affect an individual’s wellbeing (Jeurissen and Nyklicek 2001; Warr 1990). These findings suggest that an individual’s wellbeing positively influences attitudes and perceptions towards work and is consistent with suggestions that telework has
the potential to improve job satisfaction, morale, flexibility, and family/work life balance (Baker et al. 2007; Hartig et al. 2007).

Although there are numerous studies on telework, there is a noticeable gap in the academic research that explores the impact of telework on productivity and wellbeing from both a management and employee perspective, especially in the Australian context. In order to gain a better understanding of productivity and wellbeing with respect to telework, the main research question underpinning this study was 'How does telework impact on an individual's productivity and wellbeing?' More specifically, the study sought to investigate whether the ability to telework fosters an individual’s wellbeing, which in turn increases an individual’s productivity. Additionally, if telework can enable a more productive workforce with a better sense of wellbeing, how can Australian organisations empower this approach to drive changes in their workplaces?

In answering these research questions, we briefly describe the research methodology and findings in the following sections.

**Research methodology**

We were interested in gaining a deeper understanding of people’s perceptions, views and telework practices, and the impact of telework on productivity and wellbeing. Therefore, an exploratory research method with a predominantly qualitative nature was followed, complemented by quantitative data in the form of daily experience data logs. We interviewed 28 participants, (25 hybrid teleworkers and three non-teleworkers) across six Australian organisations from the education and government sectors as well as private enterprise. Participants were based in various locations, including Greater Melbourne, Sydney, Newcastle, Brisbane, Perth, Adelaide and Dubbo, and were carefully chosen based on their hybrid mode of telework (i.e., working at least two days from home each week). We were interested in both management and worker perspectives of telework and recruited teams of workers in order to gain insights on their experiences of telework. Three non-teleworkers were also invited to share their views on productivity and wellbeing as a method of comparison between teleworking and non-teleworking employees. Participation in this study was voluntary.

Table 1 summarises case study details across the various industry types. Data collection involved two phases. In Phase One, participants were interviewed wherever they worked, through face-to-face or video-call interviews. Interview questions focused on their perceptions of productivity and wellbeing while teleworking as opposed to non-teleworking. Phase Two followed the interviews and required each participant to log his/her daily experiences of telework and non-telework on four consecutive days in a week of their choice. For this purpose we developed a website so that participants could log their actual work experiences across four consecutive work days.
### Table 1 - Details of participating case study organisations

Three teams from NetworkCo, TestCo and EducoIT agreed to participate in the logging of actual work experiences. Apart from data on costs and expenses related to travel, costs related to working away from the office and using the Internet to conduct work, daily productivity and wellbeing data had to be logged prior to starting a work day and at the end of each work day. The logged data included:

1. actual hours worked;
2. feelings and attitudes towards work;
3. tasks planned;
4. actual completed tasks;
5. number and type of interruptions each day; and
6. individuals’ general feelings of their day’s productivity and wellbeing.

Participants’ feelings about their daily tasks (morale, control over their work, job satisfaction, intensity of the work and pressure on telework days and non-telework days) were logged using a 7-point Likert scale. Additionally, participants were required to comment on their overall feelings of wellbeing and productivity each day (Figure 1 presents one of the screens from our day experience data logging website).

All interviews were transcribed and a thematic analysis of both the interview transcripts and logged data was undertaken. The analysis focused on identifying key themes that could explain productivity and wellbeing from both a management and worker perspective. Daily
experience data were useful as we could compare and link the website data of individuals and teams with the qualitative interview data.

![Figure 1 - Example screen from the daily experience data log website](image)

**Research results**

We discuss our findings using three key themes that emerged from the data analysis.

**Theme 1: IT is an important enabler for telework productivity**

Across all cases it was evident that productivity was closely linked to the availability and use of adequate technology to enable and support telework. Basic collaboration and networking tools, mobile devices, access to content, workspaces, individual desktops and a supportive network infrastructure are required to achieve productive outcomes. Based on varying levels of IT support for telework across our cases, we classified IT support for telework as being high-level, medium-level or low-level as outlined in Table 2. Participants from organisations with high-level IT support indicated they could work seamlessly from anywhere, and were perceived as being more productive than those from organisations with medium or low levels of IT support. A Project Manager from NetworkCo stated:

“With [NetworkCo] being a technology company they give you everything, all the tools and technology you need to do your job well”.

Another manager from the same organisation confirmed this organisation was at the high-end of the IT support spectrum for telework:

“We're at the higher end of the scale. We are provided with what's called a virtual office environment. I have a router in my home, so my home office effectively becomes an extension of [NetworkCo’s] environment. So there is no difference in the environment between office and home, so technology is the enabler” (Regional Sales Manager, NetworkCo).
Table 2: Types of IT support and tools that enable and support productive telework

Participants from one of the medium-level IT support organisations indicated that virtual collaboration technologies (such as Skype and videoconferencing) could enhance their telework experience and improve productivity. This organisation provided only email and remote server access to support telework, requiring individuals to use their personal mobile phones for telework. One participant indicated how this impacted on her productivity:

“I think that better technology could improve it [telework]. I know there are some companies that use Skype or other technologies, and that might be useful. You find sometimes you might be emailing someone with a question and you’re waiting on a response and it’s taking a bit of time.” (Tester, TestCo).

Another participant confirmed the need for collaborative meeting tools to enhance the quality of meetings for the testing team:

“... we need something more, definitely Skype or video conferencing. Video conferencing would be fantastic.” (Tester, TestCo).

Teleworkers from organisations with limited networking and collaborative tools and devices, and low speed internet access indicated that this had a negative impact on their productivity:

“The problem is logging into the [organisation’s] system, it's slow .... I take a USB home the night before teleworking with all the big files on them so I don’t constantly download from our server during the day. I try not to have to do the remote login because it takes forever to download files”. (Manager, EduCo)

Given that this study viewed productivity as a measure of how effectively and efficiently assigned tasks are completed over time, and the attainment of measurable goals within time and on budget, it would appear that teleworkers with high-level IT support were more...
productive than others with medium or low-level IT support. This may be due to the ability of high levels of IT support to replicate the work environment as closely as possible, therefore allowing a seamless transition between working in the office environment and working from elsewhere.

**Theme 2: Relationship between telework and productivity**

Productivity did not appear to be a major concern for organisations that have developed a telework culture and were at the high-level end of IT support for telework (NetworkCo and InfraStrucCo). Two participants from these organisations commented positively on productivity:

“T...
during the week of daily experience data logs was positive – she indicated that her team’s productivity was high and that she was ‘very pleased’ with her team’s performance on telework days at the time of conducting the study.

Day experience data logs indicate that participants worked longer hours (1.5 to 3 hours longer) on telework days as opposed to non-telework days. Work days on telework days also started earlier (as early as 6:30am). Often participants reported that they would spend the time normally spent commuting to telework, thus extending their day, but also their feeling of job satisfaction resulting from greater productivity.

Three other aspects relating to productivity and telework also emerged from the findings. These relate to:

1) the issue of trust in the relationship between managers and teleworkers;
2) the need for teleworkers to be self-driven and self-managing; and
3) that a different approach to managing teleworkers is required.

**Trust:**

The importance of trust in terms of productivity and telework was mentioned by a number of participants who were interviewed. Perceptions indicated that trust is built over time as a result of one’s behaviour, as two participants indicated:

“I found it difficult to find out what they [teleworkers] were doing – and it all came down to trust, could we trust them to be productive and do the work without them being in the office. And it came down to a point of getting to know the team and we soon got to know who could be trusted and who couldn’t and the ones we suspected weren’t doing the right thing, we monitored them closely.” (Test Manager, TestCo) and

“… When you start the job you are given the trust, and it’s yours to lose if you don’t do the right thing. And then you are judged by results, so if I deliver the results then I have the trust of my managers.” (Project Manager, NetworkCo).

**A self-driven and self-managing attitude:**

A self-driven attitude towards work in general was another important factor that contributed to productivity during telework. Some participants declared themselves productive teleworkers since they are driven, independent workers with self-organising abilities. One participant commented that these aspects were important for productive teleworkers:

“What I am looking for is autonomous, independent people who can work on their own.” (National Solutions Architect, InfraStrucCo) and

“I’m very quick at what I do, but I’m also a bit of a workaholic. I get in there [my home office] and get stuff done, and nothing is stopping me from finishing off tasks later in the day.” (Project Manager, NetworkCo).

**A different approach to management of teleworkers:**

Managers indicated that telework requires a different management approach. Even though managers felt they trusted their workers, they had to arrange regular phone or video meetings to follow up work to make sure that milestones were being met and task-based deliverables were completed. One manager comment on his management style:

“I say to my guys I’m more interested in the outcomes … I expect a higher volume of output when they work at home because they are not getting distracted … I have a list of things my team have to get through and they work off a register and as they update and tick off those pieces of work I can see the progress. So should my team not be producing things on time or to the expected quality I can see that very quickly” (Manager, InfraStrucCo).

Another manager from the same organisation confirmed that managers need different management approaches to manage teleworkers:
“Managers need to brush up on their skills to manage distributed teams – managers need to be able to manage, measure and reward remote employees more effectively”.

In summary, findings suggest that telework requires a different management approach where frequent meetings, clear milestones and task deadlines are essential. Also, trust and a self-driven attitude are important aspects to foster a productive working environment (from both the manager and employee perspectives).

**Theme 3: Telework and wellbeing**

Participants interviewed agreed unanimously that there is a positive relationship between telework and wellbeing. The flexibility and ‘head-space’ enabled by telework contributed to individual wellbeing and made workers feel more productive, as two participants indicated:

“I guess the positives are less stress, no commuting on telework days, feeling comfortable when I’m working. I experience less anxiety on telework days, and have better work-life balance.” (Project Manager, NetworkCo) and

“I think I probably feel more refreshed when I’m at home, I almost feel like it’s a weekend sometimes because I enjoy my work. It’s not something like I feel I have to do. Normally by Thursday if I am not teleworking I would feel my energy ebbing away, then thank God it’s Friday, I would be tired by the end of the week and you need the weekend to recover. But having a Wednesday as a telework day, I have much more energy remaining for the end of the week. Maybe that’s because I get a chance to do stocktaking and clear the decks, clear my emails, when I telework mid-week.” (Director, EduCo).

Additionally participants felt a heightened sense of wellbeing related to a work/life/family balance as one manager indicated:

“... I get flexibility from telework, I can see more of my kids, take my daughter to school and also pick her up – these are things that regular office workers wouldn’t be able to do.” (Project Manager, NetworkCo).

In day-experience data logs, participants rated their wellbeing as ‘high’ (between 5 and 7 on the rating scale) for telework days. Wellbeing data log responses on telework days for each of the teams (NetworkCo, TestCo and EducoIT) confirmed this. Comments from participants of two teams were as follows:

“Good balance between home/work being able to assist with the family and still get a number of tasks completed” (NetworkCo) and “I’m more than happy and stress free” (TestCo).

Some daily experience data logged by participants on non-telework days was less enthusiastic Remarks logged by two participants from NetworkCo were as follows:

“I feel that I have achieved an average amount of work....so I will be behind again [tomorrow] – [feeling] a little pressured” and “Productivity average to high... however stress levels increased due to number of interruptions”.

Across the case studies, both interview data and daily experience data logs indicated that the ability to work away from the office enabled a better work-life balance which engendered a positive attitude towards work. Workers felt that teleworking allowed for greater flexibility and a sense of control over their work which energised workers, lowered stress levels and in turn allowed for more productive work. Additionally, workers could better balance family and work life, and the ability to have a presence at home contributed to a more happy family life.

In summary, from a wellbeing perspective, participants were positive about the future of telework. It would appear that reducing stress and enabling flexibility in work schedules increases productivity.
Discussion

Based on our findings across the cases, it became clear that organisations need to ensure that the right type of IT support environment is created to support teleworkers. IT is considered to be a key enabler for telework, and therefore the provision of IT tools allowing teleworkers to communicate, collaborate and access content from anywhere is essential. High-level IT support tools can boost both individual and team productivity but even a mid-level IT support environment can significantly facilitate productive telework.

Therefore organisations need to carefully assess their existing IT infrastructure as well as the nature of work required to identify what individuals and teams need to facilitate communication and collaboration when working from anywhere. The ability to access content from anywhere is essential for telework and this study indicates that sophisticated mobile and handheld devices do indeed enable productive work outcomes.

Another aspect that needs to be considered in terms of telework and productivity is that of trust. A number of participants emphasised the importance of trust in a telework relationship between a manager and a worker. From our study it would appear that some managers are more willing than others to trust their employees to work productively in a telework environment. This was often related to management style, with more traditional managers being less comfortable with teleworking arrangements.

We found that managers who themselves were teleworking on a regular basis (and therefore understood the context of telework) worried less about trust and were more concerned with measuring outputs. In terms of management style, the study found that frequent and effective communication, where expectations and targets are clearly articulated and regularly monitored, forms a sound basis for managing teleworkers and can assist in developing an underlying platform of trust. Participants in the study were also asked to identify various attributes of productive teleworkers, and their responses included being driven, self-motivated, organised, disciplined, and being able to work independently.

Our findings suggest that wellbeing is an important factor in terms of teleworking and productivity. The ability to telework fosters individual wellbeing, which in turn makes workers more productive. Working from anywhere in a hybrid telework mode clearly re-energises workers, and helps them to get away from multiple interruptions in the office allowing them to work through piles of ‘to-do lists’. Additionally, the ability to telework empowers workers to control their work-life and family balance. Almost all of our participants indicated that they would prefer to work in a hybrid-telework mode as they needed the social interaction and networking that they gained from being in the office, thereby enhancing their learning experiences, personal growth and the generation of new ideas.

Finally, our findings suggest that telework requires a new management approach to realise individual and team productivity. This approach requires more inputs from managers in terms of: clearly defined requirements and deliverables, setting of specific milestones, clear articulation of ways in which individuals and teams of teleworkers need to communicate and frequent follow-ups to ascertain that teleworkers are productive and deliver the results. This may be more demanding in terms of management style and time and may require deeper sense-making skills to monitor and assess activities undertaken by teleworkers. It would also appear that the organisational culture and climate sets the tone and can often have a profound effect on how telework is perceived, and how teleworkers are actually managed.

Conclusion

Australian industries have not yet fully embraced the advantages offered by teleworking. Given the ongoing rollout of the National Broadband Network, Australia has the potential to considerably grow its capacity for telework opportunities. We expect that managers are not yet convinced that teleworkers can be productive when working from anywhere. Our study
indicates that workers can be as productive or even more productive when they telework, particularly if they have a supportive IT infrastructure and environment that enables telework. Moreover, the ability to telework fosters individual wellbeing, which in turn yields greater productivity. It is clear that traditional office-based work is often less relevant or perhaps even unnecessary in an increasingly fluid and mobile world. In this regard, Australian managers face many challenges in managing a new generation of teleworkers who may be working from anywhere. Further research should consider the attributes required of both managers and workers in telework environments, as well as the strategies required to manage teleworkers successfully. Additionally, more studies are required to get a more comprehensive and inclusive way of measuring individual and team productivity that incorporates wellbeing.

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E-learning: Supplementary or disruptive?

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The rollout of the National Broadband Network in Australia will accelerate dramatic changes in pedagogy and access that have been underway since the advent of the Internet. Among the most important of these are the move away from bricks-and-mortar campuses towards global learning networks that share expertise and resources, the blurring of the virtual and the material and the rise of mobile learning (m-learning). When combined with the proliferation of MOOCs (Massive Open Online Courses), m-learning will result in access to education becoming a universal human right.

Introduction

The advent of the Internet around two decades ago provided universities with three monumental opportunities. Any one of these should have been sufficient to alter the way teaching was conducted but in combination should have revolutionised university education.

• First, educators now had the ability to extend their reach globally.
• Second, anyone with an Internet connection suddenly had unprecedented access to information.
• And third, with the development of Web 2.0 technologies, digital communication began to provide a medium, and for many now the preferred medium, for interacting with friends and associates.

Despite this, it was only five years ago that I was lamenting how slow Australian universities had been to exploit educational technology in the service of learning and teaching. What I said at that time was:

“educational technology has yet to fulfill its promise to the extent witnessed in other sectors of the economy. The cottage craft of teaching and learning in universities has constrained IT’s use. Indeed, in many universities, technology is often viewed as a barrier, even antithetical, to “genuine” education.”

How quickly things have moved since then. It seems that every day now, there is an announcement about some new online start-up, innovation or development in e-learning. Admittedly, the most exciting of these developments are occurring outside of Australia but since there are no geographic boundaries in cyberspace, Australian universities have no choice but to respond.

According to the National Center for Education Statistics (NCES), the number of U.S. students enrolled in at least one distance education course increased from 1 million to 12 million between 2002 and 2006, and the growth spurt shows no sign of abating. Research by the Sloan Consortium, for example, recently found that online college enrolments have continued to grow faster than the total population of college students. And respected market research firm, Ambient Insight, expects online enrolments in the U.S. to rise by a further 10
million in the next two years alone. By that time, the number of students taking all of their classes online will increase to 3.55 million while the number of students taking all of their courses in on-campus mode will actually decline.

It is difficult to obtain authoritative statistics on the rate of growth in Australia, but IBIS World recently estimated that the revenue from courses offered at least 80% online grew by 56% between 2008-9 and 2011-12 in Australia, while the number of online providers (i.e. those offering courses with more than 80% online content) grew by 40%, (from 764 to 1,082) over the same period.

More significant than the growth in uptake of online learning are changes that are now occurring in the nature and quality of e-learning itself. Until recently, the most common view of educational technology was that it was at best supplementary to conventional forms of instruction. The delivery of online courses mimicked the lecture-tutorial approach that has been the staple of university education for centuries. Lecture materials were provided, often in PDF form or, for the more advanced lecturers, as pod- or vodcasts. This material was then supplemented by online versions of tutorials, such as synchronous or asynchronous bulletin boards and chat rooms.

We are at last beginning to display more imagination in the application of educational technology as e-learning evolves into a genuine alternative to traditional teaching practices. As broadband further liberates us from the constraints of time and place, it will accelerate the movement of university education away from campuses, desktops and teacher-centred pedagogy towards learning networks, a merger between the virtual and the material, mobile learning, and a radically new, student-centred form of pedagogy.

**Advances in Educational Technology**

With the arrival in Australia of broadband, just about anything you could only do on a university campus will soon be available to you anywhere, anytime. Of course there will always be some learning activities, such as clinical placements and medical procedures that require students to be physically present somewhere at a specified time but the range of these activities will become narrower as the available bandwidth becomes broader. At this university, for example, certain aspects of emergency medicine are now taught by specialists from the medical school at the University of California (Irvine). Staff and students from UNE connect via telepresence technology to UCI’s robotic simulation ward where they direct UCI’s ward assistants to administer treatment in response to simulated medical emergencies.

The responses of the robotic patient are observed by the students, vital signs are downloaded onto UNE laptops and displayed in real time on monitors adjacent to the telepresence screen. Meanwhile, staff and students at both universities work together to adjust interventions and debrief outcomes. Similarly, academic staff in chemistry and physics are designing practical classes whereby students can manipulate scientific equipment remotely and download their results onto PCs or i-Pads. With the aid of video cameras mounted around the laboratories, students watch the equipment come to life as they issue instructions from anywhere they can obtain a broadband Internet connection.

In place of the traditional campus, then, what we are witnessing is the emergence of nodes of activity or learning networks that are physically dispersed around the country and around the world. This movement into cyberspace will accelerate along with advances in hardware and software that are blending the virtual and the material. Virtual environments are being created that mimic the real world and provide us with a visceral sense of immersion. Some have even argued that the distinction between virtual and real will disappear altogether. This is because all surfaces, including the skin are potential interface points enabling users to issue and receive computer commands using their own body parts as touchpads.

We are also seeing rapid progress in augmented reality, where an overlay of data or interactivity is created on top of the real world around us. For example, the Google Android now allows you to point your phone at, say, a restaurant and bring up reviews and contact details of that restaurant, along with seating plans, similar restaurants in nearby locations,
transport options, etc., etc. so that you are in a position instantly to augment your lived experience with new knowledge and perceptions.

In short, advances in virtual reality are further undermining the notion that students need to assemble in one place at one time in order to be informed, engaged or even entertained. As a consequence, the question for universities could soon become: What is the role of bricks and mortar in a world where students can now live and move and have their being in a network cloud? Soon there will be no compelling reason to think of universities as places at all, but if they do persist in that form, it will not be because they provide the best or most efficient means of educating people.

The worldwide proliferation of mobile devices and applications also has major implications for education. Consider some of the latest dizzying statistics:

- There are now 3 billion more smartphones in the world than there are people;
- On current estimates, 1 billion smartphones will be sold in 2014 alone, which is twice the number of PCs that will be sold in that year;
- By 2016 there will be around 10 billion mobile Internet devices globally, with 50 times the amount of smartphone traffic in that year than there is today.
- Ericsson estimates that by 2015, 80% of people accessing the Internet will be doing so from mobile devices. (In Japan today, over 75% of Internet users already use a mobile device to connect, and in the U.S., 2/3 of Americans connect to the web via a smartphone, tablet or other portable device.)
- Users are now downloading 1 billion Android apps every month and over 18 billion apps have so far been downloaded in the Apple marketplace. A recent study by Distimo predicts that by 2016, every person in the world will have an average of 7 mobile apps each.
- Ambient Insight has forecast the compound annual growth rate for worldwide mobile learning products and services at 26.3% for the period 2011-2016, with revenues rising from $US212.38 million in 2011 to $US682.13 million by 2016.

It may be, then, that the migration from campus to desktop that is currently occurring may merely be a wayside station on the road to m-learning. If so, the big winners will be what we euphemistically call “non-traditional” students: the poor, the isolated, those with disabilities and people from developing countries. This is because the cost of mobile Internet-enabled devices is in rapid decline and their power needs are minimal, which is giving even people off the grid access to the Internet.

Ten years ago, the fastest growing market for mobile phones was India, which grew from 10 million phones in 2000 to 850 million in the decade following. But India has since been displaced by the African continent as the world’s fastest growing market for mobiles, which are also the most common method of connecting to the Internet in Africa. The democratisation of education will happen not just through technological advances, of course, but the veritable flood of free courseware that is now finding its way onto the Internet virtually guarantees it.

The idea of open courseware got going in 2001 when MIT started uploading its course materials to the net. Within 12 months MIT had 50 of its courses freely available and since then it has distributed around two-and-a-half thousand of its courses and is receiving close to 20 million site visits every year. MIT estimates that in the 10 or so years since it opened up its courseware, it has reached around 125 million people worldwide. This combination of Internet-enabled mobile devices and open courseware quite literally places higher education into the hands of people who would previously have been too poor, marginalised, or remote to participate.

There are numerous other sources of free educational resources, of course, including iTunes U, which amassed more than 350,000 downloadable files in its first five years of operation. And then there is Wikipedia, which was launched in the same year as MIT’s open courseware
initiative and now contains more than 15 million articles (only 20% of which are in English), all of which are continually updated and corrected by subscribers themselves.

The enormous appeal of Wikipedia demonstrates another profound shift in the way that universities of the future will teach – the movement away from acquisition of knowledge as the fundamental purpose of education to incorporate its creation and re-creation by students themselves. This is unfamiliar territory for academics of my generation who were raised on the idea that only professional educators are qualified to teach. But Facebook, Wikipedia and blogging have radically undermined this assumption because all consist of information that is created by, not just communicated to, participants. The acts of teaching and learning are blurring as a consequence. Schooled on Google and Wikipedia, students today want to inquire, not rely on the professor. They want a conversation, not a lecture.

The most recent development in open courseware is of course the MOOC, which is an acronym for ‘ Massive Online Open Courses’ in which huge numbers of students enrol in online courses, network with one another online and undertake online quizzes and self-directed learning. The term MOOC was first coined in 2008 but entered common parlance only towards the end of 2011 when Stanford University professor, Sebastian Thrun, offered to enrol students in his online robotics course free of charge and 160,000 people took up the offer. Buoyed by the success of his experiment, Thrun and his colleagues launched a free online university called Udacity in February of 2012 and within the first three months of operation had achieved over 100,000 enrolments.

Six days after Udacity, coursera.org was launched by a star-studded line-up of U.S. universities including the University of Pennsylvania; the University of Michigan; and Princeton and Stanford Universities. These universities offer their courseware free of charge online, and there is facility for students to interact with one another and take quizzes to monitor their progress. By the end of April, coursera had amassed a staggering 1,000,000 enrolments.

Not to be outdone, two weeks after coursera was launched, MIT and Harvard University joined forces to launch edX and on 1st August 2012, arguably the world’s finest public university UC (Berkeley) threw in its lot with edX. Like other MOOC providers, edX also offers free online courseware to students around the world; its stated goal is to exceed one billion student enrolments in the next decade.

**Effectiveness of e-Learning**

Among the most common objections to e-learning continues to be that it is a very poor substitute for face-to-face teaching. Given the technological advances described earlier, however, this objection rather begs the question of whether the distinction between “face-to-face” and “online” has any real meaning in a post-NBN world. But even before the improvements that broadband will bring, there was solid evidence in support of e-learning methods.

Prior to the development of Web 2.0 technologies like MySpace and Facebook, there had been two major meta-analyses of the effectiveness of online education (Bernard et al 2004; Cavanaugh et al 2004). Meta-analysis is a technique for combining the statistical results of multiple research studies to obtain a composite estimate of the size of the effect. In this way, different studies using different online techniques and different measures of learning can be combined into a single study and a global measure of the effectiveness of online learning calculated.

The result of each experiment is first expressed as an effect size, which is the difference between the mean score for online learning and the mean score for face-to-face classes divided by the pooled standard deviation. Individual effect sizes are then combined into a single, overall index. Importantly, meta-analysis is only ever performed on studies that satisfy the most rigorous methodological standards, normally involving random allocation of students to classroom and online conditions.
Results of these pre-Web 2.0 meta-analyses suggested that there was no significant difference in learning outcome between distance education and face-to-face education. Findings of a more recent meta-analysis of job-related courses comparing Web-based and classroom-based learning (Sitzmann et al 2006) were even more positive. This study found online learning to be superior to classroom-based instruction in declarative knowledge (or knowing that) outcomes, with the two being equivalent in procedural knowledge (or knowing how) outcomes.

A more recent meta-analysis conducted by the United States Department of Education (Means et al 2010) combined effect sizes from 46 separate studies conducted since the advent of Web 2.0 technologies. The number of students in the various studies ranged from 16 to 1,857, with student ages ranging from an average of 13 to 44 years. Importantly also, the subject matter captured by the meta-analysis was very diverse, extending from medicine, to education, law enforcement, introductory science, problem-solving skills, computer science, optometry, veterinary science, and multi-media studies.

The overall finding of the meta-analysis was that classes with online learning (whether taught completely online or blended) actually produced better learning outcomes than classes with solely face-to-face instruction. Admittedly, the effect size was only moderate (+0.24) but it was sizeable enough to dispel the myth that face-to-face instruction is always the optimal form of teaching. This same meta-analysis compared three conditions:

(a) face-to-face only,
(b) online only, and
(c) blended or a combination of face-to-face with online learning.

Comparisons of these conditions revealed that the third actually produced the most powerful effects (g+ = +0.35 vs face-to-face; compared with g+ = +0.14 for online only), with the difference between online only and blended also being statistically significant. In short, then, as the technology has improved so has the relative advantage of online learning over face-to-face instruction and as broadband erodes the very distinction between online and face-to-face, the debate itself will be consigned to history.

**Conclusion**

Up to this point, I have written as if universities will continue to be the main providers of higher education and gatekeepers to the professions, but it would be a mistake for universities to take this privileged position for granted in the post-NBN world. In her confronting introduction to a U.S. Department of Education (2006) report on the future of higher education, Education Secretary Margaret Spellings wrote that:

“What we have learned over the last year makes clear that American higher education has become what, in the business world, would be called a mature enterprise: increasingly risk-averse, at times self-satisfied, and unduly expensive. It is an enterprise that has yet to address the fundamental issues of how academic programs and institutions must be transformed to serve the changing educational needs of a knowledge economy.... History is littered with examples of industries that, at their peril, failed to respond – or even to notice – changes in the world around them, from railroads to steel manufacturers. Without serious self-examination and reform, institutions of higher education risk falling into the same trap, seeing their market share substantially reduced and their services increasingly characterised by obsolescence” (Spellings 2006, p.xii).

Until the invention of the Internet, universities did not have to be innovative because they have effectively had a monopoly. But competition from virtual institutions like ed-X, Udacity and coursera is changing all that. In his research on the implementation of new ideas, Harvard Professor Clayton Christensen found that disruptive innovations rarely come out of established enterprises. Even when a truly new way of doing things does occur to someone in
a traditional organisation, established systems and standards take over and the idea is usually quashed. A new idea that is not dismissed entirely is almost inevitably modified to fit the way things are traditionally done, losing its innovation impact in the process. Let us hope Christensen is wrong. Universities must surely be among the very finest institutions that society has created. Let us hope that Australian universities embrace the opportunity that the NBN provides before it becomes a threat to them.

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Online education is growing rapidly due to faster Internet connections, a higher uptake of broadband Internet and greater IT literacy. However, effective online education can only be achieved through a considered approach that connects learners through collaboration, interaction, participation, personalisation and productivity. Swinburne Online is a recent player in the field of online education and is borne through a partnership between Swinburne University of Technology and SEEK Limited. Swinburne Online provides a model of online education that adheres to state of the art research. It uses Gilly Salmon’s five stage model of online learning combined with a supportive environment for learners. The venture to date has seen a rapid development of online courses but has not been without challenges.

Introduction

One of the most important factors affecting teaching practices within the higher education sector is the introduction of new information and communication technologies (ICT). Online technology is the largest growth area in higher education, becoming popular because of the potential to provide more flexible access to content and instruction from any place at any time. Educational institutions are attracted by the capacity to increase their course availabilities to a wider range of students who cannot, or who choose not to, attend traditional face-to-face classes, but it has implications for teaching. Increasing student diversity requires more flexible teaching and learning methodologies (Snyder 2009). Over the past ten years, many educational institutions have offered their courses online. Numbers have grown steadily. Globally, online education is growing exponentially; in many less developed countries growth rates are phenomenal. The top four adopters of self-paced e-learning, all showing projected five-year growth rates of 35% or more, are Vietnam, Malaysia, Romania and Azerbaijan (Ambient 2011).

Australia online

The uptake of broadband Internet and the IT literacy of individuals are key drivers of online education (IbisWorld 2012). Sloan Consortium reports that over 6.1 million students were enrolled in at least one online course in 2010 (Allen and Seaman 2011). IbisWorld reports over 1000 providers in Australia alone, although few are pure online providers. Most use online education to supplement existing offerings (IbisWorld 2012). Some benefits of online education are reported to be higher profit margins compared to traditional delivery modes – approximately 8.8% of revenue compared to an average of 3.8% for all education. Open University Australia and SEEK Limited are two organisations which compile most online offerings in Australia, thus enabling potential students to find online course offerings relatively easily. The majority of online courses are non-formal education (55.9%). Another
11.3% are aimed at undergraduate courses, and 13.8% at Graduate Diploma and above. By far the most popular subjects taken online are IT (44.3% of students enrolled in online courses) followed by Finance at 8.7% and management at 8.1%. About 23% of students are aged between 19 and 24 years, 22.8% between 25 and 29 years and 19% are 30 to 34 years. Only 3% of online learners are over 55 years of age and only 3.7% below 18 years of age. New South Wales has by far the largest percentage of students enrolled (39.8%), followed by Queensland (26%) and Victoria (14.8%) (IbisWorld 2012).

The NMC Horizon Report Technology Outlook for Australian Tertiary Education (Johnson et al 2012) finds that Australian experts think online education will play a major part in Australian education in the future. This differs somewhat from other countries. They predict the move to Massively Open Online Courses (MOOCs) in the next four to five years and more open content in the next two to three years. The top three trends for education in Australia according to this report are:

1) People expect to be able to work, learn, and study whenever and wherever they want,

2) Increasingly, students want to use their own technology for learning and

3) Education paradigms are shifting to include online learning, hybrid learning and collaborative models (Johnson et al 2012: 17).

The top reasons for the shift to online education will be the ability to work, learn and study whenever and wherever people want; the ability for students to use their own technology; and the shift in higher education towards more online, hybrid and collaborative models of learning.

**Online courses versus traditional face to face**

Online courses offer several advantages to students. Programs are accessible from anywhere and study can be structured around job or family responsibilities. Courses can be streamlined, condensed, or accelerated. One of the key features of online learning that differentiates it from distance education is in the opportunity for interaction between teachers and students via online asynchronous discussion forums (Mazzolini and Maddison 2003). However, although online learning offers flexibility for students to “collapse time and space” (Cole 2000), working within their own time frame and work schedules, it is essential that the learning materials and activities are carefully designed and implemented in ways that support students in effective engagement that encourages high quality learning. Dropout rates for online courses are notoriously high and it is extremely important for educators to design effective online experiences to ameliorate such high drop-outs (Lee and Choi 2011). As Berge (1999) and Northrup (2001) both note, effective online interaction does not just happen. Effective online learning brings together collaboration, interaction, participation, personalisation and productivity (Ossiannilsson and Landgren 2012). Collaboration is often conducted within a Learning Management System (LMS) via an asynchronous online discussion forum. Online discussion forums are designed to promote interactions that build deeper understandings of course content (Wozniak and Silveira 2004). Through the establishment of collaborative, networked learning environments, students are encouraged to be enthusiastic participants in a community of practice and inquiry (Sims and Bovard 2004) by being actively engaged in meaningful conversations with online peers and teaching staff.

According to Palloff and Pratt (2011), within universities there is a “myth” around online education that asserts that “it is easy to teach online – all one needs to do is to move exactly what was being done in the face-to-face classroom into the online classroom” (p. 342). However, as Garrison, Anderson and Archer (2001, 3) indicate, “teaching in online courses is an extremely complex and challenging function”. Capturing a video or I-Lecture or posting a PowerPoint into a Blackboard site is not online teaching. Teaching online is not just a technical and administrative process that allows content to be delivered on to a computer. Making content easily available and accessible does not lead to learning any more than
opening a library would lead to a literate local community. Content only becomes ‘alive’ when integrated and related to meaningful learning and pedagogical processes (Ravenscroft and Cook 2007). Learning activities need to be “pedagogically sound, learner-focused and accessible” (Laurillard 2007: xv). Although many university lecturers use technology to support their teaching by the use of such tools as interactive whiteboards, making lectures available online and providing digital library access, none of this is particularly “transformational” (Laurillard 2007: xv). Teaching staff are required to develop new skills to meet this new style of teaching and learning. Palloff and Pratt (2011) consider that members of teaching staff are rarely given the level of training that is required for effective online teaching. On many occasions, tutors are brought in at the last minute with little or no training; and when training is provided, the focus is more likely to be on the technology rather than on the pedagogy. These authors suggest that training goals are rarely made clear and that there is often little understanding or discussion around what teachers and students need to do to benefit from a quality online teaching and learning experience.

Researchers have suggested that, to provide students with meaningful learning experiences, online learning providers should offer programs that are socially and academically integrated (Kanuka and Jugdev 2006). Shin (2003) posits that the perceptions of “psychological presence” that are held by students around teachers and online peers can be significant predictors of successful outcomes within the online environment. Angelino et al. (2007) stress the importance of forming cohort relationships supported through online interaction, and Jawah (2006) identifies interactivity and interaction as key success factors underpinning the pedagogy of online learning. Interactions and issues relating to them are one of the most frequently discussed topics. These are of critical concern to online educators. The term “interaction” is given a range of meanings in the literature. According to Garrison (1997) interaction is sustained, two-way communication among two or more persons for purposes of explaining and challenging perspectives. Gilbert and Moore (1998) consider interaction and interactivity to be one and the same. They define it as “reciprocal exchange between the technology and the learner,” while Wagner (1994) believes that they are two very different processes. For Wagner, interaction is “an interplay and exchange in which individuals and groups influence each other” where there is evidence of “two reciprocal events requiring two objects and two actions” (Wagner 1994: 20) with the focus on human behaviour. She considers that interactivity has a focus on the characteristics of the technology systems that support the establishment of connections. Even if the distinctions are accepted, it seems that both qualities are linked and both are necessary. Online interactions could not occur without technologies that allow high interactivity – person to person, person to group and person to system or learning material (Roblyer and Ekhaml 2000). From the student’s perspective, interaction is the communication between student and subject content, student and teacher, or student and student (Moore 1989). Each type of interaction is likely to have different effects on achievement and attitude to learning.

The interaction between pre-existing knowledge and the information that is provided in the learning materials is a critical factor. A constructivist approach to learning must provide not only the environment and the tools for the active construction of knowledge, but also appropriate feedback on the learner’s progress (Mayes and Fowler 1999). These authors describe learning as a cyclical development that travels through three stages:

- Conceptualisation, where learners interact with their own and other people’s concepts through an interaction with pre-existing understandings and new expositions;
- Construction, where learners apply and test new conceptualisations as part of their engagement with learning tasks to create their own framework of understanding; and
- Dialogue, where learners create and test new conceptualisations through conversations with tutors and fellow learners.

Faster Internet and Web 2.0 tools have enabled online educators to construct learning environments that encourage participation and productivity. Such tools allow for much more
meaningful production of materials associated with the topic being learned and for a learner’s initial understanding to be made much deeper. Such motivational production of materials affords better participation and engagement for online learners (Ossiannilsson and Landgren 2012). In addition, the availability of information sources across most subject domains through the Internet now aids the construction of online courses. Such information is also now available in multiple formats that can be utilised effectively for student engagement and can be accessed via multiple sources to ensure better consolidation of learning.

**Swinburne Online a new partnership**

In 2012, Swinburne Online began offering a highly engaging and productive learning experience. Swinburne University partnered with SEEK Limited to create Swinburne Online. Swinburne University and Swinburne Online have created learning modules specifically designed for 100 per cent online delivery to meet the needs of working Australian adults. Swinburne Online delivers Swinburne University accredited courses that adhere to Swinburne University academic standards and procedures. Students enrolled in such courses are Swinburne University students and have the same access to resources as do their on campus peers.

Along with the Swinburne/Seek Partnership, there is also a working relationship between Swinburne University academics and Swinburne Online Academics. Subject matter experts from across a range of campuses at Swinburne, work closely with Swinburne Online’s teams of Academic Program Directors, Learning Designers, Learning Technologists and Information Specialists to develop programs that bring Swinburne University’s highly respected academic curriculum together with best practices in online learning. Swinburne Online’s model provides a ‘high touch’ service for its students.

As stated earlier, Salmon’s five-stage model is the basis of the framework around which all units are designed. Utilising the latest technologies and online practices, students find themselves in groups of around 25 students, supported in their learning by expert discipline professionals, known as eLearning Advisors (eLAs) who have relevant experience in the field. These eLAs have undertaken appropriate training, provided by Swinburne Online and used as part of the selection process, to ensure they are well equipped to teach online. Students are encouraged to become collaborative members of their learning group by taking part in weekly online activities that inspire peer-supported learning through discussion and engagement. Teaching staff support their academic learning through regular communication and feedback to build student confidence and to foster an online community of learners.

**Salmon’s 5 Stage Model**

As stated, all teaching staff working within the online units are specifically trained in the model of online learning developed by Professor Gilly Salmon, Swinburne University’s Pro Vice-Chancellor (Learning Transformations). Her focus is to meet the needs of the iGeneration and lifelong learners.

There are a number of advantages online learning has over more traditional learning environments. Online learning enables virtual exploration – we can participate in virtual classrooms, or explore learning ideas and development in ways that cannot be replicated through reading a book. Through shared communities of learning, students can explore, contribute, share, reflect and construct knowledge. It is clear that well designed and delivered online education offers a number of benefits for students – not only mobility, flexibility and interactivity, but also the quality of the learning experience.

Although it is thought to be essential that a range of interactive opportunities should be made available and supported by both staff and students, it is also important to take other factors into account. If, as Salmon believes, online learning is a “transformation” that occurs in “leaps and bounds” (Salmon 2011, p.31) and is an environment where students are required to
develop skills in computer networking alongside their learning about the content, some knowledge of the development of skills is important. Salmon defines this process as following a pattern that develops in five stages. This model has implications for both teachers and learners and these implications are in the forefront of all unit development processes.

The fact that learning takes place in a social context is at the basis of the whole learning design process. During the first stage (access and motivation) students and staff are encouraged to participate in activities that allow for everyone to get to know some details about one another. This is to encourage relationship building, allowing students to feel confident about working with their fellow students, along with development of online technical expertise.

During the second stage, online identities are firmly established and the beginnings of interactive processes are encouraged. However, it is acknowledged that collaboration is much more than social engagement.

Stage three activities begin to develop expertise in the sharing of information and ideas. This is the start of cooperation with others in collaborative ways. Students use a range of collaborative tools such as wikis to support this collaboration and are encouraged to clarify, refine and consolidate their thinking through this engagement.

At stage four there is an expectation for high quality collaborative learning that is something much more than a collection of individual pieces of knowledge shared with others. Students are expected to be involved in knowledge construction, where the insights and solutions could not be created without whole-group participation and involvement.

As students reach the final stage, students are encouraged to think metacognitively by critically reflecting on the learning process and their individual involvement in everyone’s learning.

As identified above, each stage requires students to develop certain technical and collaborative skills and requires different support and scaffolding by teachers. This is part of the online tutor development process.

**Development of Swinburne Online: challenges**

Since its conception, Swinburne Online has been in a constant state of development. This continues given the massive task ahead of it with continuously expanding enrolments.

As previously stated, it is not merely a matter of throwing existing courses online by converting what is articulated in a lecture into electronic text. In order for online courses to be successful they must be innovative and adhere to good online practices, as described earlier in this paper. As such, it has been important for Swinburne Online to develop efficient and effective processes to build online courses that may have already existed as face-to-face courses as well as to develop courses from the ground up, such as Pre-Service Education, which has its own distinct challenges (e.g. how to deal with practicum school placement requirements online).

Such rapid development of online courses, from a range of starting points, has been challenging and has required the rapid employment of staff with a variety of skills, from technical and specialist online learning design skills. An added complication is the merging of traditional tertiary structures (Swinburne University of Technology) with industry partners (Seek Ltd).

One major challenge has been overcoming people’s perception of online education as being sub-standard to the more traditional face-to-face courses. In essence, the vast majority of people (even some seasoned educationalists) still take the view that it is essential to have ‘the expert’ up in front of the students to enable them to understand the materials being offered and to ensure that they are learning the correct material. Often these fears are somewhat mitigated when they realise that the online students will be supported by e-learning advisors.
and student liaison officers who are very active in the learning process and available, rather than being left to their own devices.

Another challenge that has faced pre-service teacher education courses is how to support students whilst on work-based experience (practicum). In such circumstances it has been important to recognise the expertise of teacher mentors who work in schools rather than sending out university-based tutors to support and assess students on placement. In order for such a system to be successful, it has been important to consider support for the teacher mentor through online professional development and clear guidelines for supporting and assessing students in the workplace.

**Conclusion**

Needing to keep up with the exponential growth of broadband technologies and user demands, online education is rapidly becoming more sophisticated. It is adopting online pedagogies designed to connect learners through collaboration, interaction, participation, personalisation and productivity. Swinburne Online is a new online provider formed through a partnership between Swinburne University of Technology and Seek Limited. Using the most up to date techniques for engaging learners in online education and well-trained and industry-experienced eLearning Advisors and Student Liaison Officers Swinburne Online aims to ensure a collaborative, supported and connected community of learners. The rapid development of these courses, however, has required the rapid growth of specialist staff able to transform traditional education into innovative online courses and the adoption of processes designed to deal with such rapid growth. This investment is essential, given the changing nature of education in Australia.

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Telecommunications and health information for culturally and linguistically diverse communities
A community survey

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Enabling universal access to high quality health information is challenging in multicultural Australia, where low proficiency in English can hinder access to information services. eHealth initiatives may potentially facilitate better access to health information for minority cultural groups. However, the extent to which eHealth initiatives are inclusive for culturally and linguistically diverse groups remains under-explored.

A community survey was conducted to explore the extent to which members of a culturally and linguistically diverse community living on a public housing estate in Melbourne’s North, and the health professionals providing local community health services, currently used telecommunications in relation to health information.

The community survey findings indicated relatively low levels of access to telecommunications in homes on the housing estate and infrequent use of the Internet to access health information. Health professionals used telecommunications for some forms of communication with patients but not others. The findings of this study have implications for the accessibility of electronic health information for culturally and linguistically diverse groups.

Introduction

eHealth in multicultural Australia

According to data from the 2011 Census, as at June 2010, 27% of Australia’s population were born overseas. A substantial proportion of the population was born in countries in which English is not the primary language. In the last ten years there have been considerable increases in the number of Australian residents who were born in Nepal, Sudan, Bangladesh, Zimbabwe and Pakistan (ABS 2011). Recent census data indicates that, as of 2006, 30.4% of 5.13 million recorded residents in the state of Victoria were born overseas (ABS 2006). This increasing cultural diversity, as well as the rapid population growth, the ageing population...
and rise in chronic disease, together with inequalities in health literacy make the provision of accessible health information and health services in Australia challenging. The demand for health services is increasing in growth areas and under-serviced locations. These locations are often highly populated with older residents likely to require aged care services and by migrant communities with diverse cultural and linguistic backgrounds (McGuirk and Argent 2011).

In Australia there is currently a move towards a health policy focusing on equipping health consumers with more information and power (Sillence et al. 2007). The National Health and Hospital Reform Commission report (NHHRC 2009) promotes a preventative self-management agenda. The Victorian state-based Department of Health presented a vision of community-led prevention to be realised through strong partnerships between primary health care and community health, aged care and other services. One example of such partnerships is the community health centres (CHCs). CHCs are based on the body of evidence that a strong community based primary health care system directly contributes to improved health status, reduced health inequalities and lower health system costs (Starfield 1994). The community health services model uses strong community connections and focuses on the underlying theory of the social determinants of health (Marmot 2005). Community health services where they exist, are often the first source of information about health services for many culturally and linguistically diverse (CALD) communities (Renzaho 2008) and are seen as an integral part of best practice for providing services for migrant communities (Woodland et al. 2010). In particular, screening and referral services are ideally provided in the community and services are designed to be culturally and linguistically appropriate, accessible and affordable (Woodland et al. 2010).

CALD migrant and ethnic communities in Western societies have traditionally had poorer health outcomes and access to healthcare than local communities due to barriers such as English language ability and cultural factors including health beliefs (Henderson et al 2011). Existing research on the potential and role of the Internet to address the disparity in health outcomes and access to healthcare and health information for CALD communities is limited. To navigate online health information, users require a combination of a high degree of English language competence including reading and numeracy skills as well as critical literacy to identify reliable health information. Conversely, when information is tailored to the user, online health information can assist users to formulate questions to ask their health professionals (Katz et al 2007). Therefore, the Internet has potential to assist CALD communities to overcome some of the barriers associated with accessing healthcare and improving health literacy (Rudd & Keller 2009).

Innovations in health services and the provision of health information

The demands for health care have been growing and changing and the explosion in digital developments worldwide has become an important part of the health agenda. Electronic and digital technology has been linked to coordination, integration and improving quality of health care (Victorian Department of Health 2009). This technology is also an essential carrier for information relating to health and health care, demanding intensive infrastructure development. In Australia, the National Broadband Network (NBN) will deliver infrastructure expected to provide significant support for the role of new technologies in health, resting upon the transferral of health information. For these developments to be inclusive for culturally and linguistically diverse communities, not only do considerations of Internet accessibility, literacy and eHealth literacy need to be taken into account, but also consumers’ preferences and information-seeking behaviours for accessing health information have to be understood.

This study sought to contribute to the body of evidence on the use of telecommunications by CALD communities to access health information and to contribute to understandings of the role of telecommunications as an enabler of access to health information in different community contexts. The study’s main aim was to examine the access to, and use of, telecommunications by people of CALD backgrounds in relation to seeking health information. This exploratory study was a necessary starting point for considering the
appropriateness of eHealth information strategies for improving health outcomes for under-represented communities.

**Research design and methods**

**Design**

A guiding principle of this study was to engage with the CALD community without becoming a burden or intruding in private environments, while also acknowledging the documented challenges of sampling migrant groups (Sulaiman-Hill and Thompson 2011). A community survey design involving the community identified was deemed the most respectful approach to engage and increase likelihood of participation. Community surveys are increasingly being utilised as an effective method for community-based research (Skinner et al. 1997). A community survey was selected over a case study because there were no suitable cases available for replication (Zainal 2007). The premise of a community survey approach is that engaging with a community is an effective and appropriate way to explore an aspect of community life. Unlike the case study method of gathering a range of artefacts to form a holistic interpretation of a phenomenon, a community survey makes use of a simple questionnaire survey tool and was seen to be appropriate for exploring a specific aspect of life for this community, in this case, access to telecommunications in the home in relation to health-information seeking behaviours (Colorado State University 2013). An exploratory community survey design was intended to act as a form of pilot study during investigation of what appeared to be the research problem and to support the identification of research questions for further study.

The community survey approach made use of existing relationships with organisations providing services to members of CALD communities within the North West Metropolitan region of Melbourne. This approach allowed researchers to build trust and familiarity with the research population by maintaining a presence at the CHC for four months. Relationships with key service providers working around and within the CHC were developed. This approach has been advocated for use where there might be ethical or political sensitivities in conducting the research (Skinner et al. 1997).

This paper relates the findings of the questionnaire component of the community survey.

**Ethics**

The research was given full ethical approval by the Human Research Ethics Committee at the University of Melbourne. Participants were informed of their ethical rights in non-technical language and were given full information about the project before being asked to provide informed consent to take part. Participants were de-identified in the reporting of the research and only aggregate results were used.

**Sampling and participants**

As advised by local service providers, all research documents which were to be made available to participants were translated into the following languages, cross-referenced with demographic data about the Local Government Area (PHIDU 2011) to gain an insight into the demographic makeup of the area according to data stored locally:

- Traditional Chinese
- Vietnamese
- Sudanese Arabic

Towards the end of the project some documents were also translated into Hakka due to the prevalence of native Hakka speakers completing the surveys in English.

Participants were recruited from two population groups identified in the sampling criteria below.
Sampling Criteria

Population
Group 1 (n=59)
- Individuals who were present at the North Richmond Community Health Centre
- Individuals who self-select as having a first language other than English
- Individuals who are over the age of 18

Population
Group 2 (n=64)
- Health professionals who currently work, or have previously worked with people from culturally and linguistically diverse backgrounds (e.g., those with proficiency in a language other than English)
- Health professionals who currently work in a primary health care or community health setting

Group 1

Advertisements for the study were translated into the languages listed above and were positioned in view of service-users visiting the Community Health Centre (CHC) site. The researchers visited the site in pairs twice a week for a four-month period and established a survey station positioning a desk in the foyer to the CHC and placing chairs on both sides of the desk. Surveys, advertisements, and plain language statements were placed on the desks in piles according to translation.

Group 2

All staff in the CHC staff database were sent information and a plain language statement about the survey via the Centre Manager who had access to their email addresses. Health professionals were encouraged to forward the invitation to other health professionals in the region. Health professionals were invited to consider completing the survey and were signposted to where the survey was available.

Surveys completed | Surveys included*
-------------------|---------------------
Group 1 participants (CALD) | 64 | 59
Group 2 participants (health professionals) | 64 | 64

Table 1 – Number of valid surveys completed and returned.
*Group 1 surveys were excluded if the participants reported having no acquired languages other than English.

Study setting:

The CHC is situated at the bottom of the public housing estate which includes approximately 6,000 residents; approximately 70% are born in a non-English speaking country and a significant number arrived in Australia as refugees. In response to the linguistic diversity of the client group, interpreters in Vietnamese and Chinese are employed, in addition all reception staff were bi-lingual and represented the ethnic communities that live on the estate.

Research instruments

The survey instruments were piloted with a small sample (n=7 in total). The survey instruments were then refined and the final two survey instruments were used in the main study (Appendix 1 & 2).

Procedure

Researchers were present while potential participants became familiar with the purpose of the research and began to feel comfortable in approaching the survey station and completing a survey. This meant that data collection required a patient and flexible approach. Findings are not generalisable and are not representative of other CALD communities.
Surveys

Survey questions were a combination of Yes or No responses, multiple choice, and Likert scale responses asking participants about the following topics:

- Access to telecommunications (landline, mobile phone, internet) in the home
- Frequency of use of telecommunications
- Competency and range of use of telecommunications
- Purpose of use of telecommunications: finding health information, contacting health services

On a number of occasions interpreters were present at the CHC. One of the interpreters was employed by the CHC and supported participants completing the surveys in Traditional Chinese. On one occasion during the data collection, the research team arranged for Hakka, Traditional Chinese, and Vietnamese interpreters to be available at the research site and to support the completion of surveys where needed.

Sample demographics

The majority of the 59 CALD survey respondents were aged 51 years or over (68%) and the mean age was 59 years. The relative older age of respondents may have been due to the times at which the researchers were available at the CHC to distribute and collect surveys. Researchers were present on week days only, between 09:30 and 16:00. The sample appeared representative of the community but in-depth community demographic data would be needed to substantiate this.

Figure 1 – Age range of participants

Figure 2 – Participants’ first language
A descriptive, quantitative analysis was conducted of the survey data. The survey data was treated as two separate datasets: survey responses from people from CALD backgrounds (n=59) and survey responses from health professionals (n=64). The data sets were stored on an MS Excel spreadsheet and frequencies, averages and percentages were calculated using simple formulae. Each survey question was interrogated and key findings are presented in the Findings section.

**Key Findings**

**People from culturally and linguistically diverse backgrounds**

The demographic data indicated that the study sample was largely constituted by participants who had lived in Australia for two decades or more. A high proportion of these participants opted for surveys in their first language. There was a fairly even spread of languages spoken with Hakka being the most common first language reported (36%).

**Access to telecommunications**

Most survey respondents reported having access to landlines (n=46 / 78%) and mobile phones (n=33 / 56%). Just over one quarter had access to the Internet (n=16 / 27%) and/or email (n=14 / 24%) in their homes. A total of 22 participants (37%) reported having home access to a landline telephone only. One participant reported having access to none of the four telecommunications categories. Only nine participants reported having access to all four (15%).
Fifty one per cent of respondents reported using landlines some of the time (and 24 per cent did not use them every day. Mobile phone usage every day was slightly higher than every day use of landlines but overall access to mobile phones was lower. A quarter of the participants reported never using the Internet.

**Use of telecommunications to access health information**

Approximately on third of the participants reported using landlines to find health information. Around 22% reported using mobile phones to find health information and only 16% (n=10) reported using the Internet to find health information. Most of the participants (n=42 / 71%) reported that they do not use the Internet to find health information.

The survey data demonstrates that access to landlines and mobile telephones and the Internet is relatively low for this sample. It also demonstrates that use of telecommunications to access health information is not common practice but does exist among those who have access.

**Health professionals working with CALD communities**

Approximately 63 per cent of the health professional participants were born in Australia. Seventy six percent had access to all four types of telecommunication mentioned in the survey: landline, mobile phones, Internet and email.
Health professionals were asked what they used telecommunications for in relation to communicating with, and providing information for patients and the community. As indicated in Figure 8, sixty five per cent reported using landlines to ask patients questions. One third used a mobile phone for the same purpose and only 6% had used the Internet.

As shown in Figure 9, similar proportion of health professionals reported using landlines to arrange appointments with patients (63%). Twenty three per cent had used mobiles for this purpose and 12% had used the Internet.

Figure 10 demonstrates that just over half the participants (55%) had used landlines to conduct consultations with patients. 20% reported using mobile phones for this purpose and 5% reported using the Internet.
Discussion

The community surveyed appeared to have low access to the Internet in the home, when compared with the Local Government Area (27% Vs 84%) (Community Indicators Victoria 2011). There is very little literature on the access to and the use of the Internet and/or mobile phones by CALD users of community health services. A United States (US) study with a similar sample suggested that the use of Internet and/or mobile phones among this population group had been over-estimated (Denizard-Thompson et al. 2011). This may be due in part to the fact that “ethnic minorities are under-represented in eHealth research” (Glueckauf and Lustria 2008, p.4). The use of telecommunications in relation to accessing health information appeared low because of the low rates of access to telecommunications in the home. However, a total 16 CALD participants reported having access to the Internet and 10 CALD participants reported using the Internet to access health information, this indicates that most of those who had access to the Internet appear to have some experience of using it for this purpose. Likewise, the number of participants who reported not having access to the Internet was similar to the number who reported not using the Internet to access health information, suggesting that use of the Internet to access health information may have been higher if access to the Internet was higher. There were, however, some limitations to the survey.

The motivation to access health information via telecommunications may have been linked to the availability of other services seen as a source of information and this should be explored further. This research was conducted in a CHC which was in the centre of the public housing area. The CHC adopts a community health model of care and may be viewed as a hub of health and allied health services. This hub is in very close proximity to the residential areas of the estate; consequently, the distance to community health services was not an issue for most residents. However, this does not necessarily mean that telecommunications holds no value in terms of health information for this community. The National Ethnic Disability Alliance (NEDA) (2010) argued that geographic distance is not in itself a determinant of access to information and communication technology. It does, however, suggest that this...
concept may need to be clearly defined within a community health model, particularly as this is a key part of current health reforms (NHHRC 2009).

![Diagram showing the proximity of community health services](image)

**Figure 12** – Diagram showing the proximity of community health services

**Culturally and linguistically appropriate health information in a range of languages, regardless of the medium for its delivery**

There are a number of constraints in regards to this particular community becoming high users of the Internet to access health information, namely

- Access to Internet in the home is low on the estate
- They have a source of in-person health information at the CHC
- Principle income source is Age or Service pension, followed by Disability Support Pension (Regional Housing Office 2011)
- 34% of people living in public housing properties on the estate are over the age of 55 (Regional Housing Office 2011)
- English language competence

Furthermore, the health professionals who work with this community showed little confidence that the use of telecommunications would be a feasible alternative to face-to-face contact (Fig 11). The reasons for this could be explored in depth in further qualitative research with this group of health professionals.

**eHealth initiatives must be grounded in the needs of specific communities and fit the context of health services in the region**

Community health services are perceived as an essential part of good practice for meeting the health needs of refugees and migrant populations, particularly for recently arrived refugees (Woodland et al. 2010). The findings of this study are encouraging in the sense that there was evidence that CALD participants were satisfied with their community health services and were recruited for the survey while present at the CHC.

These preliminary findings support the argument that analyses of cultural preferences within eHealth must extend beyond simply focusing on access to telecommunications and take into account other factors such as availability and familiarity with technologies in countries of origin (Leung 2011), and availability of translated information in Australia. Australia’s multicultural population will increasingly require bilingual, culturally-competent health workers who act as the bridge between the Australian health care system and CALD communities, regardless of whether face-to-face contact occurs (Greenstock et al. 2013). This principle applies just as much to the delivery of health information via telecommunications and an important next step is exploring the system requirements of achieving this.
Attention must be paid to the changing relationships between patients and health professionals as new models of care are introduced. Research is needed to explore the extent to which various patient populations view themselves as active agents and are motivated to seek health information, as well as the emerging role of the health professional as broker or facilitator of electronic information. The latter has considerable implications for job roles and training. In addition, the use of telecommunications in health services must be diversified to differentiate for different client groups and models of service delivery. A community health services hub model could make use of telecommunications in a very different way to health services for rural and remote areas but there is potential for enabling quality health care – and access to clinically accurate information - with telecommunications in both contexts.

**Study limitations**

There were a number of limitations in this exploratory study. The challenges in defining terms in an exploratory research area meant that use of the term ‘health information’ was at times inconsistent and a source of some confusion. This was reflected in the questions that were included, and not included, in the survey. This affected the depth and quality of the survey findings. A more concise definition of health information and the role of health professionals in delivering this information was needed. Selecting a community or communities to work with was also challenging. Conducting this study confirmed to the research team that the term CALD encompasses an extremely wide variety of heterogeneous communities and it, therefore, proved most reasonable to adopt a community survey approach which was not able to generate generalisable results. The experience also confirmed that time commitment must be considered when planning this kind of research, taking into account the need to gain the trust of the community and any gatekeepers involved.

Further limitations surrounded the development of the survey instrument. The pilot survey was found to be too long and the final survey was revised and shortened. A consequence of keeping the survey to a reduced length meant that it was not possible to drill down into some aspects of telecommunications access and usage, which in turn, also affected the quality of the data.

The experience of identifying these limitations have, however, provided very useful insights in line with the expectations of an exploratory study with a culturally diverse community.

**Conclusion**

This study sought to explore the extent to which a CALD community group had access to telecommunications in the home. The intention of the study was to investigate the extent of the use of telecommunications technologies to access health information. The study indicated that access to telecommunications was lower than the State average and that use of these technologies, where available, to access health information was also low. However, the findings also indicated that some of those who did have access to the Internet did use it for accessing health information, while some of those who didn’t use the Internet for this purpose didn’t have access to the Internet in the home. There is a window of opportunity here to determine whether the use of the Internet to access health information would increase if access to the Internet were to also increase. This would depend on a thorough understanding of the reasons for the low levels of Internet access, which we believe would be more complex than affordability alone and are likely to include personal choice and cultural preferences. As the Internet continues to evolve to incorporate developments in multimedia and audio, it would be timely to explore the extent to which this may also enable access to information for non-native English speakers.

Concerns have been raised around the extent to which eHealth policy has been adapted to meet the needs of a multicultural community (NEDA 2010). The need for health-related information may in itself be influenced by the proximity and availability of health services, typically perceived as a source of health information by some communities. Universal access to electronic health information depends on universal access to the means of accessing this
information. However, community health services may provide an important role in addressing gaps and maybe more suited as a source of information for some communities.

Australia’s population will continue to grow in size and diversity, with the population expected to almost double between 2007 and 2056 (ABS 2008). The use of telecommunications will also continue to develop and replace many out-dated service delivery channels (ACMA 2011). Researchers must continue to address the interplay of cultural diversity with innovations in health information and health care, in order to ensure that every effort is made to develop health services that are accessible and acceptable to settled and recently arrived residents of Australia.

References


Greenstock, L; Woodward-Kron, R; Fraser, C; Naccarella, L; Elliott, K; Bingham, A; Morris, M. 2013. The role of telecommunications for communicating health information to migrant communities. ‘Journal of Public Health Research’. 1(3): e34

http://dx.doi.org/10.1007/s10900-010-9327-5


APPENDIX 1

Connecting people from culturally and linguistically diverse (CALD) backgrounds and health professionals through telecommunications

This survey is about your use of telephone, mobile phone and internet, the ways in which health information and services are made available to you, and how you communicate with health professionals (doctors, nurses, speech pathologists). Your answers are anonymous and will be kept confidential. By returning this pilot survey your consent to take part is implied. Thank you for your participation.

General Information
Male□ Female □ Age: ____________
First language: ____________________ Other languages: _______________
How long have you lived in Australia?
How often do you visit a health professional (e.g. doctor, nurse, speech pathologist)?

Do you use any of the following at home? (please tick all that apply)
☐ Landline telephone
☐ Mobile telephone
☐ Internet
☐ Email
How often do you use the internet?
☐ Everyday ☐ Sometimes ☐ Never
How often do you use a landline telephone?
☐ Everyday ☐ Sometimes ☐ Never
How often do you use a mobile telephone?
☐ Everyday ☐ Sometimes ☐ Never

Landline telephone
Please tick the statements that apply to you (please tick all that apply)
☐ I know how to make and answer calls on a landline phone
☐ I use a landline telephone to find information about my health
☐ I use a landline telephone to find health services (doctor, nurse, specialist)
☐ I use a landline telephone to arrange appointments with health professionals
☐ I use a landline telephone to ask questions of a health professional
☐ I have consultations with a health professional on a landline telephone
☐ Health professionals contact me on my landline telephone

---

**Mobile telephone**

☐ I know how to make and answer calls on a mobile phone
☐ I know how to send and receive text message on a mobile phone
☐ I know how to send and receive emails on a mobile phone
☐ I use a mobile telephone to find information about my health
☐ I use a mobile telephone to find health services (doctor, nurse, specialist)
☐ I use a mobile telephone to arrange appointments with health professionals
☐ I use a mobile telephone to ask questions of a health professional
☐ I have consultations with a health professional on a mobile telephone
☐ Health professionals contact me on my mobile telephone

---

**Computer and the Internet**

☐ I know how to send and receive emails
☐ I know how to search the internet and find websites
☐ I know how to talk to people using Skype or other online video services
☐ I use the internet to find information about my health
☐ I use the internet to find health services (doctor, nurse, specialist)
☐ I use the internet to arrange appointments with health professionals
☐ I use the internet to ask questions of a health professional
☐ I have consultations with a health professional using the internet
☐ Health professionals contact me via the internet
☐ Health professionals contact me another way (e.g. by post)
☐ Health professionals don’t contact me at all

---

**Please tick the statements that apply to you (please tick all that apply)**

☐ I have found health information in a language I can read
☐ I have found health information on the internet in a language I can read
☐ I have been able to talk to a health professional in a language I understand
☐ I have been able to use the telephone to find health information in a language I understand

---

**How often do you use an interpreter service when communicating with a health professional? (tick one)**

☐ Always  ☐ Sometimes  ☐ Never

**How often do you use a telephone interpreter service when communicating with a health professional? (tick one)**

☐ Always  ☐ Sometimes  ☐ Never
Are you satisfied with your communication with health professionals and health services?
☐ Satisfied  ☐ Somewhat satisfied  ☐ Dissatisfied

This project was funded by ACCAN

**APPENDIX 2**

Connecting people from culturally and linguistically diverse (CALD) backgrounds and health professionals through telecommunications

Survey for health professionals

This survey is about your general use of telecommunications (telephone and internet) in the workplace, the ways in which health information and services are made available by you, or the service you work for, to people from CALD communities, and how you communicate with patients from CALD communities. Your answers are anonymous and will be kept confidential. By returning this pilot survey your consent to take part is implied. Thank you for your participation.

**General Information**

Gender: ____________________   Age: _________
First language: ______________________   Second language: ________________
Job title: __________________________________
Were you born in Australia? ________________________________
If no, for how long have you lived in Australia?

________________________

I have access to the following telecommunications in the workplace (please have in mind the workplace where you base yourself most often) (please tick all that apply)

☐ Landline telephone  ☐ Mobile telephone  ☐ Internet  ☐ Email

How often do you use the internet?
Never  ☐ Everyday  ☐ Sometimes

How often do you use a landline telephone?
Never  ☐ Everyday  ☐ Sometimes

How often do you use a mobile telephone?
Never  ☐ Everyday  ☐ Sometimes

I feel that learning more about how to use the following telecommunications would help me in my professional role (please tick all that apply)

☐ Landline telephone  ☐ Mobile telephone  ☐ Internet  ☐ Email

**Landline telephone**

(Please tick the all the statements that apply to you in your professional role)

☐ I know how to make and answer calls on a landline phone
☐ I use a landline telephone to arrange appointments with patient
☐ I use a landline telephone to ask patients questions
☐ I use a landline telephone for consultations with patients
- Patients contact me on my landline telephone at work
- Patients contact me on my landline telephone at home

**Mobile telephone**
- I know how to make and answer calls on a mobile phone
- I know how to send and receive text messages on a mobile phone
- I know how to send and receive emails on a mobile phone
- I use a mobile telephone to arrange appointments with patients
- I use a mobile telephone to ask patients questions
- I use a mobile telephone for consultations with patients
- Patients contact me on my mobile telephone

**Computer and the Internet**
- I know how to send and receive emails on a computer
- I know how to search the internet and find websites
- I know how to talk to people using Skype or other online video services
- I use the internet to arrange appointments with patients
- I use the internet to ask patients questions
- I use the internet for consultations with patients
- Patients contact me via the internet
  - Email
  - Other

□ Patients contact me another way (e.g. by post)
□ Patients don’t contact me directly

**How often do you use an interpreter service when communicating with patients? (tick one)**
- □ Always    □ Sometimes    □ Never

**How often do you use a telephone interpreter service when communicating with patients? (tick one)**
- □ Always    □ Sometimes    □ Never

**What strategies do you use to facilitate communication with patients from culturally and linguistically diverse backgrounds?**

___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________

**What strategies do you use to share or signpost health information with patients from culturally and linguistically diverse backgrounds?**

___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________

**Do you feel telecommunications (telephone and/or internet) could enable better communication with patients from culturally and linguistically diverse backgrounds?**
- □ Yes    □ No    □ Maybe
Thank you for taking the time to fill out our survey. Your input is greatly appreciated. Please feel free to contact us if you have any further questions.

"Any screen, anywhere, any time" is the catchphrase of the OTT industry, but are Australian consumers ready for this new paradigm?

Greg Paynter  
Charles Sturt University

Distribution of film and television across the Internet known by the Telecommunications Industry as Over-The-Top (OTT) is quickly emerging as a distribution medium with the potential to challenge traditional film and television industries’ and consumers’ engagement with content.

Whilst much literature exists in relation to technical and industry challenges, little work has focused on consumer attitudes and perspectives. This paper presents the findings of an exploratory study into Australian consumers’ current television viewing practices, and their understanding, interest and concerns in regards to OTT distribution.

Six focus groups of four to seven participants were undertaken, with a total of 32 participants contributing to the study. Being an exploratory study, much of the findings present participants’ opinions and practices.

The findings from the study found that participants were generally unfamiliar with the phenomenon; and whilst expressing their interest and readiness for change, a number of concerns were identified. Notable concerns included the capacity to regulate the new medium, censorship of the Internet and capability of the Internet to deliver video content.

Introduction

The emergence of Over-The-Top (OTT) distribution of film and television across the Internet has the potential to change consumer’s engagements with film and television in much the same way that the music industry has been transformed by digital distribution.

Unlike traditional Free-to-Air television delivered over a terrestrial broadcast network, or PayTV delivered over a service provider’s managed network, OTT distribution utilises the public Internet where content is carried over one or more carriers’ or carriage service providers’ (CSP) networks before reaching the consumer. By bypassing traditional television distribution networks, OTT offerings provide consumers access to content across a range of connected devices (illustrated in Figure 1 below).
OTT distribution changes the landscape into an environment where content can be consumed on any screen, anywhere, any time with the potential to change the way consumers engage with film and television.

**Problem**

Much literature exists surrounding competing platforms; Internet distribution; policy and legislation and content (presented in the following section: Related Work), however there was little material exploring consumers’ perspectives of OTT distribution. This exploratory study focused on two key aspects:

The first; to capture consumers’ current practice and understanding of OTT, with the aim of gauging consumers’ readiness for the new distribution model.

The second; to introduce consumers to the OTT distribution model in a consistent and repeatable manner such as to gauge their interest and concerns. In doing so, it was hoped to better understand factors affecting OTT adoption and foster further research in this domain.

**Analytical Approaches and Methods**

**Context & Methodology of the Study**

This study was undertaken in the months of August and September 2012 in the State of Victoria, Australia, as part of a higher degree by research at Charles Sturt University. Ethics approval was obtained from the university prior to undertaking this study. Classical ethnographic research methods of informal and semi-structured interviewing were used. Focus groups provided a “holistic approach to the study of cultural systems” that allowed “the study of the socio-cultural contexts, processes and meanings within cultural systems” (Whitehead 2005).

**Participants**

Focus group participants were recruited via publicly advertised sessions at prominent locations around the Melbourne CBD and online via social networking sites. Consent was obtained from each participant prior to the commencement of sessions.

**Data Collection**

Six focus group sessions were scheduled and attended by the participants and moderator. Participants' gender, age, employment and educational level varied with each session, providing a range of views and perspectives (See Table 1 below).

At the end of each session, participants were asked to complete a small demographic survey and set of four Likert-type questions linked to the key topic areas of the session. (See Appendix 1)
**Focus Group Composition**

<table>
<thead>
<tr>
<th>Groups (n=32)</th>
<th>Gender</th>
<th>Age</th>
<th>Employment</th>
<th>Highest Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1 (n=4)</td>
<td>4 Men</td>
<td>3 (35-44), 1 (65+)</td>
<td>1 Student 2 Self Employed</td>
<td>2 Postgraduate 1 Vocational</td>
</tr>
<tr>
<td>Group 2 (n=5)</td>
<td>3 Men 2 Women</td>
<td>1 (35-44), 1 (45-54), 3 (65+)</td>
<td>1 Part time/ casual 1 Full time</td>
<td>2 Bachelor 1 Vocational</td>
</tr>
<tr>
<td>Group 3 (n=5)</td>
<td>4 Men 1 Woman</td>
<td>4 (25-34), 1 (35-44)</td>
<td>1 Part time/ casual 2 Full time employee</td>
<td>3 Bachelor 2 Vocational</td>
</tr>
<tr>
<td>Group 4 (n=6)</td>
<td>4 Men 2 Women</td>
<td>4 (25-34), 2 (35-44)</td>
<td>4 Full time employee 2 Self Employed</td>
<td>1 Postgraduate 4 Bachelor</td>
</tr>
<tr>
<td>Group 5 (n=5)</td>
<td>5 Women</td>
<td>1 (25-34), 1 (35-44), 2 (45-54), 1 (55-64)</td>
<td>3 Full time employee 2 Self Employed</td>
<td>2 Postgraduate 2 Bachelor</td>
</tr>
<tr>
<td>Group 6 (n=7)</td>
<td>1 Man 6 Women</td>
<td>2 (25-34), 3 (35-44), 1 (45-54), 1 (55-64)</td>
<td>1 Part time/ casual 6 Full time employee</td>
<td>1 Bachelor 4 Vocational</td>
</tr>
</tbody>
</table>

**Table 1 – Focus Group Composition**

Four key themes and a related question were devised as a control structure “giving the researcher a sense of order from which to draw questions from unplanned encounters” (David & Sutton 2004, p. 87). (Illustrated in Figure 2 below)

**Figure 2 – Focus group structure**

Each session was structured to assure isolation of consumers’ current practice and understanding, referred to as ‘pre-contextual’ responses in which participants presented their opinions without influence beyond that presented in the studies’ information sheet and website (www.ottresearch.com/2012study).

Participants were then presented with a brief history of telecommunication and media convergence, which concluded with an explanation of OTT distribution.

Subsequent expressions of interest and concern, referred to as ‘post-contextual’ responses, were presented along with responses to the central question. Within the structure, participants were encouraged to openly express their thoughts on the topic, and discussions were largely responsive and adaptive to the situation of the group (Fontana and Frey 1994).

"ANY SCREEN, ANYWHERE, ANY TIME" IS THE CATCHPHRASE OF THE OTT INDUSTRY, BUT ARE AUSTRALIAN CONSUMERS READY FOR THIS NEW PARADIGM? 15.3
Data Analysis

All focus group sessions were transcribed verbatim. A number deductive categories based on
the sections of the focus group sessions provided a starting point for the coding of the text, as
listed in Table 2 below.

<table>
<thead>
<tr>
<th>Current Practice</th>
<th>Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Understanding</td>
<td>Central Question</td>
</tr>
<tr>
<td>Interest</td>
<td></td>
</tr>
</tbody>
</table>

Table 2 – Deductive categories

The analysis process involved an initial deductive process, following the analysis of
secondary data sources and a second stage, comprising inductive analysis of the data actively
collected from participants in focus group sessions, as illustrated in Figure 3.

![Figure 3 – Stages of data analysis.](image)

The unit of analysis and categories were guided from those identified in the study design. In
the process of analysis, other pertinent or relevant themes were defined and added to the
original categories in an inductive manner. These were then tested on a sample of texts,
before finally applying this to the whole dataset. The coding of the data was checked for
accuracy before concluding the analysis.

As this exploratory study intends to be extensible, a repeatable structure was devised to allow
the finding of other studies to be cross-referenced and their findings analysed. The report
aimed to contain “sufficient description to allow the reader to understand the basis for an
interpretation, and sufficient interpretation to allow the reader to understand the description”

Trustworthiness of results

The technique of data triangulation (Denzin 1978) was used to ensure credibility (Bradley
1993, p.436). Adequate data sets and rich description were provided to allow others to find
the study useful (Lincoln & Guba 1985, p.316). To assure conformability (Bradley 1993,
p.437), the researcher engaged triangulation, open admission of the researcher’s background,
belief and understandings; extensive description of the method used to arrive at the findings
and identify any shortcomings in the methodology and their influence on the findings.
Findings

Current Practice

The study found that participants’ television viewing was as a largely personal undertaking, in which individuals utilised varying means of assessing content. A balance between need and convenience was identified and in many cases the participant felt a sense of control in the act of making their selection of available offerings.

One participant stated:

“I wouldn’t say I use the Internet to watch TV, not that I am not interested in it, but it’s just that I find it a bit easier” (Male, 35-44) whilst another stated “I find television if anything, frustrating and limiting in what it offers... for me it's the Internet, I watch content regularly” (Male, 65 and above).

Convenience driven behaviour included participants using Digital Video Recorders to “forward through the ads rather than watch them.” (Female, 45-54) and catch-up television, such as “ABC iView” (Female, 35-44), that allowed participants to watch their chosen program at a later time.

Television watching mostly centred around the home on a traditional television set watching Free-to-air television. PayTV or subscription television was not common and those who had subscribed indicated that they “pay too much” (Female, 45-54).

Whilst for the majority television watching centred around a traditional television set one participant stated:

“we don’t have a TV as such, we use our laptops and computers as viewing platforms for mainly TV episodes; also use ABC iView and that is quite good.” (Male, 25-34).

Little reference was made to Smart televisions or devices, one participant stated “We have a Smart TV, but don’t have the TV connected to the Internet” (Male, 25-34). Another participant stated “We purchased a SONY TV which has given [us] access to, or partial access to, a library of movies that they actually have under the distribution rights” (Female, 45-54).

Where participants were unable to find content via domestic channels, Internet alternatives were sought, including examples such as International News from “Al Jazeera” (Male, 65 and above), Indian cricket from “cricktime.com” (Male, 35-44), Chinese Movies from “youtube” (Male, 25-34), Indian TV “online” (Female, 25-34) and Pakistani TV from a “jadoo Box” (Male, 25-34) that streams Internet video to a television set.

Behaviours surrounding movies differed from the convenience sought in television viewing. Participants generally preferred to go to the cinema to watch a movie, stating: “You will still want to go out and see the actual cinema on a big screen, as far as I’m concerned” (Male, 35-44).

Some, instead of going to the movies sought to “acquire films via the Internet” (Male, 25-34) or by “downloading movies directly from the web” (Male, 35-44) or “on the Pirate Bay” (Female, 25-34). Others simply preferred to “go and get a DVD” (Female, 55-64) or used “Quickflix ... where they send them out in the mail” (Female, 35-44).

Illegal peer-to-peer acquisition or using bit-torrents (Hu et al., 2011, p.129) of films was commonplace. Some participants were hesitant to admit to this practice whilst others were more forward, one participant stating: “as much as I like pirating things and getting things for free, I do want to support people that have been so creative” (Male, 25-34).

Table 3 below lists key themes identified in participants’ current practice.
Current Understanding

Overall participants presented **little understanding** of OTT distribution, some participants stated that they had “no idea what Over-The-Top delivery actually is” (Male, 35-44), and that they “don’t quite get what that’s all about” (Male, 65 and above), whilst some responded **rhetorically**, questioning: “So, you mean the film over the Internet?” (Male, 25-34).

For some their focus was on the **literal meaning** of the term. One participant replied, saying:

“I am going to admit that I thought Over-The-Top technology, was just that, Over-The-Top and I just assumed it was something that was Over-The-Top. I didn’t realise that it was OTT and it actually meant Over-The-Top” (Female 55-64).

Others focused on the **exact term** “Over-The-Top”. One participant stated: “I haven’t heard of that. I probably heard of cloud but I am not too sure with that” (Male, 25-34).

Participants, who presented an understanding, did so with reference to either the **Internet** or **catch-up TV** offerings, stating:

“Because the Internet has become so quick you can watch TV, movies, straight from the Internet with no lagging. It expands the idea of having… IT online as a trend. I think in the next 5 to 10 years nobody is going to go to the cinema or theatre anymore” (Male, 25-34).

“I was aware of iView, the technology that exists, but wasn’t aware that that was actually the term that is relevant to technology” (Female, 35-44).

Overall OTT distribution of film and television over the Internet was not well understood. Older participants were largely unaware, whilst younger participants were aware of commercial offerings from Australian Free-to-air television providers or current Internet offerings. Themes identified are listed in Table 4 below.

**Table 3** – Themes of Participant Current Practice

<table>
<thead>
<tr>
<th>Personal Television</th>
</tr>
</thead>
<tbody>
<tr>
<td>Convenience Internet Alternatives</td>
</tr>
<tr>
<td>PayTV Bit-torrents</td>
</tr>
<tr>
<td>Movie</td>
</tr>
</tbody>
</table>

**Table 4** – Themes of Participant Interests

<table>
<thead>
<tr>
<th>Little understanding</th>
<th>Exact term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rhetorical questioning</td>
<td>Internet</td>
</tr>
<tr>
<td>Literal meaning</td>
<td>Catch-up TV</td>
</tr>
</tbody>
</table>

**Interest**

Interest in the phenomena was mixed, and in analysing the responses a number of themes emerged (listed in Table 5 below). Some participants expressed **general interest** in the phenomenon, expressing statements such as:

“For me I am interested when I can see my house with TV or Internet I can connect with any program, any interest for myself” (Male, 35-44).

“I think that the OTT distribution will become much more popular, specifically for the younger generation, I see people using it all the time and I think the more people will use it, it will become clearer” (Female, 35-44).
Table 5 – Themes of Participant Interests

For some participants, **variety and choice** in program offerings was of significant interest. Some of the views expressed included:

“That’ll be the ultimate. The chance to revisit all the shows you never got to really see”  
(Male, 35-44).

“... the vastness and accessibility of it is going to give people choices. Ultimately, all of a sudden we are going to be opening ourselves up to what maybe 10, 15 years ago was three or four channels and suddenly being able to access hundreds of channels, because that’s what the accessibility of this is clearly going towards, which means that you can actually tailor what you want, when you want, how you want”  
(Female, 45-54).

Whilst for most participants, variety and choice was assumed, concern was raised as to whether OTT distribution would in fact change what is currently available and questioned the notion of greater choice. One participant raised their concern stating:

“It implies, but we don’t actually know, if there will be more choice. So what does that actually mean? I hope that that will mean more choice, but does that mean that Channel Seven will show programs that traditionally have been shown by Channel Ten. How does it work? They go and they pay a licence fee to play these shows, particularly the big shows, so what does that mean? Any movie, anywhere, anytime?”  
(Female, 25-34).

The theme of **simplicity** emerged, with participants looking to find a simpler way to engage with content, with the hope that it could offer flexibility and access to an individual’s viewing interests. Some of the views expressed included:

“... you don’t have to have this for that and that for something else. You will just have one”  
(Female, 65 and above).

“It is good to have an alternative to DVD, not having to worry if you have the resources to get it”  
(Male, 35-44).

Participants expressed interest in the ability to **control** how they watch content. One participant stated:

“We have more control over the content, you know I can pause it, I can forward, I can wind back, whereas in a real TV show you won’t have any control. If your kids are watching it, obviously you can’t do anything, whereas in OTT you can skip that part and continue”  
(Male, 35-44).

Younger participants expressed their interest in **content creation** and expressed the belief that OTT distribution lowers the barrier of entry for the distribution of content and encouraged people to be more creative. Some of the views expressed included:

“I do think that OTT does facilitate local media to be made readily available. A friend of mine has a little show called “The Rap News” and that is a locally produced thing. It is quite well known in the community but also internationally as well”  
(Male, 25-34).

“It encourages people to be more creative than having to face investors, budgets..., I enjoy that. It encourages creativity”  
(Female, 25-34).
A number of participants felt that this phenomenon was already happening, expressing the views:

“You can actually see it now. I know that with Foxtel, they are offering Foxtel to your mobile or your tablet device; you can get that anyway. You are seeing more channels directed at specific peoples, to specific markets” (Male, 25-34).

“I feel like this is the status quo, this is where we are going now” (Female, 25-34).

**Concern**

In analysing participant responses in regards to concern, some participants indicated that they were not concerned or were unsure, however the majority expressed concern which varied a great deal and a number of themes were identified (listed in Table 6 below).

<table>
<thead>
<tr>
<th>Internet Speed</th>
<th>General Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet Usage</td>
<td>Indifferent</td>
</tr>
<tr>
<td>Influence</td>
<td>Unsure</td>
</tr>
<tr>
<td>Cost</td>
<td>Not Concerned</td>
</tr>
<tr>
<td>Censorship</td>
<td>Legislation and Law</td>
</tr>
<tr>
<td>Content</td>
<td>Loss of Choice</td>
</tr>
<tr>
<td>Free-to-Air Television</td>
<td>Copyright</td>
</tr>
<tr>
<td>Australian Content</td>
<td>Quality of Service</td>
</tr>
</tbody>
</table>

**Table 6 – Themes of Participant Concerns**

**Loss of choice** and the collapse of smaller companies’ ability to compete with OTT distribution was a recurring theme, one participant stated:

“I don’t think that those choices will be out there for very long, going out to get that DVD; I think you won’t get that choice and a lot small companies will close. Only the big companies will survive.” (Female, 35-44)

Participants raised concern around legislation and law illustrating governments inability to control current practice, stating:

“Well they can’t do it now, are they going to do it for a service that offers everything? No Way! They cant do it! They cant regulate anything!” (Male, 35-44)

When questioned as to whether current legislation and law would be effective in regulating OTT distribution, there was a generally negative sentiment, with some participants stating:

“I imagine not at all, they couldn’t have imagined as to where this was going to go at the time of writing.” (Female, 25-34)

“I don’t think it has kept up, consensual or not and the laws are not keeping up. No it is not keeping up with the IT industry. No they are not.” (Female, 45-54)

**Copyright** concerns were raised in relation to placing content on the Internet and general questioning of the security of the Internet, which led to the commercial feasibility of OTT distribution. One participant stated:

“Copyright laws should be updated to facilitate greater penetration of OTT.” (Male, 25-34)

A number of technical concerns were raised in relation to delivery, one being the **Quality of Service**. One participant stated:

“From a technical point of view the quality of the online media is not that great in Australia because we don’t have very good Internet connectivity and to get good
connectivity you have to pay quite a large amount of money. If you access OTT content on a regular basis, that content is not as cheap as it could be. Is the NBN going to solve that problem?” (Female, 35-44).

Delivery concerns included Internet usage questions, such as:

“Are you going to use data? Are you downloading to watch it? So then have you got capacity in your cable plan? Or however your Internet is set up. Do you have 500GB a month like we do at the moment? Or are you forced then to start getting a terabyte? Where does it end? (Female, 45-54)

Other concerns related to Internet speed, including:

“The most important thing for Over-The-Top is the moment you click on the Internet, how fast is that? If you are using the broadband Internet you have 3G now so you can’t pretty much watch anything now, it is pretty bad. 4G may make a difference. The next generation of broadband ADSL, it is fine and the next one is coming, it’s called the National Broadband Network. With the speed of the Internet, Over-The-Top will have a chance to compete with the other? Because you have to lay on top of the other Internet. So, for me the concern is that you still have to subscribe; you still have to have the Internet speed” (Male, 25-34).

“Speed, I think that will get better anyway. Well the NBN is rolling out as we speak. You would hope that in a few more years connections around the world, around Australia anyway, would get a lot faster than what they are currently” (Male, 25-34).

The question of influence and the identity of commercial parties who are actively involved in the OTT distribution industry emerged as a theme. One participant questioned “Who is behind it and how do they make their selection?” (Male, 65 and above), whilst another questioned, “Who are the major players?” (Male, 35-44) and another, “What is the hidden agenda?” (Male, 35-44)

Cost was presented as a consistent concern from participants, asking about the cost of implementation “…who is going to pay for it?” (Male, 35-44) and “Who’s going to pay for the massive database that they’re thinking of building?” (Male, 35-44).

Others presented concern about the price, including statements like:

“I think we don’t know what the price is going to be. It is hard to say whether it would be something we would utilise or not. We don’t know what the content is so whether it is of interest, whether it is that push pull marketing type thing. If it creates interest you might be willing to pay for it” (Female, 35-44).

“The cost! I think it always comes back to the cost!” (Female, 35-44).

Concerns regarding content were presented which, although varied, raised the question whether OTT distribution was able to alter what is currently available from Free-to-air, PayTV and DVD rental outlets. Some of the views expressed included:

“Where will OTT get its material from? It’s from what’s there already. It’s not coming up with new material” (Male, 65 and above).

“…the way I see it is that it is going to be the same stuff that is available now but just a different way, different channel of getting it to you” (Male, 35-44).

“And it also goes back to content too, depends on like me as a consumer, I have no say really what is going to come in anyway. Somebody might think I want to watch this, or this is good for me to watch, but I haven’t got much say in it anyway. It depends on what is going to be shown and on whether it is good, bad or indifferent” (Male, 65 and above).

“I just wonder if ‘Over-The-Top’ can address that distance between what is delivered overseas and delivered here” (Male, 35-44).
Censorship was voiced as a significant concern across all groups. Some of the views expressed included:

“How are you going to censor? C,G,MA” (Female, 25-34).

“Anything you can see on YouTube, for instance, you have guidelines that people can see, right now on Australian TV. If you just go onto the Internet, there are no controls; you can see all sorts of stuff, which you shouldn’t be able to see” (Male, 25-34).

“How to prevent, let’s say, kids watching inappropriate content, how are we going to prevent all those? Whereas television is going to be in the hallway so you know they are sitting there watching alone and someone somewhere will be monitoring them” (Male, 35-44).

A consistent theme throughout was the impact OTT distribution would have on Free-to-air Television in Australia. When asked directly, participants stated:

“We are used to Free-to-air television. We are not used to paying as a whole society; we are not used to paying for television. Paying for Television is still quite new, in this country. And I think people have just grown up with it being available, why would you pay for it?” (Female, 45-54).

“…to replace Free-to-air TV, well that’s the concern, that’s the only concern, where government still has a stance, still has Free-to-air” (Male, 35-44).

“Critical information shouldn’t be something that you have to pay for” (Female, 35-44).

A concern for Australian Content in an OTT distribution marketplace emerged consistently with participants voicing this repeatedly. When asked directly, participants replied, stating:

“It is a double-edged sword, it could be both ways. It would be easier to create movies, I could create a movie right now of us sitting here and then upload it to YouTube the next minute and it would be there for people to view. So you could do a lot of local media in that sense, but you also lose on the professional quality, I think” (Male, 25-34).

“How are we going to ensure that our identity is maintained in a way that is reflective?” (Female, 25-34).

Central question

“Any screen, anywhere, anytime” is the catchphrase of the OTT industry. The question “Are you ready for this new paradigm?” was asked of all participants and whilst the largest group of responses indicated their readiness (41%), many participants expressed varying opinions of which 3% were intrigued, 10% were unsure, 2% requested more information, 19%, were not ready, 13% were indifferent, and 3% did not respond (see Table 7 below).

<table>
<thead>
<tr>
<th>Ready</th>
<th>13 (41%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intrigued</td>
<td>1 (3%)</td>
</tr>
<tr>
<td>Unsure</td>
<td>3 (10%)</td>
</tr>
<tr>
<td>More Information</td>
<td>2 (6%)</td>
</tr>
<tr>
<td>Not Ready</td>
<td>6 (19%)</td>
</tr>
<tr>
<td>Indifferent</td>
<td>4 (13%)</td>
</tr>
<tr>
<td>No Response</td>
<td>1 (3%)</td>
</tr>
</tbody>
</table>

Table 7 – Central Question Responses
Related work

Internet technologies

Digital media convergence has seen the Internet and associated World Wide Web transition in the last decade, from a largely textual service to a platform distributing audio and video. The increase in Internet connectivity speeds, both overseas at 2.7 Mbps and in Australia at 3.6 Mbps (AKAMAI 2011), has enabled the Internet to become a platform for the delivery of high-definition video.

A white paper by Cisco Systems entitled ‘Cisco Visual Networking Index’, claims that by the year 2013, 90% of all Internet traffic will be video (CISCO 2011). This forecasted increase of video traffic over the Internet can been largely attributed to the emergence of Over-The-Top (OTT) distribution platforms, including the likes of Netflix, Hulu and Vudu in the USA.

Policy, legislation and regulation

The increasing ubiquity of the Internet Protocol (ITEF 1981) as a delivery mechanism is having a significant influence on regulatory frameworks in Telecommunications and Broadcasting. The currency and relevance of the Australian telecommunications legislation is challenged by “accelerating advances in technology, product development and consumer usage patterns” (Stanton 2011, 21.5).

Stanton addresses gaps in Australian telecommunications policy, suggesting that it is an unenviable task faced by legislators in their attempt to stay up to date with “accelerating advances in technology, product development and consumer usage patterns”. (Stanton 2011, 21.5)

Despite stating the need for Australia needing a Digital Economy Master Plan, Stanton is resigned to the fact that gaps in telecommunications policy are inevitable as a result of “rapid progress”. (Stanton 2011, 21.5)

In contrast, Selvadurai (2011) presents a transformational shift from the traditional regulatory model and proposes that the traditional vertically aligned legislation prescribed by the Telecommunications Act 1997 (Cth) and Broadcasting Services Act 1992 (Cth) be replaced by a horizontal ‘layered’ model.

Selvadurai proposes that the horizontal layers of electronic communication provide a framework that allows for legislation to be developed that better represents the reality of current telecommunications.

Here Sevadurai cites (Canon 2003, 167) presenting a model of three layers, the network layer, logical layer and content layer with the belief that such a model provides the benefit of being easier to adapt to technological changes. Sevadurai alludes to the fact that there are numerous obstacles that would arise in such a change and suggests that international experiences be considered.

One such international experience is Shin (2010), who presents the challenges faced by the South Korean government in addressing changes to communications legislation to better handle convergence.

Shin uses Actor-network Theory as a means of bringing together the legislative instruments and the disparate views held by the Grand National Party (GNP), opposition Democrat Party (ODP), the Korean Communication Commissions (KCC) and the Korean Federation of Press Unions (KFPU).

Consequently Shin is able to analyse the “macro processes of policy innovation” and identify the inconsistencies and tensions among the “institutions, policies, laws and regulations governing various parts of the converging telecommunications, broadcasting and Internet industries” (Shin 2010, 158).
Shin (2010) concludes by upholding the belief of Mueller (1999) that there is no perfect state of convergence and as such should be seen as a socio-political concern and not simply from a technological or multimedia point of view.

Whilst Stanton (2011), Selvadurai (2011) and Shin (2010) here present distinct and different perspectives on the challenges to legislation in Telecommunications and Broadcasting, what is clear is that the arrival of the Internet Protocol (ITEF 1981) as a delivery mechanism of media over a public Internet presents many challenges to exiting legislation, one for which there is no clear or obvious solution.

The promise of content

Over-The-Top (OTT) delivery of film and television across the Internet holds the promise of the Long Tail (Anderson 2006), providing consumers access to a greater range of content than possible via traditional distribution networks.

Barr (2011) presents the offerings of Netflix, Apple, Google and Facebook and how these Internet companies are changing the face of Television in the US, and whilst there is much publicity around these corporations, little real commercial data is actually available to truly examine their effect on traditional television.

In contrast Cunningham (2011) introduces possible content applications that the National Broadband Network (NBN) will offer Australians, and identifies the online distribution of film as one such future application.

Despite this, Cunningham indicates that the increase in capacity to deliver content does not necessarily translate to an increase in local (Australian) content on major platforms with only 0.5% of iTunes and 1-3% of BigPond Movies and Quickflix content being Australian content.

Cunningham alludes to the role of Public Broadcasters, specifically the ABC, and the role of initiatives like iView for catch-up television and the schemes, ABC Pool (a social media space aimed to foster collaboration) and ABC Open (aimed at curating local content from rural Australia) have in promoting local content.

For Cunningham securing local content sits with both legislative protection and Innovation Funds in order to incentivise content creation. (Cunningham 2011)

Commercial challenges faced in content creation in OTT distribution are widespread. In his article ‘Beyond big video: The instability of independent networks in a new media market’ Christian (2012) presents the commercial challenges faced by WatchMojo, MyDamm Channel and StrikeTV in the USA in engaging the market.

What is clearly evident from the literature is that increased access and capabilities for Internet video do not translate into an immediately abundant ‘long tail’ and until sustainable commercial models are developed, new technologies will not assist in resolving the availability of content.

The Australian market

In Australia, much discussion of Over-The-Top (OTT) delivery is framed by the introduction of the National Broadband Network (NBN) and Next Generation Networks (NGN) that can deliver Over-The-Top (OTT) video over IPTV subscription services to these networks. This view is reinforced by Middleton (2010)

Weinstein (2010) introduces three classifications of IPTV: Computer Based IPTV; Partial IPTV and Full IPTV. In doing so he blends OTT services with IPTV. OTT services are passed over public carriage networks and whilst OTT services may be delivered across IPTV networks, OTT services are ultimately independent of an individual carrier’s network, unlike IPTV which operates within a closed network, thus the term Over-The-Top (OTT).
Unlike Weinstein (2010), Peters frames the environment as “Internet delivered, high quality television-like video content” (Peters 2010, 27.1) and in doing so, separates IPTV from Internet Video, in which he defines as “professionally produced long-form content” (Peters 2010, 27.2).

Like Peters (2010), the recent ACMA Communications report “Online video content services in Australia” (ACMA 2012) focuses on “professionally-produced, long-form video content that is provided over a broadband Internet connection or mobile network in a way that both complements and competes with existing modes of professional content delivery, such as FTA and subscription broadcast television” ACMA (2012), finding that Australians are rapidly engaging online video services.

Common to the Australian perspective is the perceived need for a National Broadband Network and a common generalisation of Internet Video Services to include OTT and IPTV offerings.

Conclusions

This exploratory study identified that in current practice, participants largely utilised any available means to watch content. Convenience was significant in the act of watching television and where content was not readily available, participants would use Internet based methods to access desired content.

Movie watching practices presented a greater focus on quality and participants would pay for a theatrical experience. Alternatively, they would download films directly off the Internet using peer-to-peer torrents.

OTT distribution is not widely understood and for the majority of participants the sessions assisted them to formalise their understanding of commercial products like iView, of which they were aware.

In examining participants’ interest in OTT distribution, interest was qualified by a number of accompanying questions. The study identified key themes of: general interest; variety and choice; simplicity; control; content creation; and cost in participants expression of interest.

Concerns were by far the most diverse of the key areas of the study. Here a number of themes emerged that are unique to the Australian context, specifically Free-to-air television and Australian Content. Other major themes included the ability to legislate for the new medium, copyright, censorship and technological concerns in quality of service, Internet speed and Internet usage.

How effective legislation and controls on content regulation will be and how locally produced content will fare in the new paradigm remain unclear.

Overall, Australian consumers are ready, but the emerging trend will not be without its challenges. The Australian market is unique and distinct in its Free-to-air position. Smart TVs will assist consumers to access OTT services, but without content that encourages users to adopt new methods, Free-to-air is likely to maintain significant influence on television viewing.

References

Books


**Journal Articles**


**Online**

"ANY SCREEN, ANYWHERE, ANY TIME" IS THE CATCHPHRASE OF THE OTT INDUSTRY, BUT ARE AUSTRALIAN CONSUMERS READY FOR THIS NEW PARADIGM?


Appendix 1

Survey responses

At the end of the session, participants were asked to complete a set of Likert-type questions which gauged their familiarity before the study, interest, concern and readiness for OTT distribution of film and television across the Internet. The results (Table 8 below) illustrated that participants were not familiar with the phenomenon, similarly interested, concerned and ready. (See Figure 4 below).

<table>
<thead>
<tr>
<th>Reference</th>
<th>Negative</th>
<th>Neutral</th>
<th>Positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Familiar</td>
<td>1 (Not at all)</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Interested</td>
<td>3 (9%)</td>
<td>7 (22%)</td>
<td>6 (19%)</td>
</tr>
<tr>
<td>Concerned</td>
<td>1 (3%)</td>
<td>3 (9%)</td>
<td>14 (44%)</td>
</tr>
<tr>
<td>Ready</td>
<td>2 (6%)</td>
<td>7 (22%)</td>
<td>4 (13%)</td>
</tr>
</tbody>
</table>

Table 8 – Survey Likert responses

Cite this article as: Paynter, Greg. 2013. ““Any screen, anywhere, any time” is the catchphrase of the OTT industry, but are Australian consumers ready for this new paradigm?”. Telecommunications Journal of Australia 63 (1): 15.1-15.15. Available from: http://tja.org.au.
David Lindsay
Monash University


This book, published in 2011, represents an important addition to the already extensive literature on Internet governance and regulation, adding a welcome European perspective to a field of studies that, until recently, has tended to be influenced by American approaches. In particular, the book advances the field by placing Internet regulation within the mainstream of regulatory studies.

From when the Internet went mainstream in the mid-1990s, Internet exceptionalism – the view that the Internet is both new and unique – has been a remarkably persistent theme in thinking about Internet governance and regulation (Goldman 2010). Early, extreme versions of exceptionalism claimed that because of unique features of the Internet – as a global, decentralised communications system – it was impossible or undesirable for it to be subject to traditional law and regulation (Johnson & Post 1996). Combined with the then fashionable Anglo-American tradition of deregulation, which was associated with the view that government intervention would tend to stifle innovation, this led to a generally ‘hands-off’ approach to the Internet. For example, the 1997 Clinton-Gore policy statement, entitled *Framework for Global Electronic Commerce*, famously proclaimed that:

> For electronic commerce to flourish, the private sector must continue to lead. Innovation, expanded services, broader participation, and lower prices will arise in a market-driven arena, not an environment that operates as a regulated industry. (Clinton & Gore 1997, 2).

As the author of this book, Christopher Marsden from Essex Law School, correctly points out, exceptionalism-based deregulation did not survive the collapse of the dot.com bubble in the early 2000s and the re-emergence of state power following 11 September 2001 which, together with other factors, effectively brought an end to the myth of the Internet as a paradigm of self-organisation. As Marsden further points out, the move towards regulation in the early 2000s was further motivated by the extent of misuse of the Internet (here one thinks of the development of domain name dispute resolution) as well as the increasing importance of private law claims (such as actions for copyright infringement) in the context of a commercialised Internet.

These conclusions lead to the main focus of the book, which is an assessment of the new (and sometimes experimental) forms of regulatory practices that have been applied to the Internet, from a broadly empirical perspective. As previously remarked, this is undertaken from a European – and specifically from a UK – perspective, where, since about 2007, there has been an increased emphasis on applying forms of co-regulation. The complex, and sometimes fraught, relationship between Anglo and continental European approaches, which is a sub-text...
to some of the analysis in the book, is best-captured by Marsden’s statement that, the ‘book aims to examine one area in which the excesses of deregulation were sponsored and supported by the UK Government, exposed to the rest of Europe as a best practice, but are unraveling and being re-regulated both due to their manifest failings and the tide of European regulation’ (p 5).

The book begins with the stated objective of answering the following question:

\[
\text{Is Internet regulation a paradigm of constitutionally responsive co-regulation? (p 1).}
\]

This central question represents the organising principle for much of the analysis in the detailed chapters, which present case studies of selected regulatory regimes. To properly appreciate the argument presented in the book, it is first necessary to unpack the terms used in the central question.

First, there is the vexed question of the scope of ‘Internet regulation’ (or ‘Internet governance’). Much ink has been spilt in attempting to define both ‘regulation’ (Baldwin, Cave & Lodge 2012; Freiberg 2010) and ‘governance’ (Rhodes 2007), including in the context of the Internet (Drake & Wilson 2008). Reflecting its predominantly empirical orientation, the book neatly side-steps these conceptual debates by adopting a broad approach to the scope of Internet governance (and regulation) from the sets of issues identified by the UN Working Group on Internet Governance (WGIG) in its influential 2005 report (WGIG 2005).

This leads Marsden to focus on three categories of intervention as part of the mapping exercise undertaken in the case studies presented in the book: infrastructure and critical Internet resources (such as administration of the DNS); issues directly related to use of the Internet and Internet governance (including Internet security and spam); and issues that are relevant to the Internet, but with a wider impact (such as intellectual property rights and international trade).

Second, reflecting the European perspective applied by the book, Marsden adopts a ‘constitutional’ approach to the assessment of Internet regulation. As the author explains, the book uses the term ‘constitutional’ in the following two senses:

First, it refers to a general adherence to principles of administrative justice, notably fair trial, due process, independence of regulator from regulated, participation by all interested parties, and transparency. Second, it specifically refers to the types of fundamental rights that may be affected by Internet regulation as it affects the specific communications medium, notably the rights of privacy and free expression that may be enhanced or infringed by Internet-based activities. (p 3).

From the overwhelmingly pragmatic perspective of the Australian approach to regulation, it is unusual for regulatory intervention to be assessed from a constitutional perspective. In particular, while it is common-place for regulatory regimes in Australia to be assessed by reference to transparency and procedural fairness (Australian Government 2010), the extent to which a regime impacts fundamental human rights is rarely, if ever, factored directly into the assessment process. The emphasis on human rights in Marden’s book reflects the extent to which rights have become entrenched across European law and society, including in the design and assessment of regulatory regimes, providing a refreshing contrast to Australian (and US) approaches.

Third, ‘responsive regulation’ refers to the influential model, first proposed by Ayres and Braithwaite, which, essentially taking the form of a compliance pyramid, matches the form of intervention to regulatory compliance risk (Ayres & Braithwaite 1992). ‘Really responsive regulation’, on the other hand, as proposed by Baldwin and Black, goes beyond regulatory compliance risks, to make the case that regulators should be responsive to other factors, including the operating and cognitive frameworks for firms; the institutional environment; and regulatory tools and strategies (Baldwin and Black 2008). Marsden essentially applies this framework to examine Internet regulators ‘on their own merits’ rather than by reference to unrealistic regulatory ideals, such as misguided attempts to apply offline standards of
regulation and accountability to Internet regulation (p 222). This leads to an analysis of what Marsden refers to as ‘Potemkin regulators’ – namely, entities that appear to perform a regulatory function, but are limited in terms of resources, actual functions and substance. Noting that, while not unique to Internet regulation, they are especially prevalent in areas such as child protection and Internet gambling regulation, he concludes that:

*Potemkin regulators are dangerous not only because they perform a function that government has abdicated responsibility for, but also because they perform that function inadequately, incompetently and at a cost to themselves, governments and consumers.* (p 224).

Fourth, co-regulation refers to a variety of forms of regulation, falling between self-regulation and direct government regulation, which ‘generally involves both industry and government (the regulator) developing, administering and enforcing a solution, with arrangements accompanied by a legislative backstop’ (ACMA 2010, 15). The book takes a very broad approach to what amounts to co-regulation, making an important contribution by distinguishing twelve ‘ideal types’ of Internet self- and co-regulation (which Marsden terms the ‘Beaufort scale’), ranging from pure, unenforced self-regulation – such as the virtual world of Second Life – to government-mandated co-regulation – such as the UK domain name authority, Nominet. A major thesis of the book is that Internet regulation in Europe is, on the whole, characterised by a movement (or what Marsden calls the ‘direction of travel’) away from self-regulation towards greater state involvement in various modalities of co-regulation.

As Marsden argues, there are a number of explanations for this, including the ‘legitimacy gap’ of pure self-regulation, the failure of ‘Potemkin regulators’ (including failures in accountability and transparency) and the European regulatory agenda, including the need to comply with the European human rights framework. In this respect, the book concludes that:

*Co-regulation offers the state a route back into questions of legitimacy, governance and human rights in the digital environment, and therefore opens up more interesting conversations than a static no-regulation versus state-regulation binary choice.* (p 242).

In assessing the book, it must be appreciated that it represents a truncated version of a much larger report resulting from two multi-year studies (2001-04 and 2006-08) funded by the European Commission (Marsden et al 2008), which was based on a considerable number of case studies. In the course of cutting back the report for publication as a monograph, it may be that some of the technical and methodological background, which is of interest mainly to the specialist, has necessarily been excised.

Nevertheless, much of the value of the book, especially for the non-European, lies in the detailed empirical material presented in the case studies in chapters 3 through 6. The case studies, which deal with the three broad Internet governance issues identified by the WGIG are, in general, organised from less government intervention (self-regulation) through various forms of co-regulation to private regulation, in the form of Internet filtering and blocking. The case studies dealt with in these chapters, as well as their categorisation in terms of Marsden’s ‘ideal types’, are best summarised in the following table:
<table>
<thead>
<tr>
<th>Book Chapter</th>
<th>Typology of regulation (‘ideal types’)</th>
<th>Case Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>3: Self-organisation</td>
<td>‘Pure’ unenforced self-regulatory (Second Life) Acknowledged self-regulatory (Bebo; Creative Commons)</td>
<td>Second Life Bebo Creative Commons</td>
</tr>
<tr>
<td>4: Self-regulation and standards</td>
<td>Post facto standardized self-regulatory (IETF) Recognized self-regulatory (W3C) Approved compulsory co-regulatory (ICANN) Independent (mandated) body with stakeholder forum (Nominet)</td>
<td>ICANN/Nominet IETF/W3C</td>
</tr>
<tr>
<td>5: Co-regulation and medium law (essentially regulation of convergent content, including mobile content, video-on-demand and IPTV)</td>
<td>Discussed self-regulatory (IMCB) Approved compulsory co-regulatory (PEGI Online) Scrutinized co-regulatory (NICAM; ATVOD) Independent (mandated) body with stakeholder forum (ICSTIS)</td>
<td>ICSTIS-IMCB NICAM-PEGI ATVOD</td>
</tr>
<tr>
<td>6: ISPs, filtering and co-regulation (essentially private filtering and censorship)</td>
<td>Co-founded self-regulatory (FOSI) Sanctioned self-regulatory (PEGI; Euro mobile) Approved self-regulatory (Hotline)</td>
<td>ICRA/FOSI IWF INHOPE-EuroISPA</td>
</tr>
</tbody>
</table>

**Table 1 - Ideal Types of Self- and Co-Regulation.**

In the crucial seventh chapter of the book, the author compares and analyses the case studies presented in the earlier chapters – which certainly illustrate the extent to which the Internet has been subject to regulatory experimentation – identifying the factors that have led to success, failure, sustainability or ossification. This analysis leads Marsden to conclude that, in general, there is a case for greater government intervention, not merely because of the legitimacy deficit of private bodies, and the associated problems of accountability and transparency, but because of the compelling need for industry to take consumer and other stakeholder rights more seriously (p 219).

Overall, the book represents an impressive summary of the state of play of government intervention (or lack thereof) across a variety of Internet-based issues, especially from a UK (and, consequently, European) perspective. As such, it is a welcome departure from much US-inspired commentary, with its generally predictable anti-government bias. In this respect, Marsden is correct to point out that, in most of the areas studied in the book, the key questions are no longer whether or not to regulate the Internet, but the form which regulation should take.

There is no doubt that, as Marsden concludes, in Europe the recent trend has been towards a greater reliance on forms of co-regulation, which seems to reflect the current European regulatory paradigm. By comparison with the Europeans, however, Australia has a long experience with hybrid forms of regulation, with forms of co-regulation being generally preferred, especially in the field of electronic communications, since at least the regulatory reforms of the late 1980s and early 1990s. The Australian experience, including in broadcasting and telecommunications regulation, suggests that there is a case for being less sanguine about the prospects for co-regulation than Marsden seems to suggest; although to be fair, the book, from its predominantly empirical orientation, certainly does not propose forms...
of co-regulation as a ‘fix-all’ solution to all Internet issues. Instead, the book makes the case for co-regulation, involving multiple stakeholders, to be fully taken into account in regulatory Impact Assessments (IA) by government, and as generally being more workable than the alternatives.

Possibly the most important achievement of the book (apart from the vast amount of material assembled in the case studies) is how it succeeds in placing Internet regulation within mainstream regulatory theory. To an extent, this may be part of the domestication of the Internet – how it is no longer something different or, as Marsden puts it, an ‘exotic outlier’ (p 44), but has become entrenched in our everyday existence, including as an object of law and regulation. From an Australian perspective, the importance attributed by the Europeans to incorporating human rights considerations into regulatory design is not merely interesting, but potentially instructive.

Nevertheless, and despite its many fine features, there are some areas in which the analysis in the book may have been improved. First, while the book admittedly focuses on the ‘how’ of regulation, and not on the ‘why’ or ‘when’, it remains the case that the form taken by regulation is necessarily related to the purpose of regulation. It is in the relationship between regulatory justifications and forms of regulation that there still remains much scope for analysis of what distinguishes Internet regulation from other forms of regulation. That said, to go too far down the path of regulatory justifications would have diluted the central message of the book.

Second, while the book promises to evaluate Internet regulatory practices so as to identify those which have been successful and have merit, the metrics for doing so are not as clearly explained as they might be. Moreover, the conclusions drawn in the final chapters are not as expressly related to the arguments in the earlier chapters as they might be, with the reader sometimes left to draw her or his own inferences from some of the relatively succinct suggestions made in the concluding chapters. To an extent, however, this potential weakness seems to be related to the extremely ambitious nature of the research project, and the need to follow through on some of the claims in the concluding chapters, which will possibly be taken up in a further study, co-authored with Ian Brown from the Oxford Internet Institute, to be published in 2013 (Marsden & Brown 2013).

This leads to the third and final point, which is that, given the dynamic nature of this field of study, the book is very much a snap-shot of the state of Internet regulation at the point in time at which the research, and especially the case studies, were undertaken, which was mainly during the period 2006-2010. Since then, there have been significant developments in a variety of areas, including child protection, social networking services, digital copyright regulation and domain name governance. The extent to which research on Internet governance and the law is subject to rapidly becoming out-of-date is, of course, an unavoidable occupational hazard.

In short, the author, who is soon to hold the Chair of Media Law at Sussex Law School, has done a remarkable job in bringing together research in such disparate areas, as well as subjecting the diverse regulatory practices to a coherent analytical framework. There is a wealth of interesting detail on Internet regulatory regimes, with the explanation of the European regimes being especially helpful for non-Europeans. By bringing Internet regulation and governance in from the cold – by subjecting it to mainstream regulatory theory – the book has opened up major new research perspectives, which will no doubt be explored in anticipated future publications from the author, as well as other researchers.
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