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The Coalition parties spent most of 2010 criticising the NBN, and threatening to shut it down, without offering any broadband policy of their own. Perhaps this reflected their difficulty in finding common ground between the Liberal Party’s preference to 'leave it to the market' versus the Nationals' determination to win a subsidised roll-out of broadband infrastructure in the rural areas they represent, based on their long memory of market failure. After all, their Senate leader Barnaby Joyce's first reaction to the upgraded NBN plan, when announced in April 2009, was 'How could we disagree with something that is quite evidently our idea …'

The myths peddled about the NBN this year have been quite extraordinary. They include 'The technology [i.e. optical fibre] will be out of date by the time the NBN is implemented', 'Nobody needs 100 Mbps' and 'The current technologies [HFC cable, advanced DSL and mobile access] can provide 100 Mbps to the home without any need for government subsidy in the cities'. The absurdity of these and other claims provoked Rod Tucker to publish an excellent article in our previous issue debunking these 'urban myths'.

Yet many of these myths were sustained in the Coalition’s Broadband Policy, when it finally appeared on 10 August (eleven days before the elections) and was found to be a composite of two disparate policies. The first policy was for the regions (and outer metropolitan black spots), where $6.315 billion would be spent via the private sector (over seven years) to roll out an Opel-like network based on largely fixed wireless solutions, bringing rural Australia to parity with current metropolitan broadband. The second policy, for the majority of Australian dwellings, in the cities, would offer no subsidies and therefore rely on the private sector to provide more of the same (using DSL, HFC cable and mobile access). As Rod Tucker memorably wrote in an opinion piece published on the same day:

> The idea that we could use very fast broadband based on mobile technologies and existing fibre defies the laws of physics. (The Age, 10 August 2010)

Most surprisingly, the Coalition’s policy was to overturn Telstra’s hard-won agreement with the Government to sell its fixed network access infrastructure to the NBN. If implemented, this policy would return Telstra to the dominant market position that, in the view of the ACCC, the Productivity Commission and most independent commentators, stifled all competitive infrastructure investment in broadband access since 1997.

Closely following the Coalition’s broadband policy announcement, an 'Alliance for Affordable Broadband', consisting of seven junior telcos, proclaimed their support for this policy and, by implication, their willingness to share the $6.315 billion on offer. Given the long struggle by most Australian telcos to achieve any profitable business whatsoever in competition with the formidable Telstra, it is understandable that these seven would be attracted by the possibility of getting a slice of such a huge and unexpected government subsidy to the private sector.

As we know, the Gillard Labor Government was returned to office on 14 September with the support of the Greens and three independent MPs – all of whom had strongly supported the National Broadband Network. Indeed the two NSW Independents informed the public on 7 September that the NBN was a crucial reason for their choosing to support the Gillard Govern-
ment. Given the Coalition Opposition’s trenchant attacks on the NBN throughout the election campaign, it can be accurately said that the Australian electorate on 21 August voted, by a very narrow majority, for a Government based on the parties and independents that would support the implementation of Labor’s NBN policy. As a result some have called this ‘the broadband election’. Indeed it is difficult to find any other policy issue on which there was such a gulf between the positions of the winning and losing parties.

So the NBN, a rather complex policy for implementing advanced telecommunications infrastructure, has become the defining issue in Australian politics in 2010. It is as though Australians are divided into those who are pleased to see Australia leading the world in implementing a strategically valuable piece of national infrastructure, and those who are worried that we are leading and not following, spending far too much on it, and/or simply not ‘leaving it to the market’.

Since Malcolm Turnbull was appointed Shadow Minister for Broadband and Communications on 14 September, he has exhibited characteristic pragmatism, and has moved the Coalition policy, slowly step by step, towards potential acceptance of much of the electorally popular NBN. The structural or functional separation of Telstra is now conceded as ‘sensible’; and on 24 October he declared that

if the Productivity Commission were to report on the [NBN] as they should, and if they were to give it a big tick from a cost-benefit point of view, it would be incredibly persuasive.

Whether this position will be supported by his Party Leader is yet to be seen; it would seem to be almost a 180 degree shift from the marching orders Mr Abbott gave Mr Turnbull, ‘to demolish the NBN’. TJA looks forward to publishing articles providing critiques of the NBN policies of the major parties, and of the NBN rollout, in the year ahead.

* * *

Just four years ago, in November 2006, Rupert Murdoch told his Australian shareholders that ‘Australia’s Internet speeds were a disgrace’, and that Australia was being ‘left behind because of poor broadband Internet’. One might have assumed that he would therefore have been a strong supporter of the NBN.

Perish the thought! Four years later his Australian newspapers, led by ‘The Australian’, are engaged in a relentless attack upon the Government for sticking with its NBN policy, and have made extraordinary claims that the NBN will cost every household between $3,000 and $10,000 in wiring costs. (The actual minimum wiring cost to the householder in the Tasmanian rollout of the NBN has been found to be zero: householderes were able to use their existing WiFi networks, and got better access speeds from the NBN than from ADSL+2.)

Clearly the anti-NBN campaign is just a minor battle in News Ltd’s larger war to control the national agenda. But by resorting to gross distortions in this battle, it has risked becoming an object of national ridicule.

* * *
IN THIS ISSUE

Professor Jock Given (Swinburne University, Melbourne) spots an interesting trend in the politicisation of wired versus wireless communications, and generously contributes two papers on this theme, concerning events separated by 104 years. The first is a scholarly version of the witty historical vignette from 1904 that he delivered at the 75th Anniversary Dinner celebrations for TJA, held in Melbourne on 2 August. The second paper analyses the recent alignment of political forces, both in Australia and the USA, with wired versus wireless broadband network offerings during 2010; but it also discusses the complex relationships between the apparently competing technologies, in terms of their ‘interdependence, symbiosis and competition’.

Related to the same theme of wired versus wireless access (but in this case, fixed versus mobile) is a paper from Brian Williamson (of Plum Consulting, UK) on recent trends in the take-up of mobile versus fixed access communications, and the relationship between the two.

Liz Fell’s interview for this issue is with one of the most consistent, long-term supporters of the Australian ICT industry, Senator Kate Lundy. Shortly after the interview took place (in October) Senator Lundy flew to Paris to be named the winner of the 'International Top 10 People Changing the World of Internet and Politics' at the 11th World eDemocracy Forum, and to receive the International eDemocracy Award from the French Foreign Minister. Congratulations and well deserved, Kate!

TJA is grateful to our Guest Theme Editor for this November issue, Professor Catherine Middleton of Ryerson University, Canada, for attracting some very interesting articles in this issue, particularly from Canadian authors (Professor Kim Sawchuk from Concordia University; Professor Barbara Crow from York University; and Dr Wendy Freeman from Ryerson University), on the important theme of ‘User experience of modern communications’. Together with Melbourne secondary school principal Dr David Warner’s paper on ‘Preparing young people for an instant communication, networking world’, their papers span four interesting age groups: teenagers, undergraduates, graduate students and ‘seniors’. In addition Dr Linda Leung (University of Technology, Sydney) looks at the communications needs of recently arrived refugees in Australia. Catherine’s own paper explores how broadband services can be effectively delivered to customers over Next Generation Networks, such as Australia’s NBN.

Professor Brian Fitzgerald (Queensland University of Technology Law Faculty) contributes a valuable analysis of the role of the fast-growing Creative Commons licensing concept in online intellectual property. And Jim Holmes provides a book review of C T Marsden’s Net Neutrality –Towards a Co-Regulatory Solution, which analyses regularity policy, both potential and implemented, in the USA and Europe (especially in the UK).

* * *

This issue is the last of TJA to be published by Monash ePress, which was rebadged as Monash University Publishing in September, with a set of new priorities, which did not include this journal. I would like to sincerely thank Joanne Mullins and Nathan Hollier of ePress/MonashUP for their support while they were our publisher, and for making the transition to our new publisher as painless as possible. The PDF files of all articles published online in TJA from 2007 to 2009 will be made available (via online open access) by Monash University’s ARROW depository from January 2011.
I am pleased to announce that, starting in February 2011, our future online issues will be published by Swinburne University’s online journal service, Swinburne Online Journals. The four 2010 issues of TJA (Vol 60), with all articles accessible to TJA subscribers and ACS-TSA members, will be transferred to Swinburne Online Journals early in 2011.

I am grateful to John Costa for helping me investigate our new publishing options, and to Blair Feenaghty (of TJA) and Derek Whitehead, Teula Morgan and Rebecca Parker (of Swinburne Online) for assisting us with the transition.

Peter Gerrand – Editor-in-Chief
KATE LUNDY
AWARD-WINNING EGOVERNMENT ADVOCATE

Liz Fell

The Hon. Kate Lundy was re-elected to Federal parliament as a Labor Senator representing the Australian Capital Territory in September 2010 and sworn in as Parliamentary Secretary to the Prime Minister and Parliamentary Secretary for Immigration and Citizenship. In October she was selected as the winner of the International eDemocracy award at the 11th World eDemocracy Forum in Paris.


The Hon. Kate Lundy was re-elected to Federal parliament as a Labor Senator representing the Australian Capital Territory in September 2010 and sworn in as Parliamentary Secretary to the Prime Minister and Parliamentary Secretary for Immigration and Citizenship.

Since she was first elected to parliament in 1996, Lundy has gained broad respect from the information and communications technology sector for her spirited questioning at Senate committee hearings and for her creative use of Web 2 social networking tools in contributing to the Government 2.0 Taskforce.

In October she received global recognition for her innovative online leadership in working towards open and participatory e-government in Australia when she was selected as the winner of the International eDemocracy award at the 11th World eDemocracy Forum in Paris.

As a member of the Labor opposition (1996–2007), Lundy held a range of shadow portfolios: Information Technology, Manufacturing, Consumer Affairs, Local Government, Sport and Health Promotion. She also served as chair of the Joint Standing Committee for the National Capital and External Territories and became a long-term member of the Senate Standing Committee on Environment, Communications and the Arts.

Before entering parliament, Lundy was active in the ACT Labor Party and union movement. After working as a builders’ labourer (1984–86), she became a full-time union organiser responsible...
for occupational health and safety. In 1987 she was elected as Vice President of the ACT branch of the Construction, Forestry, Mining and Energy Union; in 1988 she joined the executive of the ACT Trades and Labour Council (TLC); and in 1993 she became the youngest person and the first female to be elected as TLC President.

She is a patron of CASE: Computing Assistance Support and Education, a non-profit group that provides smart, open technology support to community organisations.

Freelance journalist, Liz Fell, interviewed Senator Lundy for the Telecommunications Journal of Australia in early October.

* * *

TJA: Congratulations on your two Parliamentary Secretary positions Let's start with the Prime Minister’s Parliamentary Secretary position. Is there a formal brief for the job?

Lundy: Yes, there’s actually quite a formal brief associated with the Prime Minister & Cabinet portfolio. I’ll have carriage of two specific areas: the National Australia Day Council and the Australia Day celebrations, particularly in the capital, and our honours system. They’re quite formal areas for which I will make recommendations to the Prime Minister as her Parliamentary Secretary. Other roles and responsibilities include the progressing of the legislation program in sitting weeks. I’m thrilled with that role because it gives me a terrific understanding of the whole-of-government approach and the role that the executive plays in the processes of parliament. It’s new and it’s interesting.

TJA: What about your responsibilities as Parliamentary Secretary for Immigration and Citizenship?

Lundy: My brief is Multicultural Affairs and Settlement Services so it’s all of the associated public policy once people have permanent residency. What we do as a society to help them? I’ve been travelling around and it’s been really inspiring. I’ve been drawing on my experience from the building industry where 70 percent of the workers were from migrant backgrounds, so in a way it’s like going home!

TJA: Will you have the time to continue to pursue your policy interests in e-government and digital content?

Lundy: Yes, the other new opportunity, of course, is the conversations that I have always had, both in opposition and in government, about areas of policy interest. One of those areas is the relationship between our investment in the NBN and its capacity to close the digital divide. And what is it that government does in that online environment? That’s something across portfolios.

TJA: And digital content policy?

Lundy: Yes, but I think it’s more than content. It’s about interaction. It’s about how we deliver services to citizens, and the complementarity that an online environment provides to the traditional way in which government delivers services to citizens. Those conversations are the ones
I've always had, but I think there’ll be more opportunities to participate with a more coordinated approach.

**TJA:** Senator Conroy has a new role as the Minister Assisting the Prime Minister on Digital Productivity. Are you privy to what this new responsibility involves?

**Lundy:** To me it encapsulates the benefits of participating in the online space as far as business and commerce is concerned, and also the social capital that can be generated. What are the productivity benefits arising from the digital environment in the most holistic sense? For me, it crosses both public and private, community and business. It’s about what we do online and how we leverage that to advance ourselves. I guess I’ve never been caught up in that conversation in purely economic terms. For me, it’s as much about the social capital that can be generated. I see some fantastic examples of corporate investment: Google is a good example in the building of social capital, and partly because the content they create is in the cloud and everyone can participate in it. I think the lines are blurring between what’s private sector and what’s a public good, and that just makes it more interesting and more complex.

**TJA:** An interest in the digital productivity policy area would extend across a huge range of portfolios...

**Lundy:** I know. There’s heaps!

**TJA:** And you don’t always agree with your colleagues either. For instance, you have some strong views on Senator Conroy’s Internet filter or censorship policy, which you oppose?

**Lundy:** On that one issue we have a difference, but pretty much everything else is OK.

**TJA:** In the area of Gov 2.0 and open government initiatives, you have worked closely with Lindsay Tanner, former Finance Minister, and Joe Ludwig, then Special Minister of State, but I see that the new Finance Minister, Penny Wong, is no longer responsible for AGIMO (Australian Government Information Management Office). What happened there?

**Lundy:** AGIMO has gone to the Special Minister of State, Gary Gray. It will be located in Finance but he will have the executive responsibility for that particular agency which I think is terrific.

**TJA:** So Gov 2.0 and Digital Productivity policy-making will sit in Prime Minister & Cabinet alongside information policy, privacy and cyber security?

**Lundy:** Yes, I think for me the synergy is that I now have a close relationship and work with the department that is looking at a very broad sweep of information management policies. My experience in that area, I think will be put to good use. It’s a wonderful opportunity.

I think the reconfiguration of portfolios offers us the best chance to develop a holistic approach to information management. As far as the lead minister goes, I think it will be the Special Minister of State who will pull it together, but critically the new Information Commissioner, John McMil-
lan, will play an important role from the public sector perspective. How it all works will emerge and I’m optimistic about that.

TJA: It sounds quite complex given information management lies across portfolios and must extend to regional areas as well?

Lundy: Yes, but the other thing is that it’s not something that you can corral into a single portfolio. The question I get asked is: why isn’t there a Gov 2.0 portfolio? The answer is that you can’t create a portfolio out of something that will, by definition, remain the executive responsibility in each of the portfolio areas. You end up doing exactly what I’ve been doing which is being a supporter of ideas, and an advocate and promoter of ideas, without necessarily having any formal status at all which is the role I played during the last term.

TJA: So as a Parliamentary Secretary you now have formal status?

Lundy: Indeed, I’m getting a fantastic response from my colleagues about the potential of this. I think those multi-portfolio groupings to progress these agendas will emerge, and I’m optimistic about that.

TJA: Many readers may know you because of your keen questioning of former Comms and IT ministers at Senate committee hearings. I understand you have attended virtually every one of these Senate hearings. Is that correct?

Lundy: Pretty much.

TJA: You were a shadow IT minister when Senator Richard Alston was in charge of that Communications, IT and the Arts portfolio. Was that a tough learning experience?

Lundy: Yes. The debates we had were, in the first instance, about the development of the ICT industry in the context of the National Office for the Information Economy (NOIE). ICT was an emerging industry so the impact of outsourcing on the local industry and the prospects for Australia’s engagement in the world in digital terms were discussed in the context of that portfolio and NOIE. I remember how I categorised all the relevant topics on my website: ICT industry development, specifically outsourcing; e-government, and we now have Gov 2.0...

TJA: Was e-government debated at this early stage?

Lundy: No, but it was an issue of emerging public policy that warranted far more attention than it ever got under the Howard government. The other thing that came up... remember the Y2K bug?

TJA: Yes.
**Lundy**: Well, that was a huge issue. And there was the issue of women in ICT, which I’ve always felt passionate about, and security and privacy issues. So there were all these categories, I was trying to participate in each of them, and already it was multi-portfolio!

**TJA**: I recall reading Senate committee Hansards recording your persistence with questions to Telstra about its use of remote integrated multiplexers (RIMs) and pair-gain systems in the ACT...

**Lundy**: And the privatisation debate!

**TJA**: Yes. It was very clear that you were not a friend of Telstra!

**Lundy**: Oh, absolutely. I think the very first press release I put out in 1996 was criticising Telstra for withdrawing from what was then a fibre-to-the-kerb initiative they proposed for Gungahlin back in 1995. They walked away...

**TJA**: But you didn’t get elected to Federal parliament until 1996!

**Lundy**: Yes, but I was on the South East Regional Development Council, a Commonwealth body that was prepared to invest a million dollars of our funds into that Telstra project. So I was part of the decision to support that project, and then Telstra walked away from it because when the Howard government got elected they cut back on expenditure in preparation for privatisation. Telstra walked away from what would have been a world-first innovation at a time when it could have put Australia as a country in an incredibly strong position!

**TJA**: What about the fibre plans of the ACT’s local telco, TransACT, which would be competing with Telstra?

**Lundy**: TransACT hadn’t emerged at this point.

**TJA**: You must be pleased that NBNCo has set a date to consult with your constituents on installing broadband to the premises in the Gungahlin area of the ACT!

**Lundy**: Yes, Gungahlin was one of that group of 19 locations. I’ve actually said publicly for a long time, ‘Go to the RIM affected areas’, and they are doing that. In fact, some of the first five pilot sites are in RIM-affected areas, so I was pleased to see that too. Gungahlin is an obvious candidate.

**TJA**: Are you claiming NBNCo’s early interest in RIM affected areas, not least Gungahlin, is the result of your persistent questioning and lobbying?

**Lundy**: Oh, absolutely!

**TJA**: What is happening with TransACT now that the NBNCo strategy is to build fibre-to-the-premises?
Lundy: Until the NBN policy, they were still the best example of the most open, independent fibre-based network in the country.

TJA: Is TransACT selling its access network to NBNCo?

Lundy: I presume they are in conversations with the NBN and working to fit in. But going back to Alston, Telstra’s privatisation was the other major characterisation of his period as minister. TJA: And he was very knowledgeable about Telstra. Still, the recent election has produced new ALP members who must understand the digital world, namely, Michelle Rowland, a communications lawyer, and Ed Husic, former national president of a communications union.

Lundy: Yes. Let me say that the conversation continues to get more and more interesting as time goes on, especially among members of the party, but also because with each election the life experience of people coming to parliament is more embedded in what’s happening in the digital world.

TJA: Can we move back to your own life experience as a builders’ labourer when you left school?

Lundy: Yes, I left school at 16 and went straight to a job on a building site as a labourer. My task was to remove asbestos.

TJA: What union was covering that dangerous work at that stage? Was it the Building Workers’ Industrial Union (BWIU)?

Lundy: No, at the time it was the BLF (Builders Labourers Federation), but then the BLF were deregistered and I became a member of the BWIU. It was within the BWIU that I became an activist.

TJA: That must have been an amazing introduction to union politics with the BWIU leadership regarded as ‘Stalinists’ and the BLF taken over by ‘Maoists’!

Lundy: Yes, it was amazing because, regardless of their philosophical roots, I was being exposed for the first time to what it was to be an activist. Occupational health and safety law was my special area, and I was trying to progress changes to the law that would enhance the rights of the people I was representing. I was actually involved in the preparation of the ACT legislation for occupational health and safety as the ACT headed towards self-government, which it got in 1989.

TJA: I read that you got a scaffolding certificate at some stage, which must have been pretty unusual for a woman?

Lundy: Yes, I got that certificate later on so I could give advice to builders and members alike about the safe construction of scaffold. I knew how to do it, but I went and got the credential.
TJA: As a female in the male-dominated union movement it seems that you managed to knock down quite a few barriers. I found it interesting that you got control of the union newsletter!

Lundy: Yes, that was life-changing. The fact that I was the organiser who could type, meant that I got the computer! It was the typing skill that empowered me to innovate with computing technology, about which I had no prior knowledge. I was coming at it with fresh eyes, so I think that allowed me to think creatively as well. And again, without prior experience, I was able to translate what I knew building workers actually wanted to know into a newsletter. I don’t think I was particularly good at it, but I did know what I was doing and I knew that members didn’t want superfluous information: they just wanted to know where it was at!

TJA: Another struggle must have been to negotiate your way through the ubiquitous ALP factions. Is it correct that during the recent Federal election the rank-and-file members rejected the candidates chosen by the faction leaders?

Lundy: I think the best way to describe the experience was that the rank-and-file of the ACT ALP determined for themselves a candidate!

TJA: Are you a member of a faction?

Lundy: Yes, I’m in the left faction of the ALP, and always have been, but it never feels like there’s any factional wars going on In the ACT branch. There’s a factional dynamic, but it’s not at all like the way factions are often characterised. It’s dynamic, and a constructive environment. I’ve got a good relationship with all the factions, but I proudly identify with the left and continue to be an active member of the ACT left.

TJA: Moving to the three innovative Public Sphere initiatives you co-ordinated last year, I assume you borrowed the term Public Sphere from the German social theorist, Jurgen Habermas, who used it initially to describe a meeting place for rational debate and discussion?

Lundy: Yes. The motivation for the Public Sphere initiative was the possibility we could have a policy conversation using tools that were in the cloud and social networking. The ‘we’ was myself and my policy adviser, Pia Waugh, an activist in her own right in the open source community and a former president of Linux Australia. Pia and I had collaborated on several projects prior to her coming on my staff.

TJA: So you and Pia set up three different Public Spheres to discuss policy areas that were the responsibility of different ministers: High Speed Bandwidth; Government 2.0: Policy and Practice; and Australian ICT and Creative Industry Development. Did that organisation take some negotiation with various ministers?

Lundy: With Gov 2.0, because I was trying something new and felt confident in that area of policy, I was encouraged by colleagues to participate in the conversations. It was less of a negotiation and more of, ‘Great, let’s complement each other’. There were things I could do that
Lindsay (Tanner) would never have the time to do, and part of that was going to a number of the conferences which were proliferating because of the interest in social media.

TJA: Now you probably won’t have the same time either!

Lundy: I made a very conscious decision while I was on the backbench that Gov 2.0 was critical to all of our futures, that it was informed by the NBN, and that we were already up there as far as our creative capacity within public sector agencies and departments so they deserved the profile.

TJA: Can you briefly describe the discussion in Public Sphere #1 which was on the topic of High Speed Bandwidth?

Lundy: Well, the topics included the NBN – OK, we’ve got a high-speed network coming, what are we going to do with it – and they ranged from the philosophical overview we needed in public policy terms to discussions on openness, transparency and anticensorship. All those themes came up, but we also discussed what we were going to do on the new network and its potential for economic growth. We used spatial information as a case study for economic growth built on the open availability of geospatial data that the government has collected on behalf of citizens forever. So we had an economic case study of growth that could come with the proliferation of open data. We had another presentation by the QUT (Queensland University of Technology) representatives who had developed the Creative Commons; and their theme again was open data and how to create an environment in which collaboration becomes a natural way of doing things online? Another presentation was given by Tom Worthington from the ANU who has been an amazing innovator in the online education space, and another from Green ICT on the smart application of high bandwidth technologies – whether it’s in the transport industry, telecommuting, smart buildings, or smart grids.

TJA: Great ideas. And how were the Public Spheres structured?

Lundy: Each Public Sphere was a two-month event, with a forum in the middle where people got together and we had presentations on specific policy issues. Using blogs, the first phase was to openly invite people to make suggestions for a presentation in this policy area. Then Pia and I would ask, ‘How is this for a program?’ When the program was agreed, we organised the event. We live streamed the event and had a twitter #tag and a live blog, and we recorded it all and then posted the presentations – the PowerPoints and transcripts – online. The idea of the event was that as people presented their ideas, the conversation occurring in the twitterverse was cross-referencing other good ideas, and so expanding the data set or the sources of that given topic and commenting on the strength of ideas or related ideas as the conversation proceeded. There were also some qualitative comments like, ‘Oh yes, that sounds like a good idea’ or ‘That was already done in Sweden 14 years ago and it didn’t work’.

TJA: And was the next step to pull all this together?
Lundy: Yes, we captured all of that and it became one big data set. The next and, probably the hardest phase, was to say, ‘OK, we’ve got our topics. What were the strongest ideas? Let’s report on the event and start to draw it into a policy recommendation’. We placed the ‘first cut’ of our policy brief on a wiki and asked all of the presenters to re-contribute and to make sure it was accurate. If they didn’t agree with our conclusions, they could place their view on the wiki. That process went on for some of the Public Spheres anywhere from a couple of weeks to a full month, and we would edit as well to make sure the document held together. Once that was in reasonable shape, we would do one final iterative phase, which allowed us to prioritise recommendations, and that phase was really a necessary opportunity to filter out anything unsuitable, wrong, inaccurate, troublesome or just inappropriate that may have come into the wiki. They were all open edits so everyone could see what was going on, and when we finally closed the wiki, that document became the policy brief that went to the Minister.

TJA: Phew! What happened to the three policy briefs?

Lundy: For the Higher Bandwidth Networks brief, I was able to present the outcomes to Senator Conroy as Minister, who said he would take it into account in his own consultations that he was conducting as a Minister at the time. Lindsay Tanner in the Finance portfolio chose to use our actual Public Sphere event to launch the Gov 2.0 Taskforce and the outcomes of our brief became submissions to the Taskforce. It was just fantastic that the Taskforce launch coincided with our Public Sphere event and that both Minister Tanner and Minister Ludwig, (Special Minister of State) were there.

TJA: So your recommendations were given to the Taskforce.

Lundy: Yes. In a way I think it was a really strong example of the work I could do as a back-bencher in driving a particular policy agenda, but having a really strong response from the Ministers’ officers in wanting to progress that as well. The Taskforce became the critical platform for an action agenda for the government, which is exactly what the government wanted it to be. The government accepted the recommendations and they’re in the process of being implemented.

TJA: What does ‘in the process’ mean?

Lundy: I think they’re progressing. There’s been some progress with the Attorney General’s Department declaring government data to be Creative Commons, which was a direct response to the Taskforce. But given we had a caretaker period, a difficult election, and a minority government it will be interesting to see how that impacts on the agenda. And I’ve never heard so much discourse about the need for open and transparent and interactive government, so I think that augurs fantastically well for the future.

TJA: The third Public Sphere was on Australian ICT and Creative Industry Development. Did that topic attract ideas about what could be content demands for the NBN?
Lundy: It did, in the sense of what sectors are in the ICT area that will really drive innovative businesses. The discussion included companies producing online computer games through to innovative companies using tools in the cloud right through to issues like: what are the sources of start-up capital for young entrepreneurs in the ICT sector and what are the public policy issues related to the access to early stage capital to allow these businesses to grow? Again, a huge range of policy areas touching a lot of portfolios, but the conduit into government policy thinking was appropriately Minister Carr’s portfolio and so we fed it in there. So it turned out that three major portfolios were able to have input through the Public Sphere process!

TJA: Have you had any interest in your method or digital tools?

Lundy: When Steve Conroy ran his Broadband Futures conference in December they started to apply some of the methodologies. And we had the producer of the ABC’s Q&A program to talk at our Gov 2.0 Public Sphere event on how social networking can complement the presentation of traditional media product and elicit an engagement that otherwise wouldn’t be there.

TJA: Could the method apply to an aspect of your new Immigration and Citizenship position, for instance?

Lundy: I think it has application. The beauty of the Public Sphere is that we wrote up an Event Brief and the methodologies, so that attached to each policy brief is an Event Brief with exactly what tools we used, how many people participated, what their experience was, and some qualitative feedback about the experience of participants. That’s all publicly available. That was important to us because, most of all, we wanted to demonstrate that this was possible. We didn’t try to make it perfect, and every time was a bit different. By the time we got to the final Public Sphere we were using eight or nine different tools that already existed in the cloud to have those online conversations. So the next step is how the experience can be applied to my new responsibilities. I don’t know the answer to that yet, but it will come!

TJA: Finally, I understand you are off to the World eDemocracy forum in Paris next week.

Lundy: Look, it’s one of those amazing things, particularly for the Public Sphere initiative but also for the advocacy of Gov 2.0. In Australia, for whatever reason, innovation in that area brought me to the attention of the global eGov Forum and PoliticsOnline. I was identified as one of the people who had made some progress, so I have been invited to Paris to make a presentation and to accept an award. What I want to say is that I feel a little awkward because all the Public Sphere work was very much a collaboration between Pia Waugh, myself and a community of people across all sectors committed to the concept of open government who were active participants and supporters as volunteers.

TJA: Thank you very much for your time – and enjoy Paris!
Kate Lundy receiving the International eDemocracy award at the 11th World eDemocracy Forum in Paris

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Melvin Keith Ward was born in Mackay, Queensland on 12 December 1941. On 1 October 2010 he succumbed to cancer at his home in Jan Juc, on the coast of Victoria, surrounded by his wife Margaret, their three sons Geoff, Rick and Jonathan, and other members of his loving and close-knit family, including grandchildren.

When his parents moved to Brisbane, Mel undertook his secondary education at Brisbane Grammar School (1956-59), where he performed well academically and as a tennis and hockey player. His selection as a school prefect and promotion to Pilot Officer in the Air Force Cadets were early recognition of his leadership potential.

Mel’s engineering career began early in 1960 with his winning a PMG Cadetship to study Electrical Engineering (telecommunications) at the University of Queensland.

Mel derived maximum benefit from university life. He enjoyed the camaraderie of intervarsity hockey games and an active social life (including the drinking nights for which engineering students were notorious); and he towered tall when driving his MG TC sports car. He made many friendships which lasted a lifetime. And most importantly, he met Margaret Lowe, whom he married on 19 December 1964 – a strong and rich relationship that continued undiminished throughout his life.
With an acute and enquiring mind, Mel was a brilliant student. He graduated Bachelor of Engineering with First Class Honours at the end of 1963 and was awarded the University Medal in Engineering for that year. He followed up a year later with a Master’s degree in Engineering Science.

Soon after completing his Master’s degree, Mel and Margaret moved to Melbourne in March 1965. Mel’s professional engineering career began in the Postmaster-General (PMG)’s Research Laboratories (later Telecom Research Laboratories). There, in the Circuit Theory Group, he designed filters for transmission systems for a couple of years.

Mel moved to the Electronic Switching Division in 1967 and soon emerged as a key player in a major research project called the IST (Integrated Switching and Transmission) Project, very advanced for its time, which involved the investigation of two key ideas. The first was the concept of using software-controlled computers to perform the control functions (previously implemented by electromagnetic relays) in a telephone exchange, and the second was the idea of using digital solid-state devices to switch telephone traffic in a digital form. At the time, transmission systems carrying digital traffic were being introduced into the telephone network, but conversion of the traffic back to analogue form was necessary to perform the switching function in telephone exchanges. These two ideas underpinned the dawn of the era of computer-controlled digital telecommunications, an era which continues today although the early time division multiplexing technique of switching has by now, more than forty years later, been largely superseded by packet switching.

Mel’s participation in the IST Project took him and Margaret to Bell Telephone in Antwerp for about six months, starting in June 1968, where he worked with the designers of the new, specialised computers needed to perform switching control functions at high speeds. He returned to Australia as the key designer, together with the late Fred Symons and the late Andy Domjan, of the functional specifications of the IST switch being developed in the Laboratories. This experimental switch, the first computer-controlled digital telephone exchange in the world to handle live traffic, was implemented and finally installed in the Windsor exchange building in Melbourne in 1974, where it carried telephone traffic for many years thereafter.

With his impressive engineering talents becoming increasingly obvious, Mel was promoted in 1970 as an Engineer Class 3 into the mainstream area of Headquarters Telephone Exchange Equipment to participate in the 10C Trunk Exchange Project. The 10C trunk system was a large computer controlled switch which the PMG purchased as a result of a world-wide tender to meet network needs for switching the increasing volumes of STD traffic. As it was still in the development phase within Bell Telephone in Antwerp, it was far from a field-proven system and not without risks.

To mitigate those risks, the PMG sent a team of engineering and IT specialists to Antwerp for about three years (from mid-1970) to liaise with the system designers on the interpretation of the PMG’s specifications and networking requirements. Mel was an integral member of that team and, in fact, went a step further and programmed much of the software for the information signalling module within 10C. In the process, he earned both respect and friendship within the ranks of Bell Antwerp designers and their management. He returned from Antwerp in November 1973 to head up the new 10C Section within Telephone Exchange Equipment Branch, where he contributed to the acceptance testing of the 10C trunk exchange, leading to the first installation going into service in 1974 in the Pitt St exchange building in Sydney.
On 1 July 1975 the PMG Department was reorganised, with the nation’s postal services and telecommunications services being delegated to two new government business enterprises: Australia Post and Telecom Australia respectively. Following the reorganisation, Mel became an Engineer Class 5 in Telecom Australia’s new Switching Design Division, but was detached to head a task force on the CUDN (Common User Data Network) Project. CUDN was a new packet switched data network aimed at meeting the emerging data needs of large corporate clients – but was not without its problems. Under Mel’s leadership the task force identified various potential applications for the CUDN hardware and software.

On his return to Switching Design, Mel’s technical expertise was called upon in the final decision-making process which resulted in the selection, in 1977, of Ericsson’s AXE 10 switching system for application as a local computer-controlled telephone exchange in the Australian network. He was promoted to head (Level 2) of Switching Design Branch and managed all of Headquarters design activities relating to the adaptation and integration of the AXE 10 system for deployment in the network. Within 15 years the AXE 10 system was to become the dominant local switch in the Australian national network, including Telstra’s GSM mobile network in the 1990s.

In the late 1970s, Mel was again detached to undertake a special investigation into the future data needs of Telecom’s customers and the emerging data switching technologies which would support them. This work had significant impacts on Telecom’s organisational structures and resulted in the establishment of the Data Communications Branch. For the first time, this group combined commercial and engineering functions within a single product based organisation. Mel headed this group for about two years as a Level 3 Manager.

For the last time Mel returned to Engineering in 1981, for a relatively short period, as the Chief Development Engineer (Level 4). There, he continued to drive the digitalisation of Australia’s telephony and data networks, and managed development activities on the emerging mobile telecommunications technologies.

Mel’s career as an engineer in Telecom Australia was spectacular, but as he moved on from an essentially engineering role to more overarching management it became stellar.

In 1983, when Greg Crew moved from Telecom Australia to Hong Kong, Mel replaced him as head of the Commercial Services Division in Telecom. A year later in 1984, with the retirement of Gordon Martin, Mel became the Chief General Manager of Telecom Australia – effectively the organisation’s Chief Operating Officer. Then in April 1986 Bill Pollock retired and no one was surprised when Mel took his place as Telecom’s Managing Director. This spectacular rise was not bad for someone who started out in what even in the Research Labs was regarded as the boffins’ area of Circuit Theory!

There were three major trends in telecommunications over this period:

- the move to digital networking,
- growth in mobile communications and
- competition in the provision of telecommunications services.

Mel’s early work in digitising the network enabled the increasing penetration of voice and data services based on digital technologies.
On mobile services, he played mainly a supporting role, putting a good team in place and ensuring they had the resources to grow. As Managing Director he also made a cameo appearance in the mobiles field when in February 1987 from the steps of the Sydney Opera House he made the first call in Australia on what would now be recognised as a modern cellular mobile network.

It was as Chief General Manager and Managing Director that Mel moved into a central role in the third of the major themes for the industry – competition.

While he may have had some internal turmoil about competition in public network services, he took steps to prepare to Telecom for a competitive market place.

He called together the fifty or so most influential Telecom people – itself a novel move – to discuss the future of the organisation. This was in the early days of thinking about competition, in the early 1980s. The conclusion reached was that competition was inevitable and some estimates for dates and parameters were put around it – and these proved to be reasonably accurate.

Mel then went on, with a great deal of insight and not a little courage, to completely reorganise the organisation to prepare it for a competitive environment. This overturned almost 100 years of history and there were pockets of strong resistance. Telecom Australia became the first telecommunications carrier in the world to organise completely around customer sectors, rather than the traditional functional and geographic approach. The importance of this in getting Telecom ready for a competitive market cannot be overestimated.

Mel also recruited a small number of senior managers from North America who had experience in competitive markets. This too was crucially important in getting the organisation ready. He also negotiated with Telecom’s union leaders to progressively reduce Telecom’s total staff from a peak of 93,000 to some 69,000 by the time of his departure in 1991, through incentives for voluntary retirements – an amazing feat of industrial relations, for which the credit was claimed by one of his successors!

He was inevitably involved in the political debate that arose about competition throughout the 1980s. It was in this area that he had some notable run-ins with political forces in Canberra, which were intent on splitting Telecom into several less powerful pieces. The battle stories of these years are best told over a beer or a bottle of wine. However through all of the political skirmishes Mel continued to state his views based on the facts. He insisted on playing the ball and not the man. The end result was that he was able to convince first the Minister of Communications, Kim Beazley, and then the Federal Cabinet of the desirability, in the national interest, of merging Telecom Australia with OTC to face end-to-end competition both within Australia and internationally.

But Mel’s campaign to resist the carve-up of Telecom incurred powerful enemies in the Federal bureaucracy as well as in Cabinet. In late 1991, in the lead up to the merger with OTC, Mel noted the warning signs and retired gracefully from Telecom. The meetings held with staff in several capital cities to farewell him were quite emotional affairs; he had been enormously popular as Telecom’s leader, and his downward loyalty to staff was fully reciprocated.

After leaving Telecom Australia, Mel became a very active company director. His first directorship was a baptism of fire as Chairman (1992-94) of Brash Holdings, saving it from receivership by finding an overseas buyer. Other companies that he chaired included Logica Australia (1992-97), Sedgwick Holding (1994-99) and Pro Medicus – the latter from its float in 2000 until 2010 when ill health forced him to retire. He also served as a non-executive director on several major

He served as a company director with distinction and integrity. On the news of Mel’s death, Anthony Shepherd, the Chairman of Transfield Services, said: ‘His dedication to the Australian business community and to the arts has been immense. Mel was a true gentleman, a man of integrity, and will be greatly missed’.

Mel was very active in supporting the Arts in Australia. He was on the Board of the Australian Ballet from 1991 to 2002, serving as Chairman for the last three years. From 2002 to 2006 he chaired the Major Performing Arts Board of the Australia Council. As always, Mel threw himself fully into his work with these bodies, and introduced the concept of ‘artistic dividend’ to assist in their management.

Ian McCrae, the General Manager of the Australian Ballet during Mel’s time on that Board, said of Mel: ‘His influence at the Ballet was more than financial rectitude and good governance. As you all know he was a people person – and this defined him as much as anything else. He was genuinely interested and he cared. We would lose track of him as he wandered around the Ballet Centre chatting with everyone. I was always afraid that I might find him in a rehearsal studio decked out in tights’.

Mel’s career in Telecom and his achievements in the business community and the arts were truly monumental. He was rightly recognised with a number of awards and positions including the Order of Australia (1993) for his contributions to telecommunications, Membership of the prestigious Swedish Royal Academy of Engineering Science, recognition by the International Telecommunications Union, and was made a Fellow variously of the Australian Academy of Technological Sciences and Engineering, the Institution of Engineers Australia, and of course the Telecommunication Society of Australia.

Many people from Telstra and the wider telecommunications industry who worked with Mel have commented glowingly on his work and life. Without exception the first thing they have all talked about was Mel the man, and they all mention the same things. It is a consistent and very powerful list.

The first word everyone mentions is integrity. This is closely followed by words such as ‘warm’, ‘genuine’, ‘interested in you as a person’, incisive, ‘he played the ball not the man’, ‘no hidden agenda’, and ‘he always took a positive view of people (and was seldom disappointed)’.

He was also an extremely well-balanced individual, and was skilled in being able discern the important factors bearing on an issue – be it in a business, social or personal context – and to allocate priorities accordingly. Despite his onerous workload and responsibilities, Mel always afforded top priority to his family and was always there to participate in a rich and vigorous family life. Both he and Margaret can be justifiably proud of their three fine sons who are now successfully making their own way in the world.

A generation of Telecom managers and staff – and people in the wider industry as well – have benefited personally and professionally from working with and knowing Mel. Many believe that they are better people for having known him, worked with him and had him as a friend – a powerful and lasting legacy for this remarkable human being.

Vale Mel Ward.
The Telecommunications Journal of Australia and the ACS Telecommunications Special Interest Group would like to express their great appreciation of the life and work of Mel Ward and to offer our condolences to the members of his family. This obituary has been prepared from material assembled by Bill Craig and Ray Liggett.

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Seniors, defined as persons aged 65 and up, are becoming a much larger demographic in Canada at the same time as the wireless telecommunications industry is expanding. Yet in terms of academic research, few studies have examined how seniors understand and negotiate the influx of digital communications devices, such as the cellular telephone, into their world. Using industry and government data, as well as individual and group interviews and observations with over 120 Canadian seniors, this paper examines the repertoire of ‘cost’ in the group discussions held with this cohort. It does so from the perspective of a feminist political economy that takes into account individual experiences in the context of macro-level, structural analyses of institutions and industry. This preliminary study suggests that financial considerations play a significant role in seniors’ cell phone practices and may lead to a strategic decision to impose restrictions on their use. These restrictions to access often run counter to the desire, amongst many seniors, to have access to a cell phone for ‘emergency purposes’. The comments made by this cohort make apparent the way that personal economies within a household on restricted or fixed incomes intersect with the practices of the wireless industry and suggest future avenues for media and ageing studies.

INTRODUCTION

On 19 July 2010, Canada’s national broadcaster, the CBC, ran a revealing story about the enormous profits being made in the wireless industry and the high costs of mobile telephone services (Nowak 2010). In the June quarter, Canadian wireless communications companies enjoyed a 47.6 per cent increase in profits, ‘a margin that topped 21 developed nations tracked... in the Global Wireless Matrix report’, and ‘lead[ing] all 50 nations in the study with the highest average revenue per user’ (Nowak 2010; see also CBC 2010a; Geist 2007). Traditionally, Canada has had lower and slower rates of cell phone adoption compared to other countries, due in part to the relative inexpensiveness of landline telephones and the provision of comprehensive public services. This telecommunications landscape is undergoing momentous changes: the number of cell phone subscribers increased from 3.5 million in 1997 to 22.8 million in 2009 (CWTA 2008). The profitability of this sector of the communications industry and the increase in rates of purchase of cell phone show a marked shift from past patterns.

As industry studies have shown, this turn to cellular communications has not been uniform across the different geographic regions of the country, nor is it spread evenly throughout the population (CWTA 2008). Indeed, one of the lowest rates of adoption is amongst users who are part of a large cohort known as ‘seniors’, a term that can encompass a range of ages: in some studies the term connotes those who are 55 and up, while in other instances, it is reserved for those who are over 65, the legal age of retirement and the date at which one can start collecting a pension. As a 2008 report by the wireless industry indicated, while ‘cell phone penetration by
age was at 73 per cent for those between 18 and 34, and at 66 per cent for those from 35–54, only 40 per cent of people aged 55 + owned a cell phone’ (CWTA 2008, 10).

Most studies on cell phone usage focus on youth, in particular, only a handful of papers examine the practices, perceptions, needs or desires of those who are 55 plus, perpetuating the lack of concern for seniors that is a hallmark of much of media studies. At this first stage in our research on ageing and mobile technologies, we focus on what this absent cohort has to say about the cellular telephone and life in the age of wireless digital media. We have travelled to legion halls, churches, seniors’ centres, community clubs, private homes and apartment blocks to engage in semi-structured group interviews. We have conducted individual interviews with seniors over the phone and received unsolicited emails offering personal testimonials of cell phone disappointments and imploring us to ‘tell it like it is’. We have visited seniors in four of the ten Canadian provinces. Over 120 seniors have participated in our cross-country study, ranging from extremely affluent individuals earning over CDN$100,000 a year post-retirement, to groups of seniors who are ‘comfortable,’ to those earning less than CDN$10,000 per year. The average age of our seniors is 73.4 for men and 70.3 for women and approximately sixty percent of our interviewees are female, while forty percent are male.

We used a list of questions, but we also let the discussion take itself where the participants wanted it to go: quite often the sessions became occasions for information-sharing between participants on what phones to buy, how to save money, negotiate with companies and to describe possible uses for their devices. Given the lack of value ascribed to ageing within a youth-oriented culture, and the challenges of living on a fixed income after retirement, the discussions have since inspired us to add a survey to our research agenda to keep track of basic data. We have also paid participants for their time. In the course of doing our research, we have taken care to learn from the discussions with seniors, transforming the protocols for our research to better respond to their understandings of the world. Rather than seeing this cohort as ‘behind the times’, we understand them as speaking from a purview that spans at least sixty years of experience with communications technologies: from radio, to television, to the Internet. Our preliminary work suggests that it is paramount to resist the temptation to judge their restricted practices from the purview of ‘exuberant users’, who are often much younger.

A number of recurrent ‘systems of terms’ (Potter and Weatherall 1987, 17) have emerged from the interviews, including discussions on what constitutes an emergency, the desire to stay connected throughout the life cycle and a willingness to learn new digital skills to do so. In this short research note, we will briefly discuss the general context of ageing in Canada, provide an overview of the wireless industry before focusing on a close-up examination of one hot topic of discussion: the cost of cell phone services. In this section, which intentionally highlights extracts from our interviews, we touch upon several sub-themes that reflect how our participants articulate and negotiate the subtle influences that wider economic and policy issues have on their everyday mobile communications practices. These sub-themes include their perceptions of the telecommunications industry, their experiences with managing the added expense of a new communications device to their household communications ecology, their understandings of companies and contracts, and the impact that both infrastructure and economics have on their preferred use of the cell phone for emergencies.

Within the study of cell phone culture, the empirical work of Heather Horst and Daniel Miller (2006) loosely adopts this approach. In their anthropological study of cell phone use in Jamaica,
they make explicit how infrastructures – landlines, government policy, markets – play a role in shaping mobile technology use. They argue that consideration of telecommunications infrastructure is imperative for providing a fuller understanding on how people take up, negotiate and use (or don’t use) cell phones. Stories of trade liberalisation, the role of the state, monopolies and money are recounted in their work through ethnographic research that, in their words, retains ‘the fundamental linkage between academic generalisation, or indeed, policy prescriptions, and a language and style that retains something of the humanity and individuality of the people upon whom these generalisations are based’ (Horst and Miller 2006, 18). We have taken a page from their excellent book and have included extracts, in our paper, from our interview transcripts with ten of the twelve sessions we have held in Toronto and Peterborough Ontario, as well as Victoria, Duncan and Qualicum Bay, British Columbia.

Given the steady increase in this demographic, the accelerating privatisation of wireless industries, and the increased costs of cell phone services, what happens when we explore the personal economy of seniors in relationship to cell phone use and this powerful industry? Before we answer this question, by taking recourse to our interview materials, the following offers a word on ageing in our national context.

AGEING IN CANADA

The ‘seniors’ age group is of particular significance to questions of national telecommunications policy, as the number of seniors in Canada is predicted to double from 4.2 million at present to 9.8 million by 2038 (Statistics Canada 2007). It is expected that in ten years, by 2021, 6.7 million Canadians will be over the age 65. By 2031, about one out of every four Canadians will be 65 years or older. By 2056, one out of every ten Canadians will be over 80 years of age (CIHR 2006, 9). It is not only the size of this demographic that is increasing, but their paid work participation and life expectancy, which is currently at its highest in Canada at 80.7 years, up from 78.4 years a decade ago. Men’s life expectancy has risen by 2.9 years, while for women it has only increased by 1.8 years (Statistics Canada 2007a, 2).

In Canada the poverty levels amongst certain seniors has dropped over the past twenty years because of improvements to pension plans, and the increase in women’s participation in the paid workforce. However, these differences in economic means are extremely relative. Between 1997 and 2003, the average income of senior households increased by $4,100 while the income of other Canadian households increased, on average, by $9,000 (Government of Canada 2005, 8). Private retirement savings are concentrated in a small percentage of families: 25 per cent of families hold 84 per cent of these assets, while three out of ten families have no private pension assets (Government of Canada 2005, 12). The situation is even more pronounced for seniors living alone, particularly for senior women: fully two-thirds of senior women live below the low-income-cut-off line (Government of Canada 2005, 30).

These are significant changes in Canadian demographics. What is remarkable about these policy documents, and in fact, what is remarkable about most of the policy documents we have read, is the lack of attention to the central role of media or communications technology within this population, despite the rhetoric of ‘active ageing’ (WHO 2002; Government of Canada 2009). It is particularly ironic that this generation, shaped by the tremendous wonders of wireless...
technology in radio, has become one so dismissed and ignored in current narratives about the possibilities of burgeoning wireless technologies.

THE WIRELESS INDUSTRY IN CANADA

Data provided by the Canadian Wireless Telecommunications Association (CWTA) states that this industry generates CDN$35 billion for the Canadian economy, and they invest more than CDN$1 billion in infrastructure each year. As stated earlier in the introduction, they are ‘enjoying tremendous profits’ (CWTA 2008). According to these figures, the Canadian wireless sector is a huge success story, while wireless consumers in Canada have been confronted with high costs, manipulative bundling of services, confusing billing packages, and dropped service – and they are beginning to get angry. This anger is fuelled by investigative media reports on the industry, including Canadian Broadcasting Corporation series about ‘Canada’s Worst Cell Phone Bill’ (Marketplace 2010).

Much of the public’s anger is directed at Bell, Rogers and Telus, since collectively, the ‘Big Three’ mobile companies control more than 95 per cent of the Canadian wireless market, and critics accuse them of using their position to inflate prices. As Horst and Miller (2006, 19) point out in the context of Jamaica, their subjects often saw the telecommunication companies as ‘characters’: ‘These companies are not just tokens of academic debate about capitalism or even telecommunication: they are major figures within the Jamaican landscape’ (p. 19). The way that consumers come to identify a ‘name’ with a service provider is encouraged by ‘branding exercises’ that attempt to build loyalty. We have seen similar characterisations and personalisations of the ‘telcos’ in our interviews and witnessed how ‘brand identifications’ can instigate a backlash. Advertising campaigns run by Rogers, Bell and Telus build expectations that loyal customers will be cared for. When these expectations are not met there is often an extraordinary outpouring of dismay, particularly amongst the cohort of seniors who have been weaned on notions of customer loyalty. As one respondent candidly put it:

‘That’s why I keep my account with Telus because they were Alberta telephone and telegraph and B.C. telephone and telegraph. They were the folks that put up the poles. That’s why I keep my service with them’ (R 70, West Coast).

In 2008, partially in response to citizen and consumer protest about high costs, the Canadian government held a spectrum auction to increase competition that would facilitate more providers’ entry into the market, in order to drive down cell phone costs. Ten new entrants acquired licences and ‘In each region of the country at least two new entrants won licences, with some areas seeing up to five new companies’ (Kustra 2008). Yet this only represented a partial solution to the existing problems with wireless service in Canada, since most of the new entrants located their businesses in urban areas such as Toronto and Montreal. Looking at a map of cell phone coverage in Canada makes apparent the bias that has typified Canadian communications infrastructure: except for in Alberta, cell phone coverage typically follows this original communications and transportation infrastructure, which runs along the southern border of the country, leaving those who live in more rural and northern areas, including seniors, with less than adequate service that is not necessarily profitable in market terms due to the sparseness of the population with respect to distance and geography.
Despite recent attempts to open up the wireless market, Canada has amongst the highest cell phone costs in the world (OECD 2005, ITU 2009). Unlike other nations, it has had one of the most inexpensive and expansive landline infrastructures (Winseck 1998), although cell phone ownership is beginning to overtake landline services. Access to cell phones, in Canada, is often made available through bundled services that ostensibly offer a deal if one signs up for cable, Internet, telephone and cell phones through a single provider. The wireless services offered in many of these packages come with three-year contracts and a handset. Canada is unique in its development of telecommunications infrastructure, as the Berkman Center Report on broadband (Berkman 2009) underscores: while Canadians are eager adopters of broadband services, including those that are ‘bundled’ together to include mobile devices, internationally Canada ranks close to the bottom – 22nd out of 30 nations studied – when costs and services are measured (Berkman 2009, 66 and 157).

Demand for specialty cell phones with extra features, sold through telecommunication bundles, is predicated on the way their functionality differentiates them from landline phones. Yet, a multi-functional smartphone such as Apple’s iPhone was, until recently, only available through one provider, Rogers. This meant that if you wanted an iPhone, you had to contract with Rogers as phones shipped to Canada are locked so that they will not work with a SIM card from another provider. While they can be unlocked, this costs extra money, needs to be done through channels other than a service provider, and may lead to a loss of a phone’s warranty.

This kind of proprietary bundling, and incentives to stay with one service provider, have resulted in costs that are burdensome for many Canadian wireless customers, particularly seniors. Not surprisingly, most of our seniors had pay-as-you-go plans that allow users to buy a fixed number of minutes per month. Given that the average cost for a cell phone with service is US$572 per year (CBC News 2010), and the income for individuals over 65 ranges from as low as CDN$13,400 for an elderly, non-earner male to as high as CDN$55,900 for elderly families (Statistics Canada 2010), the senior research participants in our study, even the high income earners, were very conscious of the costs of cell phones and had much to say about these matters.

TALKING COSTS: BETWEEN INDUSTRY AND PERSONAL ECONOMIES

When we asked seniors what they thought of the cell phone industry, the first response was ‘the cost’. When queried further, there was a uniform chorus across the country: ‘too high’.

One of the things I do think in all of this, is the charges. I think that the way the phone system is run in Canada and the fact that we pay exorbitant charges, get poor service is something that would be nice to be addressed. I think that to me, I don’t understand why all the other countries can do this. And I go for those people who came in and just tried to knock out this contract business. Just because I think it’s poor. (R 1, West Coast)

This often led many of our participants to tell stories about family members and friends who had encountered exorbitant phone bills, and the ways in which they themselves attempted to avoid costly bills. For those with lower incomes, entry into the cell phone market, typically through hand-me-down devices, was mitigated by stories in the media and from friends about being ‘ripped off’.
I don’t gab on it or talk on it all that much except for the horror story. In 2008, I had a major hospital stay and the telephone in the hospital ... didn’t work. So I said, can I use my cell phone? And they said, oh sure. So I did and everybody had my cell phone number and about a month later, I got the bill. 768 dollars! (R 30, West Coast).

When she left the hospital, she was able to negotiate having the bill cut in half, and is now on a pay-as-you go plan. One individual who had a cell phone bill over CDN$1000 asked a family member to help her understand why her bill was so high. She did not negotiate with the service provider, she only asked why it was so high. She paid the bill and now has a cell phone with a pay-as-you-go card (R 27, West Coast). Many seniors cannot afford to take these risks and use pay-as-you-go as a way to monitor monthly spending.

We noticed different strategies on the part of seniors in their ability to negotiate their experience with high cell phone bills or unjustified charges that suddenly appeared. The seniors from higher incomes were more likely to call cell phone providers and demand an explanation for the costs. This group often bargained with the providers for lowering their fees, and they did so by threatening to move to another service provider, many drawing from their own experiences in business as managers or as shareholders:

As a matter of fact, Telus just increased my charge to 30 cents a minute and I called them and said, ‘look, when I got this phone you assured me that as long as I never went to a zero balance you would never raise my rate, and here I’m getting charged 30 cents ... And she said, ‘oh, okay, you’ve been a customer for five years.’ And I said, ‘yes, I’m also a shareholder too.’ Before I told her I was a shareholder, she said she would reduce it to 20 cents a minute, so I thanked her and then I said I was a shareholder and I appreciate that she’s looking after the customers so well. (R 4, West Coast)

Part of negotiating with customer service representatives involved also knowing what tone to adopt to be most effective. For some, adopting a less aggressive attitude worked.

You know, the one thing, I’ve been in the corporate world for 46 years and you get a lot more flies with honey than you do with vinegar. You come on with an aggressive attitude and they just get their back up but you come on nicely, fairly, you can get a lot of stuff from a lot of companies. (R 10, West Coast)

For others, knowing who to deal with or even threaten was a more effective tactic:

Sort of a bit of a trade secret here: I’ve been with Rogers and their predecessors for a lot of years. And so when it’s time to change phones, you know, once I’m over the hump of a contract, I want a new phone. Period. And they start with this nonsense. The first thing I do is I go down to a Rogers shop to see what phones are now available. I don’t do any dealings with a Rogers shop at all. Any dealings I do are on the phone to Rogers on their head office I guess. Then I start negotiating with them (R 17, West Coast)
What was clear that having experience in the business world in a managerial or investment capacity provided the higher-income seniors with the ‘know-how’ and experience, the social and economic capital, to play with more functions and to seek retribution from the companies that had exploited them, or that had locked them into unsatisfactory deals.

As our discussion groups revealed, seniors deal with the high costs of the cell phone in various ways: many do not keep it on all of the time, restrict whom they give their number to, or share phones with a spouse. As in the United States, Canadians pay for incoming calls as well as the calls they make. Controlling incoming calls is one of the key reasons that our seniors turn off their phones, particularly whilst travelling. Many also continued to use the landline phone for long distance, some even calling the landline phone the ‘long distance phone’. For those living in rural areas, the landline phone remains particularly important and many had negotiated deals for making long-distance calls on the landline.

‘... I have a good plan for long distance. I can phone anytime, any hour of the day in Canada so I can meet my friend or my children or whatever any time I want. I can phone and it doesn’t cost me more.’ (R30, West Coast).

Almost all of our respondents retained their landline phones because of the cost, but they also use other communication options to service their needs: many own a computer and prefer Skype and email to maintain both daily and intermittent contact and connection, a need of extreme importance in the context of Canada.

Canada is a vast country covering a large geographic area; it is a geography not only divided into provinces, but into area-code zones, which makes the management of cell phone costs a particular challenge for rural seniors. Canada is also one of the few places in the world where cell phone calls, placed outside of a particular area code, are considered long distance.

And another thing we were very unhappy with is that we have an Alberta plan and when we receive phone calls from outside of this 250 [region], we pay a very high price to get them and that’s very difficult. So like a lot of other people, we tend to turn the phone off unless we’re gonna make the calls. (R 22, West Coast)

Roaming charges, exorbitant rates that penalise the customer for receiving calls in or out of their region, without an advanced pricing ‘plan’, were expressed as a key concerns and cited as example of the greedy ‘price gouging’ by telecommunications companies. As mentioned, many Canadian seniors are mobile after retirement, often living for long stretches at a time on the warmer west coast of Canada, or in inexpensive retirement communities, and trailer parks, in the United States. For these traveling seniors, the costs associated with cell phone ownership and restrictive contracts that locked them to their Canadian company, even when they weren’t using the service, was noted,

Have you ever checked your bills on your cell phones when you were in the States? Because you’d be surprised by how many phone calls you make that you don’t know about. Every time you pass a tower, if your phone is on, you get picked up and you’re charged. (R 44, West Coast)
Many of the participants spoke of the problems of being caught moving through different zones, while others spoke of the problems of being able to use the phone outside of designated areas to call others, even in emergency situations.

As mentioned, seniors frequently speak of ‘the need for a phone for emergencies’ as a justification for their initial purchase and tended to serve as seniors’ primary entry point into the cell phone market. While non-users were extremely skeptical of the value of cell phone ownership, for those who did own one, it had become a necessity, providing a feeling of comfort and security, often connected to gender:

‘I don't think that any woman should be traveling around on her own without a cell phone. You never know when you might need it. And you can also call and say, gee honey, I’m gonna be late or I can't find your house, where is it? That sort of thing. So I find it very useful’ (R 30, West Coast).

While they expressed discomfort with too much surveillance, they liked the fact that family and friends could check in with them when they were leaving somewhere, and again when they had arrived at or near to their destinations. Many discussed how their children wanted them to have cell phones so that they could keep in touch with them anywhere. Several had learned to text message at the behest of grandchildren, despite discomforts with the size of the keyboard and screens.

For those living in higher-crime urban areas, the cell phone represented a backup option to the landline phone, a repertoire tied to the need for personal safety in the home:

I like to keep mine close to me at night because um ... I see a lot of people, they can cut you, your telephone wire and they live alone. And if that should ever happen, emergency, you have your phone close to you. (R 90, East Coast)

As one woman in her late 60s, and still working, told us, she could not afford to make a phone call to just anyone late at night, so instead of turning the phone on, she frequently pretended to be speaking on the phone as she walked to ensure personal safety.

For the higher income seniors, cell phones were framed as particularly useful during travel, helping them to locate places to stay overnight and how to get directions for their next layover, in addition to acting as a safety device in case of an emergency in their car travels, for example. For more affluent seniors, able to travel in retirement, the term emergency was tied to the lack of access to a landline phone while on the road, in a car:

We have one that my husband and I share, and it's basically probably used for a little bit more than emergency, but we only pay $10 a month and it's a good insurance policy for when you're travelling. (R 5, East Coast)

While seniors from across economic brackets have developed an emergency rationale to justify cell phone use, what counts as an emergency, and how the phone is used for emergency services in a cost-effective manner, are deeply connected to socio-economic status. In this context, it is no surprise that seniors are seen as requiring these devices for ‘help,’ and some cell phone providers are beginning to tap into this market through the rhetoric of emergency and need. Ironically, the
current pricing practices and economics in the wireless industry make this primary function difficult to fulfill.

While the theme of the 'cell phone for emergencies' is critical, only focusing on this repertoire can obscure what seniors have to say about cell phones and life in the digital era. Those we have talked to, both users and non-users, are keen to possess these digital devices for emergencies and for communication with others. To own a cell phone, and to know how to use it, signifies an on-going connection to this world, as the testimonials we have received from our respondents suggests over and over again. While statistics collected by the wireless telecommunications industry indicate that cell phone usage practices are correlated to the age of users (CWTA 2008). Those who are 55+ are part of a category that is often viewed pejoratively in studies of technological diffusion as non-adopters or as ‘basicans,’ who do not take, in the words of one researcher, ‘full advantage’ of the phone’s multi-functionality (Lee 2008). Yet is this because seniors are unable or unwilling to learn how to use these devices? Is it only because of the design and complexity of the modern ‘smart phone’?

We are still exploring these issues, but what is clear is that because of the cost of cellular services, seniors’ mobile communication practices are frequently restricted for very rational reasons that have systemic roots. Many of the more affordable cell phones operating on pay-as-you-go plans offer only basic functionality, do not make it possible to easily upgrade, and come with little backup documentation to provide the knowledge needed to acquire more skills with the device. The seniors we have interviewed were cognisant of the changes that the cell phone had brought to the entire landscape of social and personal communications. Both users and even some non-users were keen to be included in these shifts, despite their worries about cultural changes, and the systemic barriers to access they face such as those related to cost – barriers to access expressed time and again in our interviews.

Confirming our own experiences with the cellular telephone, a recent Pew Internet survey reports that the largest growing group of social media users are individuals over 55 years of age (Madden 2010). If these multimedia functions are not being taken up on the cell phone, it is not because seniors are incapable of learning. The problem lies elsewhere: in the costs and service contracts, which we have explored in this paper, as well as in the size of the device and screen. Compared to the computer, the design of current mobile devices does not cater to seniors’ needs in terms of perceptual limitations or ease-of-use, which would be required for them to engage in cell phones’ potential multi-functionality.4

**CONCLUSION**

We have just scratched the surface of the complicated nexus of wireless, mobile communications technologies as it intersects with age. What is evident is that as we age, and especially as we live on retirement incomes, our experience of what is affordable and necessary for communications, post-retirement, will also change. As our interviews indicate, seniors often describe buying a phone for emergency purposes, yet many of the practices they must adopt, including turning off their phones to cut down on costs, seem at odds with this purpose. Seniors are interested in having a range of communications tools available to them. They would like these communications devices to be affordable, they would like instruction manuals on how to use them and what the real costs are for the various services, they would like to have plain contract language, and they
would like devices that are easy to operate with intuitive design— and they would also like less expensive options, and better and more uniform customer service when things go wrong.

While these are issues of concern for all Canadians, they become more acute for those living on fixed incomes after retirement, as well as for those who are hovering beneath or just above the low-income-cut-off-line. For these reasons it is not surprising that financial considerations, including the high costs of cell phones, plays a significant role in structuring how seniors use and do not use cell phones. Economics and social class are some of the most salient variables emerging in our discussions with seniors, and as statistics on poverty and age indicate, these variables are often tied to gender, race and immigration. Arguably, more detailed research on the intersection of how the economies and infrastructures of the telecommunications industry are experienced in the everyday lives of citizens, particularly those who are at the economic margins, is urgent in our national context.

ACKNOWLEDGEMENTS

Thank you to the Social Sciences and Humanities Research Council of Canada for supporting this study, Tamara Shepherd for her editing and research assistance. We would also like to thank the two anonymous reviewers, and the editor-in-chief of this journal, for their suggestions.

ENDNOTES

1 The numbers used in this paper (R 79; R 30) refer to the number we assigned to respondents to track their comments. The numbers do not refer to their age.


3 It was often the case that the handset was to last the duration of the contract. To get another handset, one would have to buy out the full cost of the handset and it could only be replaced by another that could be serviced by the provider.

4 For an example of mobile phone designs that do take the specific needs of senior users into account, see the Austrian company Emporia Telecom (http://www2.emporia.at/en/home/).

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Cite this article as: Sawchuk, Kim; Crow, Barbara. 2010. ‘Talking “costs”: Seniors, cell phones and the personal and political economy of telecommunications in Canada’. *Telecommunications Journal of Australia*. 60 (4): pp. 55.1 to 55.11. DOI: 10.2104/tja10055.
GRADUATING UNDERGRADUATE STUDENT INTERNET USE

HOW TECH-SAVVY IS THE NET GENERATION?

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This study contributes to a growing body of research that calls into question the assumption that all members of the Net Generation are uniformly sophisticated in their use of web-based technologies. Students graduating from an undergraduate business program were surveyed about their use of a range of technologies for academic and personal uses. Findings suggest that the majority of respondents use a limited range of technologies everyday to communicate and to stream audio and video web content. Many fewer students regularly use technologies associated with producing web content. Differences were also found in technology use patterns across gender lines.

INTRODUCTION

The generation born after the arrival of the personal computer in 1982 has been referred to as Digital Natives (Prensky 2001) or the Net Generation (Tapscott 1998). Rhetoric surrounding this generation’s connectedness abounds (Oblinger 2003; Prensky 2001; Tapscott 1998) with claims that by virtue of growing up with the Internet, they are uniformly technologically sophisticated and may even learn differently, requiring the education system to adapt to their need for multiple forms of input, and technology use (Feiertag & Berge 2008; McArthur 2009; Prensky 2007). These assumptions are being challenged by recent research that is starting to show that while this cohort may possess facility with some web-based technologies, their technology use is by no means homogenous (Goode 2010; Hargittai 2010; Kennedy et al. 2008; Thinyane 2010; Verhoeven et al. 2010). As educational institutions leap to integrate the latest technologies into their curriculum, a more nuanced and articulated understanding of the value of these technologies in the everyday lives of their Net Generation students is called for (Hargittai 2010). This paper contributes to the research focused on understanding how university-aged adults use web technologies in their everyday lives, for both academic and social purposes. While many studies of the technology-use patterns of university-aged students have tended to focus on first-year incoming students (Hargittai 2010; Hargittai & Walejko 2008; Jones et al. 2010; Kennedy et al. 2008; Oliver & Goerke 2007; Thinyane 2010; Verhoeven et al. 2010), this study examines students’ technology use at the end of their undergraduate education. Specifically, this study surveyed the range of technologies used by graduating undergraduate students in a business program at an urban Canadian university and focuses on their differentiated technology use for school and for personal use.

BACKGROUND

The majority of the current graduating class of undergraduates was born between 1987 and 1989 placing them firmly within the boundaries that mark the Net Generation (Tapscott 1998) also called Digital Natives (Prensky 2001) or Millennials (Oblinger 2003). Regardless of the term that is used to define them, ready and increasing access to Internet-based technologies is a key
defining characteristic in these young adults’ lives. According to a Pew Research Center study (2010) the Millennials themselves believe that ‘their use of modern technology is what distinguishes them from other generations’ (25), and studies of technology use report high levels of mobile and laptop ownership among this group (Cobcroft 2006; Smith et al. 2009).

Differences in technology use continue to exist and have been attributed to a wide range of socio-demographic and technological factors. Research has tended to find that access is highly reliant on demographic characteristics such as socio-economic status, age, education level, race and ethnicity and gender (Agarwal et al. 2009; Goode 2010; Hassani 2006; Selwyn 2004). Nevertheless, when focusing on Digital Natives, Smith et al. (2009) report that in 2009, among the freshmen class in 39 participating universities, 93.9 per cent of respondents reported owning a laptop that was less than one year old. Their study also reports a growing trend (51.2 per cent of respondents) to own handheld Internet-capable devices such as smart phones. However, Hargittai (2010, 93) cautions that ‘it is important for research in this area to investigate differentiated uses among those online, so we have a better understanding of the contours of digital inequality and what processes underlie them’ even within the seeming equality of access.

Technology use by the Net Generation has been found to be differentiated by types of technologies, background experiences and the same social and demographic factors that affect technology usage within the general population. Email, texting and searching for information are commonplace with very little variation in terms of demographic characteristics (Kennedy et al. 2008; Jones et al. 2010; Oliver & Goerke 2007). Smith et al. (2009) for example found that among the students they surveyed, 94.6 per cent reported using the college/university library website weekly and 89.8 per cent sent text messages weekly. However, when testing the claim that Digital Natives are sophisticated users of advanced technologies, the picture changes.

Web 2.0, a term coined by O’Reilly (2005) describes a host of technologies that allow users to participate on the web by contributing content. Blogs, wikis, and video sharing sites like YouTube allow users to post content, edit text, and comment on others’ work. Despite claims that the Net Generation is heavily engaged with Web 2.0 technologies, studies suggest that usage of these more recent technologies is low. In their survey of first-year Australian university students, Kennedy et al. (2008) found that only 15.6 per cent of respondents read blogs daily, 10.2 per cent maintained a blog, only 11.9 per cent shared photographs or other digital material daily and only 3.3 per cent of participants reporting daily use of a wiki. In their review of the Digital Natives debate, Bennett et al. (2008) observe that ‘it may be that there is as much variation within the digital native generation as between the generations’ (779, italics in original).

Assumptions about the skills, learning preferences, and general technological sophistication of this generation have permeated the pedagogical and policy decisions within institutions of higher education (Selwyn 2008). In order to remain relevant to their students, universities rush to integrate new technologies into current teaching and learning initiatives. Therefore, a clearer understanding about the real technological world inhabited by the Net Generation is increasingly necessary.

Unlike recently reported studies of university-aged students that focus on first-year cohorts, this study examines the technology use patterns of graduating undergraduate students. By examining technology use patterns of graduating undergraduates this study contributes to and extends studies of university students technology use by examining the usage patterns at the end
of four years of education. Additionally, the study develops a more articulated picture of technology use by examining academic and personal use as distinct.

**METHOD**

The data reported in this paper were collected through a survey that is part of a larger examination of the everyday practices of graduating undergraduate students at an urban Canadian university.

Respondents for this survey included the graduating class of an undergraduate business-related program in a mid-sized urban university. This sample was selected based on access and fit with the research questions. The larger study is investigating how the everyday uses of Web 2.0 technologies are used by students as they transition from student to professional. As such, a graduating undergraduate cohort was required.

In February 2010, the researcher visited a class meeting and administered the questionnaire using a paper-based form. A paper-based form was used to maximise the potential response rate. The questionnaire was divided into four main sections including demographics, technology use, social networking preferences and Internet access. In the technology use section respondents were provided with nine tasks typical of current Internet use and asked to indicate how frequently they did each one. This section was divided into two sub-sections and respondents were asked to rate their frequency of the nine tasks for school and personal purposes.

At the time of the survey, there were 140 students enrolled in the course, however as a final-year project-based course, 100 per cent attendance was not mandatory. There were 88 surveys returned, with 78 usable forms. Two surveys were returned unmarked, and 8 surveys were returned without a signed informed consent form. Data were entered into SPSS for analysis.

**FINDINGS AND DISCUSSION**

Of the respondents participating in the study, 44 per cent were female (n=34) and 56 per cent (n=44) were male. The average age of respondents was 23.21 (SD=1.93) and ages ranged from 22 to 31. The program in which respondents were enrolled had both a traditional four-year format or students could complete the program in two years by first completing a relevant community college diploma (called direct entry). Of the 78 respondents who participated in the survey, 70.5 per cent (n= 55) were completing a 4-year degree and 29.5 per cent were completing a 2-year direct entry program. In terms of gender, the proportion of men (54.5 per cent) to women (45.5 per cent) was close to equal in the four-year program, however, of those enrolled in the two-year post-diploma program, 82.6 per cent were male. Gender difference was found to be significant when comparing those registered in a four-year degree versus the direct entry two-year program ($\chi^2=9.105$, d.f.=1, p=.003). The age and gender frequencies are displayed in Table 1.

Participants were asked about how they accessed the Internet. A list of access methods was provided including: mobile phone, personal laptop, home computer, school lab computer, and work computer. Respondents were asked to indicate their preferred access methods in order of priority. The six-point scale ranged from Most Frequent to Least Frequent with each access method treated as a separate unit. Figure 1 shows that the majority of participants (66.7 per cent) indicated that the mobile phone was their most frequent access method for the Internet, followed by the personal laptop (42.7 per cent) and home computer (32.5 per cent).
Based on these results, it is clear that participants in this study had the potential to be connected to the Internet regardless of place or time. Very few students indicated that they relied on work (1.3 per cent) or school lab computers (4.1 per cent) to access the Internet. These findings
are consistent with recent trends in Internet access among young adults (Smith 2010) who found that among 18 – 29-year olds, 65 per cent use their mobile device to access the Internet.

EVERYDAY TECHNOLOGY USE
The goal of this study was to understand to what degree university-aged adults are using Web2.0 types of applications regularly as part of their everyday online activities. Respondents were asked how often they performed each of nine Internet-based tasks for both school and personal use. These tasks were selected based on recent surveys of Internet use (Levin 2008; Pew Research Center 2010; Smith et al. 2009) and reflect the range of tasks that include both communication and content creation on the web. The scale of frequency provided for each of the tasks was Everyday, 2–3 times per week, 2–3 times per month, less than once a month, Never, and Don’t Know. The Don’t Know option was provided so respondents could indicate that they were unsure of a term or task, however, the meaning of ‘Don’t Know’ was found to be ambiguous and is therefore not included in subsequent analyses.

Table 2 summarises the tasks for which participants selected Everyday for school and for personal use.

<table>
<thead>
<tr>
<th>Technology</th>
<th>School Use</th>
<th>Personal Use</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n^a</td>
<td>%^b</td>
</tr>
<tr>
<td>Email</td>
<td>70</td>
<td>90</td>
</tr>
<tr>
<td>Texting</td>
<td>44</td>
<td>57</td>
</tr>
<tr>
<td>Chat</td>
<td>41</td>
<td>53</td>
</tr>
<tr>
<td>Discussion board participation</td>
<td>22</td>
<td>28</td>
</tr>
<tr>
<td>Watch/listen to music/videos online</td>
<td>28</td>
<td>36</td>
</tr>
<tr>
<td>Read blogs</td>
<td>19</td>
<td>25</td>
</tr>
<tr>
<td>Use RSS</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Post online content</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Read customer reviews</td>
<td>9</td>
<td>11</td>
</tr>
</tbody>
</table>

Table 2 Everyday school and personal use of technology
^a Represents the total number of respondents who selected Everyday for each task.
^b Represents the percentage of total number of respondents who selected the task.

Email, texting and chat were the three communications technologies most frequently used for both school and personal use by respondents. Email was the most commonly used communication technology for school purposes and texting was the most commonly used tool for communicating for personal use. Chat, while less popular as a communication tool than email or texting was used more for personal use than for school use. This pattern of use for the more
established communication tools is consistent with findings in other surveys of technology use by young adults (Hargittai 2010; Jones et al. 2010; Kennedy et al. 2008; Oliver & Goerke 2007; Thinyane 2010).

Survey participants indicated that they frequently connect to the Internet to watch videos or listen to music. An examination of the frequencies of use beyond the everyday reveals that even for school use, 59 per cent of participants indicate that they use the Internet to view videos and/or listen to music at least 2–3 times per week. This may suggest that respondents considered time spent consuming audio/video content online at school, as opposed to for school, when answering this question. For personal use, 90 per cent of participants indicated that they spend time consuming audio-visual content from the web either everyday or 2–3 times per week. This prevalence of use is approaching more commonplace uses of the Internet such as email and texting and is consistent findings in Smith et al. (2009).

Respondents were asked about the frequency with which they use Web2.0 applications such as blogs, RSS, posting content online and reading customer reviews. Overall, respondents indicated low everyday participation in Web2.0 tasks. Reading blogs was the most frequently selected task with 25 per cent of students indicating that they read blogs everyday for school and 41 per cent of respondents use blogs for personal purposes. In contrast very few students used RSS for either school or for personal purposes. In fact, the majority of students indicated that they never use RSS at all (52 per cent for school use and 60 per cent for personal use). Surprisingly, only 4 per cent of respondents indicated that they post online content everyday for school, and only 13 per cent for personal use. Studies of adolescent and young adult use of the web tend to highlight the importance of user-generated content as an essential characteristic of social media websites (Madge et al. 2009; McArthur 2009). However, in this study, the overall prevalence of participants who uploaded content to the web was quite low particularly when considering the result that 54 per cent \(n=42\) said they never post any type of content for school use and 41 per cent \(n=32\) reported never posting content for personal purposes.

It would appear that the technology use patterns of these graduating undergraduates are consistent with findings in studies of first-year university students (see Hargittai & Walejko 2008). In order to better understand these use patterns, however, it is necessary to understand if there are systematic differences that determine the decisions participants make when going online.

**DIFFERENTIATED TECHNOLOGY USE**

An examination of the reported frequencies of everyday use suggested that there were different types of users among the 78 survey participants. Some respondents indicated that they used many technologies each day, while others used only a few. Categories of frequency developed by Livingstone and Helsper (2007) to explore technology use patterns among children and young adults were adapted to examine differentiated use among respondents in this study.

The categories of everyday use are based on research reported by Livingstone and Helsper in their study of the technology use patterns of 1,511 children and young people. To avoid ‘asserting a binary divide’ (Livingstone and Helsper 2007, 681) between haves and have-nots, the authors propose a continuum of technology use that maps ‘the number and types of online opportunities taken up’ (682). They argue that the number of everyday opportunities taken when using the Internet for various tasks provides a measure of the nature of that use. In other words,
rather than tracking the amount of time spent online, the continuum of opportunities taken is considered to reflect the value the user attributes to the technologies. In this continuum, all types of tasks are treated as equivalent and therefore all opportunities are equally weighted.

The categories along the continuum include: Basic users (one to three opportunities), Moderate users (four to five opportunities), Broad users (six to seven opportunities), and All-Rounders (at least eight opportunities). For this analysis, only everyday use was counted. Because the questionnaire used in this study provided participants with a list of nine tasks, (versus the 15 listed by Livingstone and Helsper (2007)) the continuum was adapted from the original. A Light user category was added to account for respondents who did not mark Everyday for any of the tasks. The opportunity counts within each category, modified slightly from the original continuum to coincide with the number of tasks listed in this survey, are listed in Table 3 beside the user type.

The total number of opportunities taken by respondents to use the Internet everyday for school was 242 (M=3.1) and 319 (M=4.1) for personal purposes. The frequencies for each category of users for both school and personal use are listed in Table 3.

<table>
<thead>
<tr>
<th>User Type</th>
<th>School</th>
<th></th>
<th>Personal</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Light User (0)</td>
<td>6</td>
<td>7.7</td>
<td>2</td>
<td>2.6</td>
</tr>
<tr>
<td>Basic User (1–2)</td>
<td>28</td>
<td>35.9</td>
<td>16</td>
<td>20.5</td>
</tr>
<tr>
<td>Moderate User (3–4)</td>
<td>28</td>
<td>35.9</td>
<td>30</td>
<td>38.5</td>
</tr>
<tr>
<td>Broad User (5–6)</td>
<td>13</td>
<td>16.7</td>
<td>24</td>
<td>30.8</td>
</tr>
<tr>
<td>All-Rounder (7–9)</td>
<td>3</td>
<td>3.8</td>
<td>6</td>
<td>7.7</td>
</tr>
</tbody>
</table>

Table 3 Frequencies of users by everyday opportunity category
The number in brackets represents the total number of everyday opportunities taken as indicated by the respondent.

In terms of frequencies, in both school and personal use, the majority of participants fell into the basic, moderate and broad user categories. There were very few extreme cases (i.e., Light users or All-Rounders).

Livingstone and Helsper (2007) found that their categories were useful in predicting the types of tasks that users were typically engaging in when online. They observed that there was considerable consistency within categories in terms of the types of tasks in which participants were engaging. Consequently Livingstone and Helsper (2007) asserted that ‘going online is a staged process, with systematic differences between those who take up more and those who take up fewer opportunities’ (683). For participants in the Livingstone et al. study the stages included basic users (step 1) in which information seeking was the primary purpose for online activity, moderate users (step 2) added games and email, broad users (step 3) added instant messaging and music downloading and the All-Rounders (step 4) added ‘a wide range of interactive and creative processes’ (Livingstone and Helsper 2007, 684). Whether because of the more limited range of online activities listed in the survey reported here or as a result of the differences in the
age, stage and connectivity of the sample surveyed, the categories do not offer such neat predictive value in terms of tasks undertaken on a daily basis. However, a review of the frequencies in Table 4 does suggest that there may be a relationship between user categories and the types of technologies used.

Respondents in the Basic User category (one to two opportunities) tend to use the Internet primarily for communication. Email is the preferred method for school and texting is preferred for personal use. Respondents in the Moderate User category (three to four opportunities) in general tended to add instant messaging (chatting). Internet use for this group extended beyond communication to entertainment with 43 per cent of respondents for school use and 60 per cent of respondents for personal use reporting that they listen to or watch music or video on a daily basis.

It is in the Broad User category that more advanced, Web 2.0-related technology becomes part of the respondents’ everyday lives. In particular reading blogs marks the dividing line between the Moderate and Broad user category. Blog reading jumped from 21 per cent for school use among Moderate users to 75 per cent of Broad users who indicated that they read blogs everyday. The change is more substantial for personal use (20 per cent of Moderate users compared to 83 per cent of Broad users). Consistent with findings by Livingstone and Helsper (2007), it is not until the All-Rounder user category that posting of content becomes a prevalent activity for both school and personal purposes. Given that only a small percent of respondents fit within the All-Rounder category, this finding suggests that content production on the web continues to have limited uptake, even among those in the Net generation.

<table>
<thead>
<tr>
<th>Technology</th>
<th>Basic</th>
<th>Moderate</th>
<th>Broad</th>
<th>All-Rounder</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>S (n=28) %</td>
<td>P (n=16) %</td>
<td>S (n=28) %</td>
<td>P (n=30) %</td>
</tr>
<tr>
<td>Email</td>
<td>96*</td>
<td>62.5</td>
<td>96</td>
<td>90</td>
</tr>
<tr>
<td>Texting</td>
<td>26</td>
<td>87.5</td>
<td>79</td>
<td>90</td>
</tr>
<tr>
<td>Chat</td>
<td>11</td>
<td>25</td>
<td>82</td>
<td>76</td>
</tr>
<tr>
<td>Watch/listen to music/videos online</td>
<td>11</td>
<td>12.5</td>
<td>43</td>
<td>60</td>
</tr>
<tr>
<td>Discussion board participation</td>
<td>11</td>
<td>0</td>
<td>21</td>
<td>10</td>
</tr>
<tr>
<td>Read blogs</td>
<td>0</td>
<td>0</td>
<td>21</td>
<td>20</td>
</tr>
<tr>
<td>Read customer reviews</td>
<td>4</td>
<td>0</td>
<td>4</td>
<td>13</td>
</tr>
<tr>
<td>Post online content</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Use RSS</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 4: Types of opportunities taken by each user category
* S=School Use; P=Personal Use; All numbers are percentages of respondents who reported using the technology everyday within that user category.
**USER CHARACTERISTICS AND DIFFERENTIATED USE**

Differentiated use continues to be attributed to a range of social and demographic characteristics such as age, gender and socio-economic status. In this section, technology use is examined to identify the factors that distinguish among different user categories.

In this study data were collected for respondent age, gender, type of program (traditional 4-year or 2-year post-diploma), parental education, and distance and form of transportation used to commute to campus.

Chi-square was used to compare these demographic characteristics across user categories for everyday personal and school use. The Light User category (zero opportunities) was combined with Basic User category (one to two opportunities) and the Broad User category (five to six opportunities) was combined with the All-Rounder User category (seven to nine opportunities) because there were insufficient numbers of cases in each of the two extreme categories to meet the requirements of the test. This last category was renamed Power User. The Moderate User category (three to four opportunities) was not combined with any other category.

The only characteristic for which there was a significant difference was gender for school use ($\chi^2=10.343$, df=2, $p=.006$). As can be seen in Table 5, in terms of school, women’s technology use was fairly evenly distributed across the three user categories. While for the men, the majority were in the Basic User category. This pattern flips for personal use with the women having more Power Users than Basic Users while the men were more evenly distributed across user categories ($\chi^2=5.429$, df=2, $p=.06$).

<table>
<thead>
<tr>
<th>User Type</th>
<th>School</th>
<th>Personal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>Male</td>
</tr>
<tr>
<td>Basic (0–2)</td>
<td>10</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>29.4%*</td>
<td>54.5%</td>
</tr>
<tr>
<td>Moderate (3–4)</td>
<td>11</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>32.4%</td>
<td>36.4%</td>
</tr>
<tr>
<td>Power User (5–9)</td>
<td>13</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>38.2%</td>
<td>9.1%</td>
</tr>
</tbody>
</table>

* Percentages calculated as a fraction of the column

This finding suggests that for school at least, men tend to use a narrower range of technologies for everyday use. For personal use, technology use is fairly evenly distributed across user categories with a large decrease in the Basic category and an increase of almost 20 per cent in Power User category when compared to school use. For both school and personal use, the Moderate User category remains stable. These results suggest that while men tend to use a narrow range of technologies for school, they broaden the types of opportunities taken online for personal purposes. Women exhibited a somewhat similar pattern, although the change was less pronounced suggesting that they are more consistent in the types of technologies they use regardless of purpose.

An examination of the everyday use of technology for school and for personal use by technology (Table 6) reveals that the technologies being used by men and women are different.
In terms of email and text, although both men and women tend to prefer email for school communication and text for personal use, women tend to use both more everyday. This is consistent with the frequent finding that Internet use by women tends to be more social in nature (Cotten et al. 2009). However, there is a difference in the usage of chat (or instant messaging) in terms of school use. There is also a noticeable difference between men and women in terms of their use of the Internet to watch video and listen to music. Men's use is almost double that of women for both school and personal use. Men also read blogs more and participate in Bulletin Board discussions more and are significantly more likely to read customer reviews online (particularly for personal use). (Significant difference is calculated comparing frequencies of all use, not just everyday, $\chi^2=15.303$, df=4, p=.004). Overall, men seem to take more opportunities to go online across a broader range of technologies everyday, particularly for personal purposes, than women. This difference in technology use according to gender is supported in studies of this population (Hargittai 2010; Hargittai & Walejko 2008; Smith et al. 2009). Men are typically found to spend more time gaming, watching videos and listening to music and posting content online.

**CONCLUSION**

This study contributes to the growing body of research that contradicts the view of the Net Generation as a homogenous group in relation to their technology use. Consistent with findings observed by Livingstone and Helsper (2007), responses to this survey confirm a continuum of technology use that ranges from commonplace communication tools such as email and texting to watching and listening to streaming media to reading blogs and finally to posting online content. As everyday use increases, the more likely individuals are to engage with a broader range of technologies. Basic users are unlikely to read blogs, but will probably use email and text to communicate everyday. This continuum was consistent across both school and personal use and

<table>
<thead>
<tr>
<th>Technology</th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>School %</td>
<td>Personal %</td>
</tr>
<tr>
<td>Email</td>
<td>91.2</td>
<td>76.5</td>
</tr>
<tr>
<td>Texting</td>
<td>58.8</td>
<td>91.2</td>
</tr>
<tr>
<td>Chat</td>
<td>29.4</td>
<td>61.8</td>
</tr>
<tr>
<td>Watch/listen to music/videos online</td>
<td>23.5</td>
<td>41.2</td>
</tr>
<tr>
<td>Read blogs</td>
<td>18.8</td>
<td>32.4</td>
</tr>
<tr>
<td>Discussion board participation</td>
<td>26.5</td>
<td>14.7</td>
</tr>
<tr>
<td>Read customer reviews</td>
<td>5.9</td>
<td>5.9</td>
</tr>
<tr>
<td>Use RSS</td>
<td>3.0</td>
<td>5.9</td>
</tr>
<tr>
<td>Post online content</td>
<td>2.9</td>
<td>8.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 6</th>
<th>Everyday technology choices by gender and purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Percentage of gender that selected each technology as being used everyday</td>
<td></td>
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</table>
participants in this study tended to be further along the continuum in terms of their uses of technology for personal purposes.

Contrary to popular conceptions of Digital Natives as advanced technology users who regularly produce online content in blogs and on YouTube, this study finds that these Web2.0 technologies are not widely adopted for everyday use. Perhaps including detailed questions to tap behaviour on social networking sites like Facebook might yield different results and in future studies, social networking tasks will be added to the list of online opportunities presented in the questionnaire. Although the majority of participants in this study did not regularly produce online content, they more actively consumed it and findings suggest that watching video and listening to music is becoming an ordinary part of the everyday Internet activity of the Net Generation. The data reported in this study highlight the need to understand the value that users attribute to their technology use to better understand how these practices contribute to and support their everyday social and academic activities.

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Cite this article as: Freeman, Wendy. 2010. ‘Graduating undergraduate student Internet use: How tech-savvy is the Net Generation?’ Telecommunications Journal of Australia. 60 (4): pp. 56.1 to 56.12. DOI: 10.2104/tja10056.
This paper is a conversation piece about the failure of schooling to embrace the technology that 21st century young people use as part of their lives. It directs attention to the fears that schools — and probably many adults — have of young people and their technology. It argues that it is not technology that is the issue but the 20th century attitudes of schools, schooling systems and governments. It is this attitude that actually controls schools, their young people and the amount of and manner in which technology is used. It briefly explores young people and their technologies and looks ahead to emerging technologies, but again all within the context that it is not as much about technology as the culture of schools. Technology, through the Internet, enabled the global knowledge economy but schools have not really embraced either. The paper concludes with the possibility that young people empowered by their technology may well rebel against the irrelevance of their schooling and its controlling culture, particularly technology.

Perhaps this best describes what I need to say about young people and technology. Some schools enable students to have their voice. Most don’t, but young people have voice outside school through technology, particularly social media. Social networking, just over the last few years, has empowered young people way beyond where they were at say five years ago. While schools may stop it within their borders, they will not stop its influence nor the conflict that will emerge between schools and their young people if schools do not embrace the way young people embrace technology.

I recently attended an ICT Conference largely with ICT leaders and technologists from a range of public and private schools. My paper was about schooling in 2010 and their clients – young people. I got a strong sense that schools generally are still fearful of how young people use technology. Just as with a physical fence around a school to keep people in and others out, there are 'fences' around how schools embrace and allow young people to use technology. Schools seem to embrace what it is about ICT that they can control and use for administration and managed teaching purposes. To what extent they are embracing it to foster learning, create relevance with young people and work with the enormous skill sets and dispositions that young people have is questionable.

For many years I have argued that schools have to open their doors to the world in which young people live and operate (Warner 2006). Since the late 1990’s this world has increasingly involved more and more sophisticated ICT. We acknowledge, for example, their capacity to write an essay and network on Facebook at the same time, but we deny this activity in school. At a recent workshop with Deputy Principals from some seventy primary schools, there was not one school that gave young people access to social media sites at school. Indeed very few of them were comfortable with mobile phones at school, though more allowed them as long as they were kept in bags or lockers and not used!
A key element of our problem is fear. We fear what young people might do and how they might use their power. For too long we have viewed schools as institutions that manage and discipline young people. If we give them freedom, how will we control them? Teacher education programs and new teacher induction programs have classroom management as a key theme: control of young people in groups. We live in an age in which the Internet has empowered young people. They have immediate access to information, communication, commerce, collaboration, sharing and networking. The great majority display enormous maturity in their on-line behaviours. Yes, they make mistakes, sometimes get into trouble and there are some obsessive behaviours. However, this is their world. They are not afraid of it, but we are afraid of the potential consequences of it all for how we manage schools.

I do need to argue that it is not any sense of interference with their learning, even their literacy and numeracy, that causes such fear, but a direct concern with losing control. In the early years of the Internet, Edna Aphek (2002) and young people directed our attention to the immensity of the change and the need for us to learn to share authority. Aphek saw that the Internet revolutionised the balance between the power of the adult and the status of young people. However, this only really happens outside the school, despite the increasing questioning of the relevance of schooling and school curriculum by both young people and employers. A recent student survey caused us to reflect on the results to one question from a senior at Year 10 level: 'Teachers clearly explain why we are learning, not just what we are learning.' I met with the whole year group who had suggested that this was not a strong part of their current experiences. They talked to me about relevance, particularly the relevance of subjects like maths and the fact that teachers do not adequately relate it to the real world of young people or to their aspirations. Even in a school where young people overwhelmingly endorse their student voice and the closeness of their relationships with teachers, there is a sense of a gap between the world and what happens in school.

The second element to fear is perhaps a rationalisation to hide our real fears. There are dangers on the Internet. These are real. However, there are dangers on our streets, there is bullying in our homes, our schools, our communities and our workplaces. On Friday August 13 2010, the NSW Government issued a warning about letting young people walk alone in the streets because a 13 year old had been asked a question by a man in a car. There are 'bad' people in the world, but they are overwhelmingly outnumbered by 'good' people. If we continue to 'cotton-wool' our young people our society will decay because there will not be the creativity and the risk taking that enables a society to function in a healthy manner and to create the wealth through entrepreneurialism that is needed to ensure economic growth and competitiveness in this global knowledge economy. With such fears in our leadership it will be very difficult to create the sort of open culture within schools that characterises social media. Such fears are not conducive to management through protocols.

I think as a mature community we do recognise that the dangers of the Internet are very similar to the dangers in our communities and much the same as they have been for centuries. The Internet creates greater exposure and the speed of communication and contact has increased. However, this is about teaching young people and their families to identify the dangers and to be able to deal with them. Removing the technology from schools is simply hiding a problem – but worse, it is about schools refusing to take up their social and emotional responsibilities in terms of the education of young people. The Victorian Government has removed social networking
from its new Ultranet, ostensibly because of privacy fears (that word again), but there are no significant privacy issues as such in closed communities. It would appear that the real reasons are more likely to be fear of the empowerment that young people feel through their social networking. Given the real fears, one would have thought that the best place to teach young people about using technology safely would be the school. After all, teaching and educating are our business. If we cannot teach for safe and ethical use of technology then should we be trusted to teach young people at all?

A third element of the fear is security against virus attacks and related malicious attacks on computers, systems and personal privacy. I am not a technologist but again it would seem that most networks can manage these reasonably well even when using cloud technology. Schools do fear that students and teachers can bring in all sorts of problems if the network is not tied down tightly. I suspect we need to get over it and learn to manage as best we can. If a young person can take their device into McDonalds and connect they surely are going to believe that they should be able to do it at their school.

The contrast to the restrictions and controls within schooling is the freedom that ICT, particularly the Internet, has given to the vast majority of young people in the developed and much of the developing world. A few years ago we directed attention to young people and Generations Y and Z as being the Internet users. One would have thought that schools, therefore, would have been amongst the first to embrace it with their young people. However, true to their history, schools have avoided it and at best will become corporate followers in say about ten years. I guess this is not too bad as it is some 90 years since Taylor's hierarchical, tightly controlled factory style of management, and schools still embrace it.

Dennis Masseni explains:

The corporate sector now understands that transparency is the new world order in communications. Control of the brand is gone. It's a world where the institutions must saddle-up beside their community and become part of the conversation as an equal. You spin – you die. (Masseni 2010)

He describes social media as accessing, sharing, commenting and collaborating online. He argues, from a Survey with 140 School Principals, that schools are 'spooked' by social media and need to learn from the corporate sector.


Research Director for Nielsen's online business. 'Incredibly, nearly nine in ten Australian Internet users (86%) are looking to their fellow Internet users for opinions and information about products, services and brands, and Australians' engagement with online word of mouth communication is going to increase in coming years as social media plays an increasingly important role in consumer decision making.'

Social networking on sites such as Facebook was a key driver in Australians' trial and uptake of social media. Close to three in four online Australians (73%)
have looked at others’ profiles on social networks and well over one third (37%) of these report to be interacting with others via social networking sites on a daily basis.

So, the keys to effective use of ICT in schools are: one, to overcome our fears of young people and how they use technology, and; to create school cultures that actually embrace young people and their 21st century world. We tend to spend our energies more on how we as adults can use ‘our’ technology in schools to create new engagement and learning opportunities rather than looking at our attitudes to what schooling can and should be. We sometimes appease ourselves by talking about how we might create the conditions so that in ten years time there will be sufficient change. Governments have done this so often with the notion of 2020! Perhaps the baby-boomers are using delaying tactics so that the issue is left to the next generation! However, as Elliott Eisner (2004) argues:

Preparation for tomorrow is best served by meaningful education today...we will realise that genuine reform of our schools requires a shift in paradigms from those with which we have become comfortable to others that more adequately address the potential that humans have for shaping not only the world, but themselves.

Educators, therefore, need to tackle these issues now. This also means that Governments need to identify the real issues and create the policy vision that empowers schools to act.

This directs attention to how we take responsibility for attempting to understand the nature and potential of incoming new technology (Warner 2006). ELTHAM, for example, developed very early in the first decade of the 21st century a secure Intranet that gave transparency to curriculum, immediacy of communication and on-line continuous reporting. Individual students, their parents and their teachers were in a customised and secure interactive environment. ELTHAM students have always had Internet access, open use of computers to access the Internet, games and social media and mobile phone use. It is hard to keep up! However, we do need to think about incoming technologies because as they come, young people will be amongst the first and most active users. Schools do need to get to the leading edge in terms of technologies rather than slowly following the corporate sector, but these technologies must be about supporting how young people will use technology and how we develop transparency, communication and interaction with all stakeholders.

Having said this, the issue of culture within schools is not about technology but rather it is about how the people in schools work with each other and the types of relationships that they have. In a school culture where younger and older people work together, collaborate and fundamentally respect each other as people, fear is not a feature of thinking or behaviour. However, in a traditional hierarchical school where young people are less engaged in the decision making and working life of the school, there is a greater chance that the decision-makers will fear how young people will react to greater freedom and autonomy. In this there is then the fear of allowing a tool (ICT) that young people as digital natives ‘own’ into the open life of the school.

We need to change this culture so that young people can use technology as they do within their 21st century living or recognise that young people will use it themselves to bring about
change. In this spectre lies the potential for increased conflict. This isn't about a physical battleground but rather a climate of increasing antagonism and disengagement. Even the young people who currently 'play the game' to get their results, particularly final year results for university entrance, will disengage in school. However, it is the sixty percent of young people whose talents lie elsewhere who increasingly disengage but who may well find school more attractive if their social media, games and other technology can be part of their schooling experiences.

Part of our control is in our making the decisions about what technology and how it should be used. This is fine if we want to be at the leading edge and take Hamel's view (Hamel 2004) that we are going to surprise and excite our clients by what we are doing. I believe ELTHAM did that by creating its Intranet, the Knowledge Network, which provided transparent curriculum, communication and continuous on-line reporting. However, in the main school control is about restricting the use of technology by young people because it threatens adult ownership of the culture and curriculum of the school. It is rarely about being at the leading edge and there is sufficient evidence that schools are well behind the corporate sector.

Unlike much of the corporate sector, however, schools' clients are young people and there is a community expectation that schools are educating young people. Perhaps the big issue is that from Governments to individual households there is limited knowledge about what this education should be or be about and even worse, total insecurity about how it should happen. At least the corporate sector generally has a clear focus on what it is selling. Schooling does not have this focus. Hence, it relies almost entirely on an historical perspective on what 'good' schooling should be and works very hard to distance itself from the realities of the world that its clients, students, are living in.

I recently talked with our final years students about their use of technology. Not surprisingly they contrasted their personal use with what they have to do to manage VCE exams. Some in fact are trying, and I emphasise trying, to reduce their use as it does not fit with the assessment expectations of final year examinations. What a weird world! Major assessment is still via written exams in long-hand not via computers or indeed the Internet. It also is still totally individual rather than team-orientated, which is very much in contrast with the use of social media, much of the games world and indeed, the world of work.

However, even in such a world young people can take their skills and attitudes and apply them to traditional learning. We have to believe that they can develop the skills and disposition for self-directed learning and, using their technologies, master even the most traditional forms of learning and assessment that we throw at them. Matt Blair, a final year student, mastered the iPad as a tool for his learning. The technology didn’t do it. The person did and made the technology work for him. Young people can do that. I direct attention to the following YouTube reference: http://www.youtube.com/watch?v=5V0tYs_Ogds

However, one of our fears is that young people will not achieve as well as they should if we give them the freedoms to become self-directed learners and self-managing in their behaviours. This is not true, but it takes an enormous leap of faith or 'legislative' decree to enable such transformation. Greg Whitby, Executive Director of Schools, Parramatta Diocese, directs attention also to the high performances of NSW HSC students in the transforming Diocesan schools (BOSS 2010, 62). I certainly direct attention to ELTHAM’s results, where young people in both their VCE examination results and their post-school successes demonstrate that transformed schooling that enables freedoms and self-management works. It is sad however, that we need to make such
statements, as the school assessment systems are as outdated as the industrial curriculum that
we subject young people to. We still, for example, prepare young people for industrial learning
and assessment in an age in which technology and the immediacy of the world of information
and communication is much more about 'just-in-time' learning.

The 'gurus' appointed by Governments are recreating schooling in their image and ramping
up standards so we are '1980's best practice', but avoiding the fact that young people are in a
transformed world that owes little now to the industrial paradigm. It may have served a previous
generation well, but it does little for the digital natives who are now in the second decade of the
21st century. We have to move beyond believing that at best schools should only use technology
to the standard of their teachers or the systems that employ them. The YouTube video of
ELTHAM student, Matt Blair, is a good illustration of young people saying 'let us move with
our world and help us to understand and work with it'. His technology world can help revolu-
tionise schooling, but only help. To really work it needs the attitudes of people in schools and
systems to change to focus more on how schooling can provide for young people a 'best-fit cus-
tomisation'.

No longer is reality, for example, just what we can feel, smell, taste and see. The physicality
of accessing, storing and sharing information is shifting and our 'digital natives' seamlessly weave
this into everyday life. Rather than printing out schoolwork, an email with a link can be sent to
where the document is stored on the cloud. Textbooks can be downloaded and viewed on screen
with students having capabilities to highlight, search and summarise texts.

Schooling tends to be a private transaction between the school and the individual. While we
teach in groups, the learning is individualised. Today young people, as well as the corporate,
business and industrial worlds, tell us that learning, living and working are a social transaction.
Technology makes learning a more 'just-in-time' process which is applied and has social con-
sequences. The move to Web 2 technology has added the social interaction dimension that young
people have made their own. Learning is about sharing information and constructing new
knowledge or meaning and sharing this in social space. It does not deny the importance of the
enabling skills nor the essential methodology of disciplines, but these need to operate in an integ-
rated and relevant context. New paradigms are emerging that are several paradigms ahead of
what we currently offer young people in our schools. Russell Ives, Deputy Director, iNET2 Aus-
tralia argues that allowing young people to utilise technology in their learning provides oppor-
tunity for students to collaborate in constructing new knowledge and communicating that in a
powerful way through social media. In this context knowledge grows and schooling and its young
people are more in sync with the global knowledge economy.

There's a new generation of learners. We need to help them transform the world by trans-
forming our fear of technology into curiosity.

Service industries, indeed all industry, are absolutely curious about the client. At what point
does business ever say 'we know all there is to know about the client' and do what they have
always done? Young people and their world have transformed, schools surely should be curious
about them.

When we realise our responsibility to students – our client – the message becomes: what
should be the roles of school and teaching in this new world? What should be the role of techno-
logy? We fear combining curriculum and technology as young people use it and we fear above
all losing control of assessment and measurable outcomes. In 2010 we assess industrial curriculum in industrial ways and get at best industrial outcomes from our schools.

We owe our students the best and that entails examining what is going on in their lives so that we can make the educational experience as relevant to their lives as possible. We need to be curious about our students and the world in which they live. Social transactions are becoming most relevant to students. Why? Students are curious about the world in which we all live – and of greater importance, social media is central to growing their social world. Technology has allowed this natural curiosity to flourish yet we as educators have not caught on. In fact, we should question just how much a ‘client culture’ exists in the education industry.

If we want students to learn from us as educators, we need to start learning from them.

What is needed in schooling and schooling systems is leadership with integrity, technological vision and a powerful and urgent curiosity about the client, the young people we tend to call students.

I don’t know at what stage young people will take their frustration and anger with schooling and rebel. The frustration and anger existed, particularly with young men, long before technology became part of their lives. However, what we should realise is that technology has empowered young people in ways we never even imagined. They now have the tools and probably the attitudes to rebel. And, their world of technology may well allow them to learn very effectively without traditional schooling. I could argue that their learning may lose some of the riches that schooling can provide, but they may well be more creative and innovative than they are now and just as literate.

ENDNOTES

1 Frederick Winslow Taylor is a controversial figure in management history. His innovations in industrial engineering, particularly in time and motion studies, paid off in dramatic improvements in productivity. At the same time, he has been credited with destroying the soul of work, of dehumanising factories, making men into automatons. http://www.skymark.com/resources/leaders/taylor.asp

2 iNET stands for International Networking for Educational Transformation

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TELECOMMUNICATIONS ACROSS BORDERS

REFUGEES’ TECHNOLOGY USE DURING DISPLACEMENT

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This article reports on recent research examining refugees as a particular user group of communication technologies. The term ‘refugee’ refers to all people who are exposed to refugee-type experiences and may include displaced people, asylum seekers and resettled refugees who have been granted residency in Australia. A review of literature has found that refugees as technology users have had very little attention across different disciplines, although the research has shown that technology is key to sustaining emotional wellbeing and precarious connections with family members when displaced. In particular, the telephone is the most critical technology for refugees in terms availability and familiarity. However, the access and affordability of telecommunications services and other technologies during displacement impacts on refugees’ adoption and use of technology in the settlement process.

INTRODUCTION

This article reports on recent research examining refugees as a particular user group of communication technologies. The term ‘refugee’ refers to all people who are exposed to refugee-type experiences and may include displaced people, asylum seekers and resettled refugees who have been granted residency in Australia. A review of literature has found that refugees as technology users have had very little attention across different disciplines, although the research has shown that technology is key to sustaining emotional wellbeing and precarious connections with family members when displaced. In particular, the telephone is the most critical technology for refugees in terms availability and familiarity. However, the access and affordability of telecommunications services and other technologies during displacement impacts on refugees’ adoption and use of technology in the settlement process.

What follows is an analysis of the issues surrounding refugees’ technology use as identified in the literature, including the pilot study which was published as a monograph Technology’s Refuge (Leung et al 2009), concluding with ideas and recommendations generated by refugee communities and settlement service providers about how to best address these issues.

LITERATURE REVIEW

The disciplines of Cultural Studies and Global Studies have studied transnational migrants’ use of technologies, such as the internet (Graham & Khosravi 2002; Karim 2003; Parham 2004; Bernal 2006), phone cards (Vertovec 2004; Wilding 2006) and mobile phones (Horst 2006). However, there has been minimal consideration of the specific importance of technology to refugees, who are similarly affected by issues of migration and marginalisation. While migrants generally exploit cheap access to communication technologies to sustain connection with familial and diasporic networks abroad (Baldassar et al 2007), refugees as a subset of this group, do not have the same opportunities as a result of being displaced and uncertain of the whereabouts of their loved ones. Overall, the study of communities and communication practices that surround
particular technologies has concentrated on groups other than refugees. A review of literature across both these disciplines has shown the study of:

- technology use by refugees has had minimal investigation;
- the familial and diasporic networks of transnational migrants has infrequently included refugees;
- communities and communication practices that surround particular technologies has concentrated on groups other than refugees.

Although the study of refugees is a discipline in its own right, there has been minimal examination of the role of technology in maintaining connections with family and diaspora in situations of displacement and resettlement. Instead, the literature within Refugee Studies is generally in the areas of:

- systems of immigration administration, such as comparison of different methods of managing refugees, particularly between Australia and the UK, Canada and the USA (see Human Rights & Equal Opportunity Commission 2004);
- how such systems inform public attitudes towards refugees (see Kushner & Knox 1999; MacCallum 2002; Mares 2002, McMaster 2002);
- the provision of basic health and education services to refugees (see Preston 1991; Hodes 2002; Mares & Jureidini 2003) including the treatment of the psychological effects of family displacement and separation (see Nickerson 2008; Johnson & Stoll 2008; Luster et al. 2009; Senyurekli & Detzner 2008).

The few studies that have been undertaken concentrate on the use of a range of technologies by refugees living in resettlement countries. For example, Kabbar and Crump (2006) examined the adoption of the information and communication technologies (ICTs) by refugee immigrants in New Zealand. McIver Jr and Prokosch (2002) explored how various technologies are used for information-seeking by immigrants and refugees in the United States. De Leeuw and Rydin (2007) have conducted research on the ways refugee children represent their cultural identities in the creation of their own media productions. Research which has focused on specific technologies include Howard and Owens’ (2002) study of the internet as a medium for communicating health information to refugee groups. Luster et al. (2009) acknowledged the critical importance of the telephone in reconnecting Sudanese refugees in the United States with their lost families in Africa. Glazebrook (2004) has explored mobile phone use amongst refugees on Temporary Protection Visas in Australia. Riak (2005) has studied how kinship rights of Dinka refugees are enacted through the telephone. Such studies explore how technologies are used where access to and literacies in those technologies is assumed to be unproblematic and does not fundamentally affect communication practices. Nonetheless, the latter studies point to the key role of telecommunications technologies in the lives of refugees.

The findings of the pilot study reported in Technology’s Refuge (Leung et al 2009) confirm that the phone is the main technology used to maintain vulnerable connections with family members in situations of conflict, displacement and resettlement. As a result, availability, access and affordability of phone services are fundamental to refugees’ emotional wellbeing. The role
of technologies in promoting wellbeing has been explored in Eardley, Bruce and Goggin’s (2009) review of literature on telecommunications services for disadvantaged groups; O’Mara’s (2009) study of using ICTs to empower culturally and linguistically diverse communities; Infoxchange and A.T. Kearney’s (2010) report on digital inclusion as a means to social cohesion in low-income areas; Metcalf et al’s (2008) article on connecting marginalised young people through technology; and various other studies of how feelings of trust, intimacy and community are promoted online (Preece 1998; Abdul-Rahman & Hailes 2000; Kadende-Kaiser 2000; Henderson & Gilding 2004). Such studies of the ways that technology can facilitate individual and community wellbeing have not particularly focused on refugees, and where migrants have been studied, it is usually in the context of settlement with those who are advantaged in their capacity to voluntarily undertake economic migration.

METHODOLOGY

_Technology’s Refuge_ analysed 30 interviews and 43 surveys with refugees and asylum seekers about their use of communication technology across the contexts of displacement, detention and resettlement. Participants included:

- male and female refugees or asylum seekers; participants from different regions of the world, including Africa, the Balkans, Asia and the Middle East;
- refugees resettled in the Australian community;
- former asylum seekers who had been detained within immigration detention centres;
- adults as well as those who arrived as child refugees.

Therefore, it is one of the few studies to explore refugees’ communication technology use in displacement contexts, and one of the first to do this in relation to detention centre environments.

As _Technology’s Refuge_ was a pilot study and exploratory in nature, it was important to verify the findings following the launch of the report. Refugee communities, advocates, international non-government organisations, resettlement services and researchers were invited to a community workshop that would disseminate the report’s findings and identify potential solutions and actions that will support refugees and asylum seekers’ use of communication technologies in displacement settings and during resettlement in Australia.

The workshop focused on the experience of refugees and asylum seekers from Eastern and Western Africa. Participants came from a variety of backgrounds, including six participants from African nations.

A2-sized posters were created to summarise the key findings of the report as it related to three central questions. These were used as talking points and to guide discussion on the day. One of the key questions, discussed further below, was ‘How can we help refugees communicate during war, in flight and in refugee camps?’

DISCUSSION

Workshop participants who had lived in countries in Africa generally agreed that the challenges summarised in _Technology’s Refuge_ and the workshop posters were ones they or members of their communities had faced.
While displaced, access to technologies was hampered by war and damaged or diminished telecommunications infrastructures. Access to the most basic of technologies, such as phone and postal services, was also compromised by the cost to use them. The demand to use these communication technologies led to the formation of micro-economies, in which use and access was possible only through personal or professional contacts, and/or payment. Participants highlighted the vital role of the phone for staying in contact with family, and informing them of their family’s whereabouts and safety during displacement and flight. These participants indicated that the phone was the primary means of staying in touch and it was difficult to remain in contact without it. However, the opportunities for learning modern technologies in Africa could be particularly limited. For example, several participants from African countries only became phone-literate after arriving in Australia.

The following table is a simplified overview of one of the posters presented at the workshop, and which served as a prompt for discussion.

<table>
<thead>
<tr>
<th>COMMUNICATION CHALLENGE</th>
<th>ILLUSTRATIVE QUOTES AND STORIES</th>
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<tbody>
<tr>
<td><strong>Challenge 1: Access in refugee camps:</strong> Some camps had no public phone. Mobile phones were owned only by the ‘wealthy’ few. Poor mobile network coverage made receiving incoming calls difficult. It was difficult to earn money in the camp to afford to communicate.</td>
<td>‘People who owned mobile phones rented them out.’ ‘If I wanted to call someone, I had to stand on top of the hill.’</td>
</tr>
<tr>
<td><strong>Challenge 2: Affordability:</strong> Some people could not afford to own a phone. It was difficult to earn money in refugee camps to be able to afford to communicate.</td>
<td>‘I relied on my landlord to access a phone to receive my husband’s calls.’ ‘We had a two way radio in the office and it was free.’</td>
</tr>
<tr>
<td><strong>Challenge 3: Communicating on the run:</strong> Whilst in flight, refugees wanted to let their family know that they were alive and safe. The public phone is a common way to communicate while fleeing. There is limited money and few calls.</td>
<td>‘When we arrived in Jordan, we contacted our family to tell them we were safe, then again when we reached Malaysia and again in Indonesia.’</td>
</tr>
<tr>
<td><strong>Challenge 4: Surveillance:</strong> Some people were worried that their family or friends were under surveillance by their enemies. They feared the post could be intercepted or phone calls recorded.</td>
<td>‘I didn’t even write a letter, I did not feel it was safe for them.’ ‘I wasn’t saying where I was because we were scared that the government was listening.’</td>
</tr>
<tr>
<td><strong>Challenge 5: Staying connected to family:</strong> Some refugees could not communicate with their family because no-one had a phone. Some participants lost touch with family members if they went into hiding. Refugees can feel distressed if there is no news.</td>
<td>‘I have a sister who visited from Khartoum. She’s the one who knew where my parents were.’ ‘If someone comes to visit Khartoum from our area, we all come to ask whether our parents are alive – you don’t even know.’ ‘I heard rumours about where the rest of my family had gone, but I had no way to contact them.’</td>
</tr>
</tbody>
</table>
Specifically in relation to communication practices whilst fleeing and displaced from their home countries, workshop participants observed that communication becomes a driving need as important as basic shelter, food and water. Communication technologies that enable refugees to find lost family, communicate with them, inform family and friends of their needs and receive financial assistance can act as a vital lifeline. At the workshop, participants further elaborated on issues of access, affordability, surveillance, limited and damaged infrastructure, and staying connected to family.

Participants also identified two additional challenges at the workshop: using communication technology to arrange monetary transfers and being at the mercy of the black market.

**ACCESS**

In refugee camps that were covered by a telecommunications network, mobile phones provided the main means of communicating. Participants commented that in the camps they had resided in, only a few people had a mobile phone in their possession. Camp residents will occasionally hire mobile phones from others. Furthermore, some refugee camps do not have telecommunications networks that link the camp to other regions. In these situations, access to communications is
very poor. Satellite phones or radios play a critical role, but are usually too expensive for displaced persons. Refugees may travel to town to make a phone call, if camp policies allow.

Participants who had lived in refugee camps said how they would travel to town to meet a variety of communication needs; for example, to visit the United Nations High Commissioner for Refugees (UNHCR) office, to send a telegram, to receive money transferred to them or to access a landline phone to make a call. The dangers and inconveniences of travelling to town from refugee camps were described: extreme heat, long distances, bad roads and the risk of attack by bandits. One refugee camp was three days walk from town. Once in town, refugees have to contend with a limited communication system, which may involve queuing at phone booths or dealing with jammed telephone lines that prevent you getting through. Often the expense and effort of travelling into town is wasted.

**AFFORDABILITY**

Residents within refugee camps found it difficult to afford to communicate. Money might be found by doing manual labour, borrowing money from a friend or receiving financial assistance from outside the camp. Some people are only able to afford to use communication technologies because family members outside the camp pay, for example, by sending money to buy a mobile phone or by ‘phoning in’ and paying for the calls. The difficulties faced in finding money to communicate increased people’s disappointment when an attempt to communicate was unsuccessful, for example, if the phone was cut off or they reached voicemail and their money was gone. One participant recounted a story where he had borrowed money from a friend to make a phone call which wasn’t successful and had to find a way to pay this money back after he had made the call.

**STAYING CONNECTED**

During conflict and flight, people easily lose each other. Attacks happen unexpectedly and fleeing can occur in a chaotic manner. After separation, family members struggle to find each other again and reunite. It takes a particularly long time to find a family member who has travelled overseas. Participants described the anxiety displaced people experience waiting for news when they don’t know where their family members are, or whether or not they are still alive. One participant recounted a story about a radio station that acted as a ‘missing link’ between family members, after the telecommunications link between the town and main centre had been destroyed. Community members paid to register their name and location with the radio station. A printout of this information was used to help family members locate each other.

**SURVEILLANCE**

Community members, who fear they will be traced by the government they had fled, find it difficult to talk about ‘exactly what’s on the heart’ with friends and family. There is strict scrutiny over communication into some countries; phones are tapped and certain lines restricted. A comment was made that a West African government had been known to disrupt and destroy some communication methods.
LIMITED AND DAMAGED INFRASTRUCTURE

There are still some areas in Africa where there are no telecommunications services or postal addresses. People travel to see those with whom they want to communicate by foot or donkey cart. Satellite phones are an important option in these areas, but are too expensive for the ordinary person.

Some participants had experiences where they were unable to get through to the person they were trying to call because the phone lines were jammed. Participants commented that phone connections are regularly cut off, and that the strength of the network signal overseas is weak. The lack of a reliable or steady source of electricity in the recipient's country can be a major problem, although this will vary by region. Growing populations in some areas weakens network connectivity, as more people require more power. Individuals may also have difficulty accessing electricity to charge their mobile phones.

Participants had also experienced intrusion in communication. Communication lines had been crossed, so that participants could hear other voices on the line, and phone calls had gone through to the wrong country. Participants believed that this problem lay with the service provider.

One participant described the difficulties she had in contacting her husband in a camp. She sent money to him to buy a mobile phone so that they could communicate, but other people in the camp would also use his phone. Subsequently, she would have to call repeatedly and wait for hours to get in touch.

Family members who are living in different places can lose touch when the telecommunications infrastructure is destroyed, or when a family member, who is not contactable by phone, loses a telephone number.

MONETARY TRANSFERS

Refugees and other displaced persons need to securely receive money transfers from family and friends. Whilst the Internet is a reliable way to send money from account to account, this is too expensive for people in Africa. Therefore, this normally has to be done through a third party such as a broker, the Western Union or a bank in town. These organisations charge a fee for their service. One of the workshop participants recounted a situation during the war in which official ‘organisational’ infrastructures had collapsed and all communication with their family and money transfers had to be done through a Somali broker who owned a satellite phone.

There is no direct way of transferring money to the recipients in refugee camps. If transferring money to a family member or friend in a refugee camp, there is a need to phone them to let them know it can be collected. Collection can involve a trip to town or finding someone who can pick up the money from the capital city. Inefficiencies in money transfers between financial organisations can result in the trip to town being unfruitful, with the displaced person returning to a disappointed and desperate family.

THE BLACK MARKET

Displaced people are at the mercy of those who can afford to own communication technology and who control access to it. The expense of using communication technology can markedly increase when the owners of mobile phones in refugee camps become corrupt or phone booths in town are controlled by the black market.
PROPOSED SOLUTIONS

A brainstorm of initiatives or actions that could be undertaken in refugee camps and other types of displacement settings generated the following project ideas. The feasibility and merits of each idea could not be fully assessed during the workshop. Therefore, these project ideas are presented for further analysis and development.

CENTRALISED COMMUNICATION SYSTEM

Workshop participants proposed that a centralised communications system be established within camps with one professional and accountable service provider. In certain locations this would necessitate the building of infrastructure. In addition, a communication room could also be set up to provide displaced people with access to phones. Additionally, an Internet café could be set up which could provide access to email and internet/VoIP. Training would need to be delivered to residents in the camp so that they were able to use available technologies, such as computers. Participants suggested that priority use be given to linking displaced people with their family members, especially if the whereabouts of immediate family were not known. A user-fee could be levied to cover the operation costs. However, this would necessitate non-government organisations (NGOs) providing a means by which residents in the camp could earn an income, for example, by offering skills training and the opportunity to engage in trades, or microloans that enable displaced people to establish small businesses in camps.

Participants argued that a central communications system would help protect vulnerable people from being preyed on by the black market and discourage the proliferation of corrupt communication businesses. It would also enable better management and policing of legitimate small communications businesses within the camp. If a single telecommunications service provider were introduced, it would give NGOs the legitimacy to institute rules that govern the use of all telecommunication services within the camp. Some participants also expressed a view that it would be unjust to eliminate corrupt businesses without first providing an alternative means of communication for desperate people in need of family contact. A centralised communication system would be less costly than other alternatives and could eliminate the need for refugees to travel into town to meet their communication needs.

This, however, would not be without the danger of misuse. A central communications room could make it easier for spies from former governments or enemy groups to track down individuals who reside in the camp. If political information or conversations were transmitted on a central communications link, it could place the humanitarian organisation in a bad light. Security is a primary concern in refugee camps and communication systems are not exempt.

Participants recommended that a governance structure for communications be put in place to protect it against misuse, and to uphold the principles of impartiality and neutrality. For example, rules which specify that the communications room be used only for personal communication could be introduced. Refugees who use the communication system would need to be cautioned that political information should not be transmitted.

Participants proposed that a pilot model for a communication room, which is scalable so that it can be rolled out to other refugee camps, be trialled and evaluated. A pilot project would demonstrate proof of concept, and provide a platform on which to lobby for communication capabilities to be introduced into other refugee camps. Its evaluation could provide tangible
evidence to support funding applications for similar projects. Participants recommended that such a pilot project be conducted under the auspices of an organisation specifically set up to provide technology aid for refugee camps, by administering communication technology projects. This would establish an organisational infrastructure through which similar projects could be initiated once the pilot study is complete.

**MICRO-FINANCE LOANS FOR SMALL COMMUNICATIONS BUSINESSES**

Micro-finance loans could be provided to individual refugees or households in refugee camps to help them establish a small communication business, for example, by renting out mobile phones or satellite radios. This would improve access to telephone services within refugee camps, particularly where there is no other communication service.

**SATELLITE RADIOS**

Satellite radios could be provided in refugee camps where there is no mobile telephone network coverage. The provision of UHF/VHF radio communication facilities to refugees in the camp could potentially facilitate communication between friends and relatives in internally displaced people's (IDP) camps because the UHF/VHF radio has wide network coverage. A system could be set up where a simple message is delivered to a similar communication facility in another IDP camp and the message delivered to the relative and friend. Participants also suggested that radio messages could be used to locate missing persons.

**PURCHASING AIRTIME**

Participants proposed that a project be established through which airtime on mobile phones could be purchased from anywhere in the world for refugees in Africa. They noted that the establishment of relationships between community groups in refugee camps and groups in Australia and the United States may enable such a project to occur. Further subsidies also could be achieved by negotiating cheaper deals with telecommunications providers for technology aid.

**LETTER DELIVERY**

One small group of participants suggested that the drivers of vehicles who regularly drop food off to camps could deliver letters or money transfers. Security concerns were not discussed. This type of arrangement may be particularly beneficial for improving access to communication technologies in camps where there are no telecommunications links between the camp and the outside world. The direct delivery of letters to refugee camps would also be facilitated through the provision of post office boxes.

**SUPPORT FOR FAMILY REUNION**

Comments were made that NGO coordination is vital for maximising the effectiveness of systems which have been set up to find missing persons. Competition between NGOs could potentially stifle the coordination required to identify missing persons and send messages to them.

**ADVOCACY AND EDUCATION**

Workshop participants recommended that the communication needs of displaced peoples be acknowledged as a central requirement, alongside the provision of food, water and shelter. They
noted that humanitarian organisations do not adequately address the needs that displaced people experience as a result of being separated from their family. As one workshop participant expressed it, these are their ‘most meaningful’ needs.

Sustained advocacy is needed for the provision of communication centres to become a standardised feature in humanitarian assistance. Participants suggested that advocates consider whether they should lobby for communication needs to be incorporated into the Humanitarian Charter and Minimum Standards in Disaster Response Standards (SPHERE standards).

**CONCLUSION**

Little is known about the use of communication technologies in situations of displacement in developing and/or war torn countries. Various factors inhibited access to technologies while participants were dislocated: including war and violence leading to damaged telecommunications infrastructures and poor coverage as well as government sanctions on telecommunications in periods of conflict. In this context, affordable infrastructure solutions are likely to aid communication. Mobile phones had the utility of facilitating communication in situations of conflict or dislocation, particularly, in refugee camps and in rural or regional settings that do not have basic telecommunications infrastructure. However, while the mobile phone is versatile, its limitations are clear: they are expensive, can potentially be lost, may not be able to be used in a different national network when asylum seekers flee across national borders and can be dependent on vulnerable mobile network stations in conflict zones. Satellite phones may be the only way of contacting family when telecommunication infrastructure is damaged. Nevertheless, mobile phones can ensure that family members remain contactable during flight and displacement and may protect a family member’s whereabouts from being lost. Participant accounts indicated that letters are a fallback communication method in displacement settings where telecommunication services fail. However, these can be limited by the unreliability of the postal services and the threat of surveillance by enemies.

Humanitarian assistance in facilitating access to communication technology is likely to ameliorate distress and help prevent the separation of families. Humanitarian agencies could potentially have a role in the emergency delivery of letters and facilitating community access to satellite phones. Participant accounts highlighted the difficulties in communicating to the outside world from refugee camps that had limited communication services. In these settings, these agencies might effectively intervene by supporting ‘indigenous schemes’ for resource sharing, for example, sharing a mobile phone whilst each individual owns a SIM card. There is a role for humanitarian actors to more effectively support refugees and asylum seekers in meeting their vital communication needs so that access to technologies is widened and no longer has to be negotiated on an ad hoc basis through brokers and favours.

The workshop generated a multitude of ideas, recommendations and project ideas. While not all could be actioned, participants and readers are welcome to appropriate them in the provision of services to their communities or clients. They are summarised below:

- pilot and evaluate a model for a communication room, which is scalable so that it can be rolled out to other refugee camps;
• provide micro-finance loans to establish small communications businesses within refugee camps;
• provide satellite radios in refugee camps where there is no mobile telephone network coverage;
• establish schemes for purchasing airtime on mobile phones or other technologies from anywhere in the world for refugees in Africa;
• negotiate cheap deals with telecommunications providers as a form of technology aid;
• facilitate direct delivery of letters to refugee camps through the provision of post office boxes. Drivers of vehicles who regularly drop food off to camps could be an additional means of delivering letters or money transfers;
• support family reunion by using radio messages to locate missing persons.
• engage in sustained advocacy for the communication needs of displaced peoples as a standardised feature in humanitarian assistance.

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Investment in 'next generation' (very high speed) broadband infrastructure is expected to enable access to services that will provide citizens with social and economic benefits. Developing services for access using broadband infrastructure can be quite complicated however. This paper explores how services can be delivered over broadband network infrastructure, outlining four broad categories of access devices, three service delivery platforms and two types of networks. Using Australian data, the paper explores user behaviours and expectations around service delivery, illustrating the need for diversity and choice of service offerings. It also notes the importance of mobile services, and makes the case that wireless broadband connectivity should be part of a national broadband infrastructure.

INTRODUCTION

Broadband networks are widely considered to be the foundation of the digital economy. Often described as the infrastructure of the 21st century, broadband connectivity is understood to be central in enabling individuals to engage in an information society, and in contributing to economic productivity. The Broadband Commission for Digital Development goes so far as to say that broadband connectivity is becoming 'the foundation of public services and social progress' in developed and developing nations (Broadband Commission for Digital Development 2010a).

Broadband connectivity offers a great deal of promise, but the actual mechanisms for creating societal benefits by connecting citizens to broadband networks are not well articulated. Progress has been made in establishing regulatory environments and funding policies for developing broadband infrastructure (e.g. in the EU; European Commission 2009; European Commission 2010). Projects like Australia’s National Broadband Network (NBN) (Government of Australia 2009), New Zealand’s Ultra-Fast Broadband Initiative (Ministry of Economic Development 2010), and Singapore’s Next Generation Nationwide Broadband Network (Infocomm Development Authority of Singapore 2010a) are all underway, and will result in nationwide infrastructures that connect citizens to next generation broadband networks.

Proponents of broadband networks as an enabler of economic and social benefits cite a variety of services that such networks will support. For instance, in the glossy brochure accompanying the launch of Australia’s NBN, Australians are promised 'real time, high-definition video conferencing', 'opportunities for remote patient monitoring', 'better access to online curriculum content', and 'use of interactive content and enhance[d] remote learning opportunities' (Government of Australia 2009).

These themes of improved connectivity, enabling e-health and e-learning opportunities (among others) are echoed throughout the international discourse on the benefits of broadband (Broadband Commission for Digital Development 2010b; Department for Culture Media and Sport and Department for Business Innovation and Skills 2009; Ezell et al. 2009; Federal Communications
But broadband networks are just conduits. The next generation network infrastructure being built in various countries is exactly that, infrastructure. To create value for users and realise the promises of network promoters, fibre optical or wireless ‘pipes’ must be connected to users’ devices, and services must be available for delivery over the network. While this observation is obvious to many, there are many complexities inherent in developing broadband services (applications/content) to be delivered over a national infrastructure to a variety of access devices. These points are explored below, with a focus on services used by individual citizens, not by businesses.¹

**BROADBAND USERS AND ACCESS DEVICES**

The Australian Bureau of Statistics (2009) (ABS) reported that 62 per cent of Australian households had a broadband connection, and the Digital Futures project (Ewing and Thomas 2010) estimated broadband uptake at 75 per cent in 2009. As such, somewhere between a quarter and a third of Australian households do not currently subscribe to a broadband service. The ABS also noted that 22 per cent of Australian households did not have access to a computer in 2009. Until quite recently, it was difficult to access broadband services without a computer, but the nature of computers is changing, resulting in a broader range of connectivity options. Additionally, some broadband services (e.g. videoconferencing) can be accessed without a computer. Not having a computer no longer excludes a household from accessing broadband services, provided that the services are designed for delivery to other devices that might be available to household members, or that potential users access a broadband connection at another location (e.g. workplace, public library). Indeed, with more than a fifth of the population not having a home computer, alternative means for providing citizens with access to broadband services are essential.

There are four broad categories of devices that can be used to access broadband applications and services. An increasingly popular means of accessing broadband services is by use of a smartphone, and more recently, a tablet computer (e.g. Apple’s iPad). Portable computers and desktop computers are still the most common access devices, and are considered in separate categories. A less common option, one that does not provide Internet access but does allow access to some broadband services is the combination of an Internet protocol (IP) gateway (e.g. a set-top box) and a consumer device (e.g. television or computer monitor, telephone). Each of these is discussed below.

**SMARTPHONES/TABLETS**

Smartphones are mobile phones with embedded computing power. To access broadband services, the important functionality in a smartphone is the data connection (enabling network access), not the mobile phone. For this reason, devices like Apple’s iPod Touch (a handheld mobile computing device without a phone) can be included in this category. Smartphones and tablets (a new form factor popularised by the Apple iPad, offering mobile data access and services on a larger device than a smartphone) use different operating systems than computers, typically running applications (‘apps’) rather than the standalone software programs that are installed on computers. There are differences in the functionality of smartphones and tablets. For instance, screen size is an important differentiator – tablets are better suited to watching video, web browsing and...
reading/editing documents. Both use wireless connections (Wi-Fi or 3G) to access content and services. These devices are popular because they are small, highly mobile and support multiple activities (including entertainment, communication, and information seeking).

More than 20 per cent of mobile phones in the US are smartphones (Comscore 2010). Gartner (2010) forecasts that 268 million smartphones will be sold globally in 2010, rising to more than 875 million in 2014. Once a luxury item, smartphones are becoming more affordable. As individuals replace their current mobile phones, they will be encouraged to switch to smartphones (which provide greater revenues to mobile carriers), and in a few years it is expected that the majority of mobile phones will be smartphones. While many smartphones are currently used primarily for text and voice connectivity, they do provide users with the capacity to access broadband services and to run applications, activities that are expected to grow in popularity over time.

The iPad tablet has been criticised for limited functionality (e.g. no USB port for file transfers, no camera or support for videoconferencing, unable to run Flash video or multiple applications at once) yet Apple sold more than 3 million iPads in the first three months of sales (Apple 2010). iPad sales are insignificant in comparison to smartphone sales, but the iPad marks the arrival of the tablet as a viable consumer device. A variety of tablets running competing operating systems are now coming to market, and they will likely offer much of the functionality missing from the first generation iPad. It is estimated that by 2015, 23 per cent of personal computers sold in the US will be tablets (Epps 2010).

In the context of providing broadband services, smartphones and tablets are important because they are relatively cheap access devices that have broad market appeal. With touch screen interfaces and ‘point and tap’ applications, these devices can be less intimidating for new users than traditional PCs, and may help encourage those who are currently not accessing any broadband services to get connected. Fibre to the premises (FTTP) networks do not provide direct broadband connectivity to these devices, although users can create wireless networks within their homes to provide access. At present there are no wholesale wireless networks that service providers can use to connect to tablet and smartphone users (but the devices have the advantage of being able to connect to 3G mobile broadband networks when Wi-Fi is unavailable). Additionally, most services that currently work on portable or desktop computers will need to be repurposed or modified for delivery to these new mobile devices. Although smartphones and tablets are becoming increasingly popular, it may not be easy to deliver broadband services to them.

**PORTABLE COMPUTERS**

This category includes laptop, notebook and netbook computers. By 2015, laptops (also called notebooks – fully featured portable computers, with similar functionality to desktop computers) are expected to make up 42 per cent of personal computer sales in the US. Netbooks (smaller and lighter computers, with less power and functionality than desktops or laptops) are forecast to be the choice of 17 per cent of American computer purchasers in 2015 (Epps 2010). Collectively, these devices offer more functionality than tablets and smartphones (e.g. improved capacity for creating content, ability to run traditional software programs, more flexible file management and improved document editing), but do not have the same user-friendly interface nor do they run apps. They can connect wirelessly to broadband networks using 3G or Wi-Fi, and can also
connect through a wired home network to the fibre-to-the-premise FTTP networks being built as part of national next generation broadband projects.

Portable and tablet computers may converge over time, resulting in affordable portable devices that provide more options for managing files and creating content, while also offering touch screen interfaces and supporting apps as well as traditional software programs. In their current form, portable computers will be used from multiple locations, using connections that may or may not make use of FTTP to access broadband services through traditional software interfaces (e.g. web browsers, email clients, file sharing services, commercial music and video providers).

**DESKTOP COMPUTERS**

Desktop computers, designed for use in fixed locations, are expected to account for just 18 per cent of new computer purchases in the US by 2015. Even in 2015 however, desktop computers are still expected to be more common than tablets, laptops or netbooks (Torrens 2010). Desktop computers are likely to be used in individuals’ homes, where they can take full advantage of wired connectivity.

The sorts of broadband services envisaged to provide social and economic benefits to citizens can be delivered easily to desktop PCs, but some functionality may be lost because the PCs are connected in a fixed location. For households with a single PC shared among users, a decision must be made as to where the computer should be physically located to provide optimal access for a variety of services. Some services might be best suited to a private location, while others might be more useful in an easily accessible common space.

**FIXED LINE ACCESS WITHOUT A COMPUTER**

In many countries, Internet adoption rates appear to be plateauing at about 75 – 80 per cent of the population (with broadband adoption rates somewhat lower). There are a variety of reasons that people choose not to connect to the Internet, including cost, perceived complexity, and lack of interest (Dailey et al. 2010; Horrigan 2010). Older individuals, and/or those with low incomes or less education are least likely to be Internet users (Australian Bureau of Statistics 2009; Ewing and Thomas 2010), but like the rest of the population, these individuals could benefit from services delivered using broadband networks.

As noted, broadband networks can deliver services without an Internet connection, simply using a managed Internet protocol (IP) network (the NBN Implementation study refers to these as 'direct delivery' or 'standalone' services, McKinsey & Company and KPMG 2010). Networks like Australia's National Broadband Network will bring a fibre optic connection to a household. A service provider can then connect the fibre network to peripherals like a television screen and IP camera for use in videoconferencing, or a voice over IP (VoIP) telephone. The network can also support smart grid services (e.g. to enable monitoring and control of electrical devices), telehealth applications (e.g. transferring medical data between a household and a healthcare provider) and many others. This sort of functionality is not yet common in households, but applications like videoconferencing and VoIP telephony are widely used in the public sector (see Alberta SuperNet 2006, for a description of how an IP network enables broadband service provision throughout the Canadian province of Alberta).

Even without a computer, households can access some of the benefits offered by broadband networks. IP-based managed services are different than the software or app-based services access-
uble on computers though, and require separate development. Managed services can be offered to anyone connected to a FTTP network, and have the potential to be especially valuable in those households that do not have a personal computer connected to the Internet. With more than 99 per cent of metropolitan Australian households having at least one television set (Screen Australia 2009), there is potential to provide some broadband services to almost all Australians using their television set as an access device. Of course, the television set can also be connected to a broadband network as a television, enabling interactivity and content on demand in addition to traditional television programming.

**USER BEHAVIOURS**

Many Australians are already using multiple devices to access broadband services, and for those who are not yet connected there are now simple options available. Smartphones and tablets have uncomplicated user interfaces, and built-in connectivity (when 3G access is enabled), making them easier for most to use than personal computers. The option of delivering services over managed IP networks to familiar devices like telephones and TVs also reduces the complexity of using a broadband network. Services are not free, meaning that cost may still be an access barrier, and those who are not currently Internet users may not be aware of the potential benefits of broadband connectivity. Given the range of devices and connectivity options now available however, broadband access of some sort should be available to everyone who wants it, creating the possibility that widespread social and economic benefit can be realised from investment in a national broadband infrastructure.

That said, to date broadband networks are primarily used for communication and entertainment purposes, with services delivered over the Internet (see Ewing and Thomas 2010, for data on Internet use in Australia). Individuals do use broadband to access government and health information, and for educational purposes (e.g. online research), but extensive e-health, e-learning and e-government services that promise notable social and economic benefits are not yet well-established or widely available in broadband economies around the world. As part of the development of the Singaporean Next Generation Nationwide Broadband Network, a program has been created to support the development of innovative services that make effective use of higher bandwidth connectivity (Infocomm Development Authority of Singapore 2009) and a demonstration site (the iExperience Centre) is now showcasing next generation services. The NBN Implementation study recognises the potential for advanced services delivery over the NBN, but such services are not yet common (McKinsey & Company and KPMG 2010).

**APPLICATIONS AND SERVICES**

National broadband infrastructures that offer wholesale network access enable a wide range of service providers to use these networks to connect to citizens. The focus here is on services available to individuals (as opposed to enterprise services), but detailed consideration of how service providers actually connect to national broadband infrastructure is beyond the scope of this paper. The discussion here assumes that service providers can negotiate access to the network, and that they have the freedom to develop and deliver innovative services that will meet the needs of their users. Service providers are often referred to as ‘retail service providers,’ a term that encompasses Internet service providers (ISPs) as well as other entities that sell services. The focus
here is not on Internet service provision (an essential part of a national broadband infrastructure), but on the organisations and individuals that will provide services (entertainment, education, health, communication, e-government etc.) used on the network.

Services are essential in enabling users to benefit from broadband access, but there is enormous complexity inherent in developing services that are accessible to users on the device(s) that they prefer. As the previous section notes, many users have adopted multiple devices, but others may use only one. Service providers are faced with decisions as to how to offer their services, and may need to develop expertise across a variety of access platforms. The discussion distinguishes 'over-the-top' services from 'managed' services, notes the challenges in developing mobile applications, and discusses the need for hardware to enable delivery of some services.

**OVER-THE-TOP SERVICES**

At present, the majority of broadband users rely exclusively on over-the-top (OTT) services. This terminology is used to describe services that are delivered over the Internet, on a 'best effort' basis. In contrast, managed services require enhanced quality and/or security, and are delivered on managed IP networks, for instance with quality of service (QoS) protocols enabled (see McKinsey & Company and KPMG 2010, on this point). Managed services can operate on a standalone basis, meaning that an individual does not need an Internet connection for access.

The simplest OTT services are offered through a web browser. To access a service, a user simply enters the URL in a browser, and then engages with the website. Web-based services are effective for searching, information dissemination, file sharing, accessing audio or video content, and transactions (online banking, bill payment), and are familiar to most users accessing the Internet using a PC. Websites are relatively easy to design and maintain, and will continue to be a key element for service delivery in the foreseeable future.

Services can also be provided over the Internet using software installed on users' computers. For instance, programs like Skype or Google Voice allow people to talk 'on the phone' to each other, messenger programs enable instant chatting, and entertainment platforms like iTunes provide access to music, movies, television and books. Online games like World of Warcraft allow individuals to interact with each other, and virtual worlds like Second Life can be used for entertainment but also for e-learning or to provide e-health services (e.g. support groups). Developing software to support a service is more complex than developing a website, but allows for a much richer interface and user experience. Programs like these could be adapted or extended to offer a broader range of services.

OTT services work well for those accessing the Internet using a personal computer. It is possible to access websites with a smartphone, but the experience is often sub-optimal (many phones do not support scrolling effectively, it can be difficult to click on embedded links, and the screen size limits the amount of text that can be displayed). The experience is somewhat improved on tablet devices, but mobile phones and tablets often don’t have the necessary software to handle downloaded files, or to display online content (e.g. video). Some users find that it is difficult to enter data onto a website using a mobile device, and the cost of accessing services using a mobile device (smartphone or tablet) can be prohibitive.
MOBILE APPS

Apple’s iPhone had a big impact on the smartphone market, popularising the concept of apps, and improving mobile web browsing. Apps are self-contained applications for mobile devices. Designed specifically for a particular mobile operating system, apps provide access to an enormous range of services and content. Apps are designed to take advantage of the specific functionality present in a particular smartphone. Apps can make use of GPS/location data to provide location specific services, can synchronise information between computers and mobile devices, and can be customised more easily than websites (e.g. allowing users to choose the types of news stories they want to highlight in a newspaper app). A wide range of businesses, public sector agencies (e.g. transit authorities, local governments) and individuals have created apps delivering value to mobile device users. Many apps are available free of charge, and those that are for sale often cost just a few dollars.

At present, five operating systems dominate the smartphone market. Nokia’s Symbian is the global market leader (~40 per cent market share), RIM’s BlackBerry OS and Google’s Android are competing for second place (~17 – 18 per cent each), followed by Apple’s iOS (~15 per cent) and Microsoft’s Windows Mobile (<7 per cent) (Gartner 2010; IDC 2010). In Australia in Q1 2010 Symbian had 45 per cent market share, followed by Apple iOS with 40 per cent, BlackBerry with 9 per cent and Android with 2 per cent (Colley 2010). This market is very dynamic, and it is possible that some of these operating systems may disappear over the next few years if/as the market consolidates. From the perspective of delivering next generation broadband services, recognising multiple operating systems (OS) is important, because the OS are incompatible. An application developed for use on Apple’s iOS will work on an iPhone, iPod Touch or iPad, but not on a Nokia or BlackBerry device.

The operating systems used for smartphones also power tablet computers. Some smartphone applications will run on tablets using the same OS, but others need to be modified to fit the tablet form factor, meaning additional development may be needed to provide services to both devices. At the time of writing, Apple’s App Store offered about 250,000 apps, compared to about 100,000 for Google’s Android platform. Microsoft, Symbian and RIM do not have well-developed apps markets, but arguably what is important is that each platform has a sufficient number of effective, useful applications to meet user needs.

Apps take advantage of the touch interface found on many smartphones, making them very easy to use. For someone who is unfamiliar with a computer interface, it is much easier to access web content (e.g. online newspaper, social networking sites, online video) through an app than a web browser. Rather than using a mouse to launch a web browser and then navigating to the appropriate site, a user simply touches the app (easily identifiable with an icon) and the content appears on the screen.

Apps change the dynamics of Internet access, moving away from a browser-based routine to provide users with a richer experience. With five operating systems to develop for, and five app stores to negotiate with to make an app available, the complexity of service provision is increased. Additionally, as will be discussed below, broadband content (app- or browser-based) delivered to a mobile device may be transmitted over a mobile operator’s network, not a national broadband infrastructure. This changes the economics of the transaction.
MANAGED SERVICES

Managed services operate independently of the Internet. Services delivered directly to end users via a managed IP network require a different set of competencies in a service provider than over-the-top Internet services. Managed services require direct contact with the user to enable the service (e.g. physically connecting hardware to the FTTP network in an individual's home). Managed services cannot be delivered over commercial mobile broadband networks (at least not without negotiation with the network operator).

There is great scope for the development of managed services to support health and learning (and managed services are also used to provide entertainment content, e.g. IPTV). Applications like videoconferencing work much better when quality of service protocols are in place, and a direct network connection can also be used for telepresence (an enhanced form of videoconferencing), running software, sharing large files (e.g. educational videos or medical images), and monitoring applications. Hardware can be integrated to provide diagnostic capabilities (e.g. blood pressure or blood sugar device monitoring). Because managed services do not require an Internet connection they can be delivered to people without computers, extending the reach of services to a population that could not previously benefit from broadband connectivity. With the appropriate user interface, managed services can be easy to use (e.g. controlled through a television, or through a dedicated device with a simple operating controls, perhaps analogous to a household appliance). There will likely be a sizeable group of users whose only broadband services are delivered through a managed IP network, but many others will combine managed services with OTT Internet services accessed on fixed or mobile devices.

IMPLICATIONS FOR SERVICE PROVIDERS

FTTP networks work well to deliver services over the Internet, and through managed networks. The rise of mobile services adds a level of complexity. Citizens are not likely to be too aware of the differences between their mobile broadband provider and the ISP from whom they get access to a FTTP network. Mobile broadband users will understand that there is a different pricing structure for mobile services, but could reasonably assume that most services will be available on whatever platform they choose to use.

The discussion above indicates that services must be built in different ways for use on different devices. It is quite possible that a single provider could be expected to offer a service through a software or web interface (OTT), as well as making it available for mobile browser, and for all five different mobile operating systems. This increases the cost of service development, and may stretch the resources of the service provider. The proliferation of service delivery platforms may also require that organisations change their service delivery processes and policies, a point that is noted by McKinsey & Company and KPMG (2010) when discussing the challenges of implementing e-government services on Australia’s NBN.

BROADBAND NETWORKS

Many national broadband networks are designed as 'open access' networks, meaning that multiple service providers can offer services to a household using a single broadband connection to the home. While these networks may or may not be owned by national governments, they are built in part with government funds, and are managed in a way to provide public benefit. Service
providers negotiate network access with the wholesale operator (NBN Co in Australia), and then make direct arrangements with the household to provide specific services. For instance, a household might choose to purchase Internet access from one company and television service from another, as well as selecting several government services offered through a combination of OTT and managed access. Open access fosters competition among service providers, encourages innovation and allows citizens choice in their service providers. Additionally, the open access/wholesale model is designed to ensure affordability of network access (for service providers and end users), as the connection to the home is not controlled by a monopolist operator.

In Australia, it is anticipated that 93 per cent of premises can be connected to the National Broadband Network using fibre (FTTP). For premises that choose to connect, the fibre will enter the home at a single point, and can be connected to an existing in-home wired network, or to a wireless router to create an in-home wireless network. Laptops and desktops can be connected to wired or wireless (Wi-Fi) in-home networks, and mobile devices can use the wireless network.

It is important to differentiate between wireless connectivity that is provided through a national broadband network and that which is provided by mobile operators (e.g. 3G networks providing data access for smart phones, or USB/dongle mobile broadband connections for laptops). Mobile providers operate their networks on a commercial basis, and are not subject to open access regulation. Users have a choice of mobile providers, but there is no guarantee that a service provider that doesn't own a network (e.g. government agency) can ensure affordability of its services when accessed through a commercial mobile network. The Singaporean national broadband network does include a wireless service as part of its national infrastructure (Infocomm Development Authority of Singapore 2010b). Elsewhere however, next generation broadband developments are currently focused on providing FTTP connectivity (offering wireless or satellite connectivity only where it is uneconomical to lay fibre).

Mobile Internet access devices are proliferating – it is not uncommon for technologically savvy consumers to have a smartphone, tablet and laptop computer, frequently coupled with a mobile broadband subscription. In Australia, as of December 2009, 35 per cent of broadband subscriptions were for wireless services (Australian Bureau of Statistics 2010), and Ewing and Thomas (2010) report that 35 per cent of Australians have accessed the Internet using a mobile device. There will be some overlap among mobile broadband subscribers and those who use mobile phones to access the Internet, but collectively these numbers suggest that mobile access to broadband applications and services is popular among Australians.

Wireless networks (3G or Wi-Fi) are capable of supporting most of the applications and services on the market today (see Williamson 2010 for a detailed discussion of the value of wireless networks). Although priced at a premium, mobile services are convenient and offer value to their users. While it is unlikely that wireless networks alone will be able to support the full range of next generation services envisaged by national broadband plans (Tucker 2010), it is easy to understand why individuals want the flexibility and convenience afforded by mobile services. As more services that provide broader social benefits are developed (e-government, e-health, e-learning etc.), it is perfectly reasonable for citizens to expect these services to be available to them via wired or wireless networks.

Users are looking for seamless engagement with broadband services, and many are unaware of the differences in access arrangements between open access fibre networks and commercial mobile networks. If national governments want to ensure the broadest possible access to, and
take up of, next generation broadband services, delivery only to homes connected to fibre networks will be insufficient. Development of open access wireless infrastructures could facilitate service innovation, but would require significant change in current industry structures. Nevertheless, as recognised by the FCC in the American national broadband plan (Federal Communications Commission 2010), the development of good wireless infrastructure is a policy objective that should be pursued. Ultimately, a combination of FTTP, Wi-Fi and 3G/4G networks should be deployed to meet citizens’ connectivity needs.

**DISCUSSION**

In a promotional document for the NBN (Government of Australia 2009, p. 1) it is noted that 'to get the best out of the new opportunities offered by the Internet, people need to be able to upload and download information.' This paper demonstrates that this is a rather narrow view of next generation broadband infrastructure. Downloading is certainly a valid way to disseminate information, but it is one of many. Although the Internet will be central to many broadband services, Internet connectivity is not an essential component for service delivery. Initial visions of service delivery via the NBN seem to centre on individuals accessing the NBN on their home computers, but there are many other possibilities.

Different users will have different needs. Demographics and geography influence demand for services and choice of access device(s). Service providers can reach new users (bridging the digital divide to reach those who are uncomfortable with computers) by offering services on mobile devices or direct to appliances in the home. Many users are familiar with multiple means of accessing broadband networks, and expect services to be available on the platforms of their choice. Given the diversity of platforms however, it may not be economical to serve them all. Service providers must make difficult strategic decisions about how to best deliver value to end users, in a context of rapid technological change. This paper has outlined components involved in such decision making.

Broadband networks have great potential for delivering innovative services to provide social and economic benefit. To make this happen, service providers must carefully assess the needs and expectations of users, and develop affordable, accessible services that provide value to users on devices that they choose, wherever they want to be. In particular, delivering services to wireless devices, allowing users mobility and the added functionality of location-based services, is essential to realising tangible benefits in the long term.

**CLOSING COMMENTS**

This paper offers insight into the complexities of developing next generation broadband services in ways that will create social and economic benefits for users. It highlights the need for service developers to understand their potential customers, and to think carefully about which platforms are best suited for service delivery. It demonstrates the relationships among users, devices, services and networks, illustrating why an understanding of these interconnections is important for developing services that will meet the needs of a diverse population of users.

This discussion focused on Australia’s National Broadband Network, but the elements of service development and delivery described here are common to other national broadband infrastructure projects. The nature of access devices, methods of service delivery, types of services and
user preferences will change over time, but the complexity of the multi-device, multi-service, multi-user environment will remain. It is likely that demand for wireless broadband will continue to grow, creating pressure to incorporate wireless networking into national broadband infrastructures. Policy makers and service providers are advised to keep close watch on, and to respond to changes in user behaviours, access technologies and network usage patterns when creating an environment in which broadband services can bring real benefits to citizens.

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ENDNOTES

1 Although this paper does not address business-to-business applications, their importance should not be overlooked when assessing the value of national broadband infrastructure. It also does not consider narrowband applications like telemetry that will be an essential part of a national information infrastructure.

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On 12 July 1906, representatives of Marconi’s Wireless Telegraph Company staged a demonstration of the new medium of wireless telegraphy across Bass Strait, between Point Lonsdale in Victoria and Devonport in Tasmania. A special train was organised from Melbourne for the Governor-General, the Prime Minister, most of the cabinet and members of the young Australian Parliament, who deferred debate that day on important industrial legislation. The event and its aftermath provided a striking illustration of the relationship between politics and communications. Political enthusiasm for the idea of new communications technology ran well ahead of the capacity to make lasting decisions about how it should be deployed.

A little over a hundred years ago, the Australian Parliament took a train from Melbourne to Queenscliff. They were there to see some magic.

It was 1906, a decade after a 22-year-old Italian had been granted a patent for ‘wireless telegraphy’. (Baker 1970, 28) Experimenting at his family’s home in Bologna, Guglielmo Marconi had worked out how to transmit Morse Code signals across short distances without wires. People had been doing this with wires for half a century. Much of the world was traversed by overhead, underground and submarine telegraph cables. But doing it without wires was magic.

When Marconi claimed to have transmitted a signal across the Atlantic in December 1901, many refused to believe him. They thought nature may have played tricks with his equipment, or bravado with the interpretation of his results. Although ‘Mr Marconi has gradually accustomed us to the wonders of wireless telegraphy’, wrote The Times, the achievement was still ‘in some degree a shock to all preconceived notions’.¹ But the man who a few years later shared the Nobel Prize in Physics with the German wireless innovator Karl Ferdinand Braun was not deceived.² He had done it first, then tried to work out how. Human understanding of the transmission of electromagnetic energy over long distances had some catching up to do.

By 1906, when the Commonwealth Parliament took a train down the Bellarine Peninsula, the Italian was a global celebrity. Though his London-based company had still not turned a profit, it had a global network of subsidiaries and affiliates and some prestigious customers – the Royal Navy, Lloyd’s and Cunard. Marconi was not going to be in Queenscliff himself, but if his system of wireless magic was coming to town, everyone wanted to be there. In his place came a representative, Captain Louis Walker, and two technical assistants. Signing himself ‘Agent in Australasia for Marconi’s Wireless Telegraph Company Limited’, Walker spent a year and a half in Australia and New Zealand trying to sell three things: the idea of wireless, the Marconi wireless system, and shares in Marconi’s Wireless Telegraph Company. He was to be paid a 5% commission on any business contracted.³ The immediate priorities were the international passenger steamers and point-to-point communication between the Australian mainland, New Zealand and Tasmania.⁴ Walker had very little success.

The timing seemed good. Walker arrived in Australia soon after the first Wireless Telegraphy Act was passed by the Commonwealth Parliament in 1905. The Canadian Parliament also passed a Wireless Telegraphy Act that year, as had New Zealand in 1903 and Britain in 1904. (Baker...
1970, 110; Wilson 1994, 92) Under pressure from the Colonial Office, the governments of the empire responded in unison to the new technology. They asserted public control of the airwaves, but left open the possibility of licensed use of them by private operators.

The Australian Parliament’s legislation was the second major use of its constitutional power over ‘postal, telegraphic, telephonic and other like services’. (see LaNauze 2001) The first, the Post and Telegraph Act 1901, consolidated the separate state post, telegraph and telephone administrations into a single national monopoly responsible to the Postmaster-General. Some had argued a monopoly would ensure the new organisation did not resist new technologies that threatened existing investments. This might have occurred if the telephone had not been controlled by the same colonial agencies that ran the telegraphs. (Moyal 1984, 88–90) The Wireless Telegraphy Act appended Marconi’s medium to this Commonwealth colossus. A state monopoly of the ether was argued to be ‘purely a formal measure’, although there was some confusion about whether or not the Commonwealth was also taking over privately-held wireless patents. Attorney-General Isaacs explained this was not the case. The intention was ‘not to appropriate the invention, but to control it’.

A demonstration of wireless communication across Bass Strait seemed a politically savvy pitch to the politicians of the young Australian federation. The distance, around 200 miles, was comfortably within the capacity of Marconi’s technology by then. Just fifteen months after the Australian demonstration, in October 1907, the company would open a commercial wireless telegraph service across the Atlantic, using stations in Clifden, Ireland and Glace Bay, Canada. (Baker 1970, 123–128) But it was far from the first telegraphic communication across Bass Strait. Tasmania was first connected to the mainland by submarine cable in 1859, although the cable failed and a permanent link was not re-established until a decade later. (Adams 1992, 3–4; Atkinson 2001) Nor was it the first wireless demonstration in the area. A Post Office engineer established a station near the Black Lighthouse at Fort Queenscliff in 1901, exchanging messages with a ship escorting the Royal Yacht as it arrived in Port Phillip Bay, bringing the Duke and Duchess of Cornwall and York to open the first Australian Parliament. (site visit 5 Jan 2006)

Permission for a demonstration across Bass Strait between Point Lonsdale in Victoria and Devonport in Tasmania was granted, and Walker’s two technical assistants established communication over the route in May 1906. (Walker and one of his engineers on the trip, H.M. Dowsett, later published many editions of a wireless manual.) 12 July was supposed to be a sitting day for the House of Representatives, which met in Melbourne at the time. But three-quarters of the members and all but two of the Cabinet told Prime Minister Alfred Deakin they were accepting Captain Walker’s invitation to attend the demonstration. So much for the new Australian parliamentary democracy. Politicians prefer a new communications infrastructure project any day.

The House adjourned for most of the day, though not without dissent. The federal member for Corangamite, the electorate adjoining Corio where the demonstration was held, complained the invitation was ‘merely to attend a picnic’. There had already been ‘a great many picnics’ in the five-year life of the national Parliament, he said. And this one was ‘a picnic to support a monopoly’—the Marconi system, which the company was trying to make the sole world wireless standard. ‘Worse than that,’ he said, ‘it is a foreign monopoly.’
What the member for Corangamite thought particularly offensive was that, to make way for the Marconi picnic, the Parliament had to adjourn debate on the Australian Industries Preservation Bill. This ‘Anti-Combine Bill’ was based on the United States Sherman anti-trust legislation passed in 1890, which outlawed restrictive trade practices. It was a decisive shift away from the English Common Law, which supported freedom of contract, even where the consequences of particular contracts were trade restrictive. Though eventually passed by the Australian Parliament, the legislation was interpreted so narrowly by the High Court in a case a few years later that Australia was left without effective trade practices law until the 1970s. (Walker 1967, 24–36)

So debate on the Australian Industries Preservation Bill was set aside and a specially-organised train took the politicians from Melbourne to Queenscliff station. The Governor-General, the Prime Minister, the Governor of Victoria and the sender of Australia’s first telegraph message between Melbourne and Williamstown 52 years before were the stars of a large and luminous cast. They were greeted by 200 schoolchildren who sang the national anthem, a small price to pay for the half-day holiday they were granted.

Cobb and Co coaches took the party past the flags, strung between the Post Office and the Grand Hotel, to The Springs, just before Point Lonsdale. There, The Age thought there was ‘little for the eye to see—nothing of ostentatious display’, just two masts 162 feet high. Wires strung across the 70 yards between them provided the aerial, which was connected by cable to equipment housed in three buildings.

The 200–300 guests were treated to a luncheon and speeches. Prime Minister Deakin joked that, since the Anti-Combine Bill had not yet passed, he had entered a conspiracy with the Victorian Attorney-General to replace the toast to the Parliament with one to the success of Marconi’s Wireless Telegraph Company. If Tennyson had not been able to foresee the scientific development the crowd had assembled to witness, the Australian poet Brunton Stephens ‘had gone very near to it’, when he spoke of Australia as ‘she whose ear thrills to the finer atmosphere’. Wireless telegraphy ‘seemed likely to transform future economic, political and warlike proceedings all over the globe’.

Contemplating future uses of the technology, the Victorian Attorney-General favoured what he called pocket Marconi installations. These devices, he imagined, could be used to transmit photographs to the wives of politicians, letting them know where their husbands were. Prime Minister Deakin thought federal members would have nothing to fear from such mobile applications, though he was less confident about the members of the Victorian Parliament. Governor-General Northcote worried that wireless may make it harder for him to travel beyond the control of the Prime Minister.

As the cigars arrived, the exchange of official messages between the Point Lonsdale and Devonport stations began. Deakin sent a message to the People of Tasmania: ‘Australia tirelessly pursuing her great distances by rail and wire, to-day enlists the waves of the ether in perfecting the union between her people in Tasmania and upon the mainland.’ Senator Keating also emphasised the federal theme: ‘We narrow the straits as we call across them.’ Postmaster-General Chapman – the Stephen Conroy of the day – sent a message on behalf of the mainland press to the press of Tasmania: ‘No limits can be set to the beneficent influence of journalism now that the atmosphere has, at the bidding of genius, become its servant.’ (Marconi’s 1906) Chapman had visited wireless stations overseas, including in Italy. He thought people who asked ‘Will this pay?’ needed ‘to look at the matter from something more than the commercial aspect’. 
The Tasmanian Governor did not miss his moment, reciprocating the mainland’s greetings on behalf of the ‘small and beautiful sister, by whom Victoria was founded’. He hoped the wireless experiment ‘may accelerate the date at which this state’s contribution towards cable subsidies can be diminished’. (Marconi’s 1906) The Blame Game would be over soon. Across Bass Strait in Devonport, things were less rosy. There was a crowd of 2000, but it did not include ministers in the Tasmanian Government. They were stuck in the Parliament in Hobart facing a no confidence motion. It took forty minutes to get a reply from the Governor of Tasmania there, because of a bit of a backhaul problem. The wireless messages in Devonport had to be written down and sent by bicycle and ferry to the nearby Post Office, where they were relayed by cable to Hobart.

The Tasmanian proposer of the toast to the Federal and State Parliaments didn’t miss his moment either, using it to complain about the impact of federation. Defences had not improved; there had been no consolidation of State debts; and the nation had implemented a tariff that pleased nobody. This Tasmanian was particularly fed up with minority federal governments: he ‘did not want wobblers at the present juncture’. The Master Warden of the Mersey Marine Board proposed ‘Prosperity to Devonport’.

A sheaf of correspondence was sent to Captain Walker by men looking for jobs with Marconi’s new medium. Many already had experience in telegraphy at the Post Office or the submarine cable companies in Australia and overseas. Some had worked in the very new art of wireless telegraphy, as ship’s wireless operators or with the Royal Navy. An electricity lecturer from the Launceston Technical School wanted to be Marconi’s agent. He had ‘from the first taken a keen interest in the development of wireless Telegraphy as far as it has been possible on this side of the globe’, but stressed he had no interest in the German Telefunken system, Marconi’s main global rival, whose equipment he had borrowed for a demonstration. Another, from St James, on the railway line between Benalla and Yarrawonga, wanted to call in and ‘see how the latest wonder works’. St James was just a small country town, but it was, he said, the home of Jas Carruthers, the Inventor of ‘Carruthers Electrical Clock’. This was ‘a great thing nearly as great as Marconi’s invention, but they won’t put it on the market I don’t know why’. A strict teetotaller from the Victorian Railways Audit Office, with nearly four years experience as a warder in the Yarra Bend Asylum, said he was ‘quick at picking up anything in electricity or machinery’.

Captain Walker helped to sell the idea of wireless, but failed to sell either the Marconi system or shares in Marconi’s companies. The Government agreed to place £10,000 on the estimates for a chain of coastal wireless stations, although it had no clear plan for how to spend it. (Curnow 1963, 54) Poulsen’s arc wireless system was attracting a lot of publicity as a rival to Marconi’s spark system—‘These people are all full of this man’s invention and talk of nothing else’, an exasperated Walker told his boss in London—and the Australian Government insisted there must be an open tender for any wireless stations it decided to establish. The idea of conceding the whole field of wireless to Marconi forever, or even for the duration of his patents, was troubling to governments and commercial rivals alike. As to the chances of selling Marconi shares in Australia, Walker said ‘although there are a large number of rich men, they would prefer to invest their money in things they understand, and they would regard this as rather too speculative’.

Six months after his demonstration, it was clear that Australian communications policy had hit a roadblock. No decisions would be made about wireless in Australasia before the Colonial
Conference in London the following year. It might be useful for Walker to be there himself when the Australasian leaders he had lobbied arrived. He booked a passage home and, with his technical team, arranged for the storage of the demonstration equipment. Four years later, Marconi’s new Australasian representative had to break in through the window to collect it.24

Walker told the Secretary to the Postmaster-General’s Department he feared Australia’s delays would ‘not be considered by the Public here or the outside world as in keeping with the splendid progressive traditions of the Australian Colonies’.25 He was frank about the failure of his trip, but he felt the year-and-a-half was not completely wasted. New Zealand Prime Minister Sir Joseph Ward, he said, gave him a verbal promise of a five years’ contract with his government. Australian Prime Minister Deakin had told him ‘most emphatically that we had distinctly the prior claim for consideration from the Government, and that I might depend upon it that this would be borne in mind by the Government when they came to determining the matter’. At the very least, he said ‘if I have failed to obtain a contract by my presence and work here, I have certainly made it very difficult for anybody else to, and have succeeded in keeping others away’.26

Australia eventually got a national wireless network – an NWN – but not for another five years, once a Labor Government, led by a Queenslander – Andrew Fisher – was in office. The NWN was established by the government, not the private sector. The first wireless station was in Melbourne. It did not use Marconi’s technology. (Amos 1936) The Italian magician responded in Australia as he did around the world,27 by commencing legal action against the Commonwealth alleging infringement of his patents. Marconi’s got a court order allowing it to enter the government stations to inspect the technology, but before the case could be decided, the government changed.28 Joseph Cook’s incoming Liberal administration made a large payment to Marconi’s and the matter was settled. Then the government changed again. The Queenslander was back in charge, though not for long. Brought down from within his own party, Fisher resigned and headed off to an overseas post. (Day 2008, 347-52)

I could tell a long story about Australian telecommunications, but it may sound like a short story told many times.

NOTE

This is an expanded version of a talk given at the 75th anniversary dinner of the Telecommunications Journal of Australia in Melbourne on 2 August 2010. It draws on material held in The Marconi Archive at the Bodleian Library, University of Oxford and in the Mitchell Library in Sydney.

A cairn beside the sports field near Point Lonsdale now marks the spot where the Parliament went for the wireless demonstration. One of the original Morse Code transmissions across Bass Strait was re-enacted at a centenary celebration in 2006 attended by the Governor of Victoria, local politicians, residents and schoolchildren.

ENDNOTES

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Broadband was one of the few issues that deeply divided the major parties in the August 2010 federal election. Labor and the Coalition disagreed about how big the problem was, what was needed to fix it, and how much should be spent. Strikingly, their positions cleaved down an old fault-line. Labor planned much more wire; the Coalition emphasised a bigger role for wireless. This article examines the background to this conflict and the arguments presented in support of the Labor Government’s heavy investment in fixed line infrastructure. It then indulges in a ‘thought experiment’ to argue the opposite case — that mobile access networks will dominate in the future so as to undermine the rationale for subsidising (not for building without subsidy if commercial investors choose to do so) some or all of the FTTP NBN. It concludes that a Government planning the biggest intervention in Australian infrastructure history might find itself with rather more competition from wireless access networks and rather less interdependence and symbiosis between wire and wireless than it hopes.

WIRE, WIRELESS AND COMPETITION

Conquering the ‘tyranny of distance’ may be an old and enduring theme in Australian history, but it is rare for communications or transport policy to decide federal elections. In 2010, broadband became one of the few issues where there was a deep divide between the parties. Labor and the Coalition disagreed about how big the problem was, what was needed to fix it, and how much should be spent. Strikingly, their positions cleaved down an old fault-line. Labor planned much more wire; the Coalition emphasised a bigger role for wireless.

When wireless joined wired communications in the late nineteenth century, some thought it self-evident that the new medium would eventually take over all electronic communications. Why lay wires if you could communicate as effectively, and more cheaply, without them? Wireless was modern, wires were history. But as scientists and engineers learned more about the behaviour of signals transmitted on different radio-frequencies, as industries developed to manufacture transmitters and receivers and to offer services, as users adopted or rejected the new products, costs and revenues changed, and profits and losses accrued, wires and wireless both found homes. Some were relatively stable, reflecting the nature of the service. Maritime and aeronautical communications were wireless because it was the only way to exchange messages with mobile objects. Some seemed stable for a long time, like radio and television (wireless) and the landline telephone (wire). Some were not stable at all.

‘Complementary’ is a misleading way to describe the relationship that evolved between wired and wireless technologies. At some times, for some services, it has been brutally competitive. There were eras of spectacular, rapid shifts in the dominant technology used for individual services. Short-wave wireless had a devastating impact on the international submarine telegraph cable business in the late 1920s and 1930s. Submarine telephone cables returned the favour from the 1950s, effectively ending the international short-wave wireless telephony business. Optical fibre
took over much long-haul carriage from microwave circuits, and international telephone traffic from satellites. Mobile voice telephony overwhelmed landlines, first in the number of subscribers, then in revenues earned.

What made those shifts happen was not cosy complementarity, some kind of inevitable relationship determined by the technologies themselves, but aggressive investment by private and public corporations with particular technical visions of the future.

**THE PARTIES: LABOR**

The Australian Labor Party did not set out to become the party of wire. It set out to do something about Australia’s ‘broadband backwater’ in 2007, something bigger than what the Coalition Government was doing. Ideally, it needed to involve public investment, so as to ease the party’s policy migration away from supporting full public ownership of Telstra, once the final tranche of privatisation made this position untenable. NBN Version 1, which the party took to the 2007 election, was a version of Telstra’s own plan to upgrade part of its fixed line copper network to FTTN. NBN Version 2, announced in April 2009, was a turbo-charged response to the failure of NBN 1. Both plans emphasised fixed line infrastructure although NBN 2 left a large, clear role for fixed wireless and satellite to serve the 10 per cent of premises (now 7 per cent) that would not be reached by fibre.

The rhetorical emphasis was all about fixed line. Interpreting FTTN as only an interim solution, FTTP became a leap-frog straight to what finance minister Lindsay Tanner called ‘the end game’ (Tanner 2009) and telecoms industry analyst Paul Budde ‘the final destination’ (Budde 2009). Prime Minister Kevin Rudd said: ‘Going beyond fibre optic to the node to fibre optic to the premises is the right way to go. It puts us in the slot when it comes to being competitive with the world economy, the 21st century’ (Rudd and Swan 2009). When country independent Tony Windsor declared he would be supporting Labor to form a minority government after the August 2010 election, and broadband was one of the two issues that had made up his mind, it was because ‘You do it once, you do it right and you do it with fibre’. The wireless technologies that will have to be used to deliver broadband to 7 per cent of all premises, and a much larger proportion of non-metropolitan premises (around 20 per cent in Tasmania), were not central to the political pitch.

As voters, Australians seemed to like the idea of the fixed line broadband plan, but as customers, they were increasingly drawn to mobile. The day before the government announced NBN 2, the Australian Bureau of Statistics (ABS) released data showing a fifth of all broadband subscribers at the end of 2008 were mobile subscribers (ABS 2009). The number had grown by a million over the previous year. DSL remained by far the most popular broadband access technology, but the number of subscribers had grown by only 400,000 over the same period. Stephen Bartholomeusz (2009) argued ‘The shift to wireless and wireless broadband has been so abrupt and dramatic, and wireless technologies are developing at such a pace, that the eventual scale of demand for fixed-line broadband is quite uncertain’. Acknowledging the importance of mobile, the biggest stick included in the draft legislation designed to force Telstra to accept structural separation was a provision that would allow the Minister to prevent it bidding for new spectrum for wireless broadband.
By June 2010, nearly 3.5 million of the country’s 9.6 million Internet subscribers – 36 per cent of all subscribers and 39 per cent of broadband subscribers – were mobile wireless subscribers. DSL had fallen to 44 per cent of all subscribers and 48 per cent of broadband subscribers. These figures do not treat as broadband subscribers those people that use powerful ‘smart’ mobile phones like iPhones and Blackberrys to access the Internet either directly or by tethering them to laptops, so they understate the significance already achieved by the mobile Internet. The ABS published data on this for the first time with its June 2010 Internet Activity release. Stressing that ‘the data are considered to be experimental while the ABS refines its collection methodology’ and advising that it be used ‘with caution’, ABS found 6.8 million ‘mobile wireless connections via mobile handset’, nearly twice the 3.5 million ‘mobile connections via datacard, dongle or USB modem’ included in the main collection. (ABS 2010)

THE PARTIES: COALITION

The Coalition responded with a cheaper broadband policy released shortly before the 2010 election. It emphasised a mix of technologies. There would be money for more fibre backhaul and to increase the number of households able to get better broadband via DSL or HFC, by installing extra and more modern DSLAMs in exchanges, by remediating pair gain lines and by redesigning networks in places currently served by ‘remote integrated multiplexers’. There would also be a lot of money for wireless broadband, $2 billion of the $6.3 billion total for the policy. Of this, $1 billion would go to grants for wireless networks in rural and remote areas and $1 billion would go to investment in wireless networks in outer metropolitan areas, required to return 1 – 2 per cent above the long-term bond rate.

Where Labor’s rhetoric emphasised fixed-line, the Coalition emphasised wireless:

Wireless technology is now in a phase of spectacular development globally. There are many more users on wireless networks than on wireline networks internationally, and the numbers are especially large in the most rapidly growing economies of our region. The very large and growing installed base of customers served on wireless networks is one factor behind the enormous commercial potential of wireless. Another is the rapid take up of devices such as the Kindle and the iPad.

NBN is a hugely expensive bet on a particular technology (FTTP), but it is not a bet which should be made with taxpayers’ funds – especially with the surging popularity of wireless broadband. (Coalition 2010)

Explaining the policy, Opposition leader Tony Abbott said:

I mean, all of the people who are using their Blackberrys or their iPhones for Facebook. All of the people who are sitting in cafes and hotel rooms doing their work, they’re all using wireless technology and we shouldn’t assume that the only way of the future is high-speed cable. (Q&A, ABC TV, 16 August 2010)

Minister Stephen Conroy had previously dealt with criticism of the Government’s concentration on fixed-line by arguing it was equally focused on wireless. Addressing the Australian Mobile
Telecommunications Association’s (AMTA) Member Networking Forum in Sydney in March 2010, he began by praising the mobile sector:

At a time when the Global Financial Crisis has cut a swathe through most industries across the globe, it seems the wireless communications sector has hardly missed a beat. Looking to the future, in terms of demand for wireless broadband, it looks like there will be exponential growth for some years to come.

But servicing this demand, he said, ‘won’t just happen’. [emphasis in original]

We need to put in place critical pieces of national infrastructure to deliver those services and this includes both fixed and wireless infrastructure. The importance of fixed services to provide backhaul and handle very high bandwidth services is vital to the delivery and reliability of wireless services. Equally, the massive growth of mobile services will drive greater use of fixed services, particularly if the trend towards centralised processing of data occurs in the Internet cloud. [emphasis in original] In this way, the growth in wireless services does not have to be at the expense of fixed broadband, or vice versa. There is no reason to restrict either – they are major productivity-drivers and critical parts of the national infrastructure.

Then came the crucial language:

At a more technical level, wireless and fixed broadband technologies are complementary. In fact, it is more than this. Wireless and wired communications networks are interdependent and have a symbiotic relationship. [emphasis added] The Government’s massive expansion of the fixed line capacity through the National Broadband Network will dramatically increase development of wireless services. This will particularly benefit mobile broadband, through the provision of additional competitively-priced backhaul. Together, decisions on wired and wireless communications will provide the critical infrastructure that will be a cornerstone of productivity growth for decades to come. (Conroy 2010a)

The Minister announced an aggressive 126 MHz ‘digital dividend’ in June. This is the amount of UHF spectrum that will be freed for alternate uses once all analogue TV broadcasting ends in December 2013. ‘Wireless broadband is an important complement to fixed line services, and the release of this spectrum will enhance and support the services that will be enabled by the Government’s investment in the National Broadband Network,’ said Conroy (2010b). The planned 126 MHz is a little more than the amount freed in the US but considerably more than the minimum 72 MHz being harmonised for mobile broadband use by the European Union. (Hart 2010; ACMA 2010b. Appendix B) It will require ‘restacking’ by some broadcasters, a politically sensitive process that means shifting their transmissions from existing frequencies to different ones. The aggressive digital dividend showed the Government was still serious about wireless broadband, or at least, serious about the revenues that could be received from auctioning spectrum for it.

It may just have been a product of the elevated temperature of an election campaign, but the language seemed to toughen after the Coalition’s ‘Plan for Real Action on Broadband’ was an-
nounced. ‘The Coalition’s focus on wireless,’ said the Minister, ‘defies the advice of industry experts who agree it is a complementary technology to fibre and will not deliver the high speeds and capacity needed for the delivery of healthcare, education and business applications of the future’. (Riley 2010)

**THE CASE FOR FIXED: THE NBN IMPLEMENTATION STUDY**

The NBN Implementation Study conducted by McKinsey and KPMG (2010), published in May 2010, implicitly responded to criticism of the NBN’s emphasis on fixed access and anticipated the political controversy that attracted so much attention during the election campaign.

It acknowledged the current decline of fixed-line markets that had been ‘a ubiquitous part of the communications landscape over the twentieth century … Customers world-wide are leaving their copper-enabled PSTN services in favour of mobile and VoIP services, and DSL take-up is not yet sufficient to maintain fixed-line penetration.’ Australia, where 87 per cent of household still had a fixed line in 2009, lagged the trend in developed North American and European countries, where just 50 – 60 per cent of households still had fixed lines. The Study thought ‘significant declines’ in fixed-line penetration were likely from this high starting point, ‘irrespective of a fibre overbuild’. But it also believed that ‘fixed-line demand for NBN services is likely to be strong and will underpin a revival in fixed-line demand across Australia’. (McKinsey and KPMG 2010, p 229)

There were three reasons for this. First, McKinsey and KPMG argued the fixed-line market would shift from ‘voice-centric’ to ‘broadband-centric’. Broadband would replace voice as the ‘anchor fixed-line service’. Second, they forecast continuing strength for fixed broadband in the future because of its superior performance and price/performance. Emerging services like 3D HDTV would require sustained data rates of up to 60 Mbps that could not be supported cost-effectively by mobile for large numbers of users in populated areas. ‘For comparable prices, mobile operators are unlikely to deliver competitive products with current network constructs.’ Third, the recent surge in wireless broadband had resulted from the ‘confluence of several unique and temporary factors’. Price drops, poor fixed broadband offers (‘slow, expensive and usage-constrained when compared with international peers’), and the widespread adoption of remote working in business market that had stimulated mobile broadband growth, would weaken as drivers in the future. (McKinsey and KPMG 2010, pp 229–37)

For these reasons, McKinsey and KPMG concluded demand for fixed-line services in Australia would revive. ‘NBN will be Australia’s future fixed-line network and will offer a step-change in performance relative to copper.’ (p 229)

**THE CASE FOR MOBILE**

Let us engage in a thought experiment and try to make the opposite case – that mobile access networks will dominate in the future so as to undermine the rationale for *subsidising* (not for building without subsidy if commercial investors choose to do so) some or all of the FTTP NBN. What arguments might we mount?

First, some recent history. Over the last twenty years, the social practice of voice telephony has undergone a huge migration from fixed to mobile devices. Given the option, people chose mobility, even though it was more expensive – hugely so for local calls of all but the shortest
duration in Australia, where fixed services were untimed. The 24.22 million mobile subscriptions in Australia at 30 June 2009 comfortably exceeded the number of people in the country and is 2.3 times the number of fixed services. (ACMA 2010a) It is not inconceivable that many of the activities people want to perform online might be equally or better undertaken on a sufficiently capable mobile device, even if it is more expensive.

Next, the present. Wireless broadband is where almost all the growth in broadband subscribers is coming from now. If it is an inadequate substitute for fixed, someone is going to need to tell the customers pretty soon. By mid-2009, the majority of Australia’s mobile phone users (55 per cent) had a phone ‘capable of accessing 3G services such as the mobile Internet’. 3G services grew 44 per cent in 2008/09. (ACMA 2010a) Further, as the Implementation Study noted, a significant and slowly growing share of Australians now live in homes without fixed line phones. The Australian Communications and Media Authority (ACMA) (ACMA 2010a) estimated that in 2008/09 around one in ten Australians aged 14 and over did not have a fixed phone line in their home and used only mobile phone services. Unlike their parents, young adults have always had a phone bill but few have experienced a fixed-line bill. Those habits might prove hard to dislodge, especially if the first two ‘temporary factors’ cited by the Implementation Study prove durable (mobile price reductions; poor fixed broadband offers according to international comparisons).

Third, mobile broadband might actually be cheaper for typical usage patterns, or at least feel cheaper because of the pricing options offered for low-medium users or particular types of use: eg. pre-paid options (44 per cent of all mobile phone services at 30 June 2009 (ACMA 2010a)), unmetered access to the most popular content or activities (eg. social networking sites), revenue-sharing arrangements between carriers and ad-supported content providers. The fixed line NBN is offered as a route to faster, cheaper broadband, but, as Kevin Morgan argued at the CommsDay Melbourne Summit on 13 October 2010, ‘I just can’t see how to stick an extra $40+ billion in costs into an industry and not get higher prices’. The Implementation Study contemplates steadily increasing wholesale access prices. In the United States, where FTTP is not being deployed nationally, the biggest builder of FTTP networks so far, the east coast incumbent Verizon is, unsurprisingly, targeting the most lucrative customers. It has built in New York and Washington DC but not Baltimore. It has sold off altogether under-performing franchises in New Hampshire, Vermont and Maine. FTTP is effectively a ‘Mercedes’ for the well-off in well-served areas where the incumbent fears there is a real danger that another provider, particularly a cable operator, might pick them off. Elsewhere, customers will be offered the physical flexibility of good-enough wireless broadband via LTE in financially-manageable packages, a ‘Toyota’ product that might suit them perfectly well. Stephen Bartholomeusz (2010) argues: ‘The combination of steadily tumbling prices, rising speeds and the exploding inventory of applications does provide a rather compelling argument that, if the future isn’t all wireless, for a significant proportion of the market it will be a very substantial part.’

Fourth, some users are going to get wireless whether they like it or not. In Australia it is going to be 7 per cent of premises. If the Government’s arguments about the essentiality of much faster broadband in the near future prove well-founded, ways are probably going to have to be found to deliver fibre-like performance off wireless infrastructure for non-metropolitan users whose interests will receive acute attention in a finely-balanced Parliament. In other countries, especially developing countries without existing landline telephone infrastructure, it will be much more
than 7 per cent. The energy of innovative practices developed there and the cost-effectiveness of the technical solutions might provide lessons for other places that started out with bandwidth expectations that could not be met with earlier generations of wireless technologies and network designs.

Fifth, investment in mobile broadband networks might take place more quickly than in politically shaped, fixed line networks. Mobile operators might prefer to put their scarce capital into infrastructure involving less-regulated network elements, and minimise their reliance on government-funded or regulated infrastructure, even while they encourage its construction as a handy alternative in less lucrative areas. In Australia, Telstra’s aggressive construction of its NextG 3G network while the upgrade of its fixed access network was being negotiated with Government and the regulator seems an obvious precedent for its strategy in a world where it no longer has a fixed access network of its own, as envisaged under its heads of agreement with NBN Co.

Sixth, wireless broadband might become the Next Big Thing in the global telecoms arms race. The United States President declared in June 2010 that ‘the next transformation in information technology’ was beginning – ‘the wireless broadband revolution’. (Obama 2010) National Economic Council director Lawrence Summers (2010) called it ‘the third wave of the Internet’s development’. He placed the mix of public and private initiative needed to make the most of it alongside 19th century land grants for railways and educational institutions, as an example of the long American history of ‘government actions to assure the necessary foundational investments for economic growth’. Going ‘All the Way’ with fibre might become yesterday’s passion. As so often in the past, US decisions, such as the proposed allocation of 500 MHz of spectrum for mobile and fixed wireless broadband over the next ten years, might strongly influence policy outcomes elsewhere.

Finally, mobile might attract investment, innovators and users because it seems to be where the ‘cool’ people are. A 2009 Pew Internet and American Life report found ‘mobile connectivity is the new centerpiece of high-tech life’. (Horrigan 2009) Google’s CEO Eric Schmidt told the American Society of News Editors in April 2010:

It’s important to understand that three things are coming together: the powerful mobile devices that … are paired with the tremendous performance that we can now get on computers … it is the sum of that, and the capabilities and the technologies that will exploit the sum of that, that will define the next ten or twenty years for all of us. So when I say “Internet first,” I mean “mobile first.”

Now, some of the most clever engineers are working on mobile applications ahead of personal computer applications. People are literally moving to that because that’s where the action is … (Garber 2010).

**INTERDEPENDENCE, SYMBIOSIS, COMPETITION?**

The McKinsey and KPMG Implementation Study does not shirk the awkward truth about the current decline in fixed lines in Australia and elsewhere. It may be right that ‘fixed-line demand for NBN services is likely to be strong’ and it does solid work explaining the forces it believes ‘will underpin a revival in fixed-line demand across Australia’. But it does not hide the challenge.
The discussion in that study and above suggests three concluding observations. First, the politicisation of wire vs wireless has plainly oversimplified a complex set of issues. (Lynch 2010) Increasing integration of fixed and mobile networks and applications, especially through devices like the iPhone that can choose to use accessible WiFi networks ahead of 3G if both are available, means there is no simple contest between fixed and mobile access that will be won or lost simply by looking to consumers’ innate preference for mobile or fixed locations. As has often been remarked in response to Tony Abbott’s comments about iPhone and Blackberry use and Malcolm Turnbull’s iPad, the fact that customers want mobility doesn’t mean that some of the places they move won’t be fed by fixed lines and WiFi or wireless femtocells – the home, the workplace, the café, the bar, the gym. The June 2010 ABS broadband data shows that although more than a third of broadband connections are wireless (including fixed wireless and satellite as well as mobile wireless), they accounted for less than 9 per cent of the data downloaded. (ABS 2010) The anecdotal cliché is that young users go home or to work for a fast fixed line connection to download music and movies. Mum, Dad and the boss might not see so much of them if they cut their cords too.

The home may be largely history (as Unwired CEO David Spence memorably told Liz Fell (2008) for these pages) as a site for the consumption of shared ‘home’ services like voice telephony, but not as a technically convenient hub for the distribution of discrete services for consumption by individuals one of several venues where they happen to spend a lot of time. The same Pew study (Horrigan 2009) that found mobile connectivity to be ‘the new centerpiece of high-tech life’ also found that mobile Internet access was drawing people into more frequent online use:

> The information nugget initially discovered on the handheld device might prompt a user to open the laptop at home to explore further. Conversely, the fascinating blog post discovered on the desktop at home might be pursued further on the mobile device on the train to work and then taken along new pathways once online at the office.

The report’s author John Horrigan compared this to the steep increase in the use of the telephone in the 1980s produced by the take-up of answering machines: ‘relatively small changes in society’s technology portfolio in one area can have significant impacts in a related one. The answering machine served as an accelerant to Americans’ existing calling patterns.’ The finding that the mobile Internet was ‘drawing people further into the digital world’ was, he said, ‘the cornerstone of the Pew Internet Project’s second typology of information and communication technology (ICT) users’. (Horrigan 2009, p 18)

Second, the case for virtually universal fibre is really all about one thing: capacity. Even a single fibre can carry a huge amount of information and FTTP means a dedicated physical connection to the customer’s premises (at least, from the kerb-side splitter in the 32-premise GPON architecture proposed in Australia) rather than shared use of spectrum. (Tucker 2010) Significant as these points are, they are engineering concepts that do not tell us the critical things that matter to customers – what user experience will be offered in typical customer set-ups and what it will cost. Further, if in-home access to the services enabled by FTTP is to be via WiFi, the apparently terminal deficiencies of wireless will be a widely shared feature of typical access to NBN-enabled services. At the CommsDay Summit in Melbourne on 13 October, NBN Co CEO Mike Quigley
cited the fact that only 3 per cent of customers taking fibre from NBN in Tasmania so far were doing any sort of internal rewiring as proof that such rewiring was not necessary for customers to receive the benefits of the NBN. Wireless can’t be an intrinsically sub-standard technology up to the front door but future-proof inside it.

This greatly complicates the policy challenge beyond the delivery of Big Broadband to every door. Predicting costs and consumer behavior and the pace and nature of technological change are tasks that need to be approached with a good deal of humility. A decade ago, reviewing broadcasting regulation in Australia, the Productivity Commission (2000) and many others were highly sceptical about television broadcasters’ demands for additional 7MHz channels to allow them to introduce high definition TV (HDTV). Citing a study by BDA that concluded only 5 per cent of the population were likely to purchase high definition digital television sets, the Commission concluded ‘High definition TV appears to be best understood as a premium service, rather than a medium with general appeal’. (Productivity Commission (2000, pp 247–8) A decade later, it is hard to buy anything but a high definition TV receiver. Nielsen ranked Australia No 1 for HD take-up of 55 countries surveyed. (Nielsen 2010) Countries like the UK that did not incorporate HD into their original DTV plans are doing so now. Much more convincing, it seemed, was digital TV’s promise of interactivity. This has developed much more slowly and not in the directions anticipated. Television broadcasters have made much more use of SMS and program websites for audience interaction. Some take from the HD experience the lesson that bandwidth demands always exceed expectations. The implication for broadband policy is that 3D will now replace HD. A different lesson from HD and interactive TV in Australia might simply be how wrong even widely shared, intuitively appealing beliefs about likely future consumer behaviour can be.

HD was chosen in Australia in part because particular corporations thought they could profit from it. TV viewers may have been pre-disposed to want better TV pictures. More likely, there was some pre-disposition that was hugely stimulated by manufacturers and retailers that promoted it. Similarly, 100 Mbps download was chosen as a target for 93 per cent of Australian premises because of a perception that people wanted better broadband without any well-argued arithmetic about the precise services that such speeds would enable. A political case could be made for much faster broadband and 100 Mbps was the current capacity of one of the most widely deployed fibre access technologies, 2.5 GHz GPON. Having chosen the goal and made capacity the central policy issue, the contest between wire and wireless was decided, because no existing wireless technology could realistically deliver that kind of consistent download speed in densely populated areas. A different goal or combination of goals could radically change the technologies capable of meeting them, as the quite different bandwidth goals chosen for areas not served by fibre demonstrate.

Third, the choice of the target and the technology, the institutions and the regulatory arrangements to deliver better broadband may have left Australia in a position where cozy complementarity between wire and wireless is the least likely outcome. The McKinsey and KPMG Study hints at this. ‘For comparable prices, mobile operators are unlikely to deliver competitive products with current network constructs.’ Who is thinking of current mobile network constructs? Certainly not the three mobile players in Australia, Telstra, Optus and VHA who are all trialling LTE and have the spectrum assets to deploy it even before the release of digital dividend spectrum.
Australia’s new wired and wireless networks are being built through investment by private and public corporations with particular technical visions of the future. The private sector is going to be building wireless. The public sector is building fixed and regulating both. One of the crude rules of public policy is that the bigger the intervention the bigger the unanticipated consequences. A Government planning the biggest intervention in Australian infrastructure history might find itself with rather more competition and rather less interdependence and symbiosis than it hopes.

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NOMADICITY AND THE EVOLUTION OF APPLICATIONS, NETWORKS AND POLICY

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A number of behavioural observations point to a preference and willingness to pay for communications technologies that support mobile and nomadic use. This paper considers these observations and the implications for the evolution of mobile and fixed networks. It then considers whether there are wider external social benefits and the possible implications for public policy.

Mobile and fixed are both substitutes and complements. Consumers with low bandwidth and, in particular, low capacity (gigabytes per month) requirements may opt for mobile broadband only. Consumers with low bandwidth and high capacity requirements might choose to meet their need for capacity with copper, complemented by wireless. Demand for fibre may be more limited. To meet demand for mobile bandwidth and capacity, fibre can be run to mobile base stations, but this only requires a network of around 1/2000th the density in terms of points of connection of a fibre to the home network. Demand for fibre to the home is limited to those who are willing to pay for high bandwidth and capacity.

Some key questions addressed in this paper include whether external social benefits arise from mobile and fixed network access, whether the incremental external social gains from a move from current to next generation networks are material and whether they are likely to differ between mobile and fixed networks. We conclude that such gains are likely to be significantly larger for mobile than for fixed networks since wide area coverage and smart mobile devices can support applications that fixed cannot, mobile is likely to contribute more to getting the final third of the population online and spectrum reallocation would result in gains from trade that are not privately appropriable since spectrum utilised for broadcasting is generally non-tradable. These questions have a direct implication for policy decisions: priority should be given to spectrum reallocation for mobile use (including public expenditure as required) and removal of barriers to commercial investment in fibre, including possible regulatory barriers to copper network retirement and price differentiation for wholesale fibre access.

‘Our nature consists in motion; complete rest is death.’ (Pascal 1660)

CONSUMER BEHAVIOUR AND WILLINGNESS TO PAY FOR NOMADIC/MOBILE SERVICES

Studies show that humans have a natural propensity to be mobile/travel (Mokhtarian et al. 2001). This suggests that nomadic/mobile apps have a unique added value, and some of the services that mobile devices support uniquely require mobile/nomadic access and cannot be replicated using fixed broadband. For example, applications that rely on sensors and location derive most of their value from mobile use. The value of these attributes is not therefore necessarily separable from the value of mobile broadband access when revealed behaviour is considered.

The following lists some of the attributes of mobile devices and services that are both valuable to users and are not available or would not be nearly as valuable with fixed broadband access only:
• Location awareness. This enables maps to be used more effectively for navigation and facilitates location tagging of photos/video, location based search and social networking services.
• Sensors, currently including a camera, microphone and orientation/movement sensing via accelerometers and gyroscopes. These sensors enable new interfaces, sharing of experiences, obtaining information such as the identity of an object, barcode or song directly and for information to be overlaid on the environment through 'augmented reality'.
• Mobile devices enable consumers to interact with the device’s content and applications, to share knowledge regarding functionality and to learn from and help others in social contexts. This aspect can be expected to impact on Internet adoption and digital literacy.

We now consider evidence that consumers have an incremental willingness to pay and demand for unique value added of nomadic and mobile applications and wide area connectivity.

DEMAND FOR NOMADIC/MOBILE DEVICES AND SERVICES

Consumer demand for devices that fit our social and nomadic tendencies is evidenced by the growth in mobile phones, netbooks, smartphones and tablets. These devices have shown far more rapid growth than earlier technologies such as fixed line voice telephony which took almost a century to reach high levels of penetration in wealthy countries (the slow diffusion of fixed line telephony may also in part be explained by monopoly and regulation) (Wallsten 2001).

Mobile phone ownership is high in many developed countries, for example, 96 per cent of those aged 15–74 in the Republic of Ireland say they personally own a mobile phone (ComReg 2010). Mobile ownership is also growing rapidly in developing countries. Aside from the advantages inherent to mobility, the emergence of mobile phones has facilitated more flexible tariff options including pre-pay. It has also to a large extent avoided ex ante regulation which has facilitated network rollout and innovation in technology, business models and pricing.

A more profound change is now underway with the development of advanced smartphones and tablets with easy to use multi-touch interfaces, downloadable third-party applications ('apps') and 3G/WiFi access. This has allowed Internet enabled devices to be carried at all times and for

![Figure 1: Global number of iPhones & Android phones sold](source: Plum Consulting, Apple quarterly financial results, Gartner)
applications to be developed that exploit the location aware and sensor rich characteristics of smartphones and which optimise the user experience over relatively slow and variable wireless connections.

The take-off of this class of device can be dated to 2008 with the launch of the iPhone 3G, the Apple apps store in July 2008, and Android in October 2008. Figure 1 shows estimated cumulative iPhone (Apple 2010a) and Android phone sales since then (Gartner 2010).

On the basis of current sales, over half of consumers in high-income countries may have advanced smartphones within five years.¹

**MOBILE DATA TRAFFIC GROWTH**

Adoption of mobile devices and use of the mobile Internet have driven growth in mobile traffic volumes, over-taxing networks in a number of locations. Figure 2 shows projected mobile traffic in Asia Pacific, North America and Europe where projected mobile data growth rates are over 100 per cent pa (Cisco 2010).

![Figure 2 Mobile data traffic forecast (TB/month)](source: Plum Consulting, Cisco)

**WILLINGNESS TO PAY AND CONSUMER SURPLUS**

The adoption of smartphones indicates that consumers have an incremental willingness to pay both for devices and for the associated mobile data plans. For example, a contract-free 16 GB iPhone 4G costs £499 in the UK (significantly higher than the cost of a basic mobile phone which can be as low as £10), and a 12 month SIM-only contract including 500 MB of data costs £15 per month, while an identical contract excluding a data allowance costs £10 per month.² The handset cost difference compared to a basic phone is almost £500 and the data premium is £5 per month for 500 MB (with the option to buy additional data at the same per 500 MB price).

Willingness to pay is not observed directly and will, for all but the marginal consumer, exceed what they actually pay (consumer surplus is the difference between willingness to pay and what
consumers pay). What we know is that a growing number of consumers are prepared to pay a premium for access to mobile Internet.³

PRODUCER SURPLUS

Whilst consumers have benefited from mobile services, some producers have also earned high returns providing mobile services and devices. For example, Apple has seen high revenue growth from their mobile products; it earned a gross margin of 39 per cent in the June 2010 quarter (Apple 2010b) and had an overall market capitalisation which exceeded that of Microsoft on 26 May 2010. Verizon in the US, which offers both wireless and fixed (copper and fibre) access to services, has seen growth in wireless connections and a decline in total fixed connections, an EBITDA of 47.5 per cent for wireless versus 22.7 per cent for fixed, and has an investment focus on LTE wireless going forward (Verizon 2010). Commercial incentives are therefore strongly aligned with ongoing innovation and investment in relation to mobile devices and networks.

CONSUMER PREFERENCES, NETWORK COSTS AND MARKET OUTCOMES

Consumer behaviour, devices, applications and both fixed and wireless networks should be thought of as a system that is co-evolving. Consumer preferences, available devices and supply side network characteristics and cost functions will shape outcomes. The following sets out some of the key interactions:

• Growth in the number of mobile devices, apps and cloud computing may lower the bandwidth requirement for a given service level, since smaller screen sizes require less bandwidth for a given resolution and apps and the cloud allows data transfer to be optimised for slower, less reliable connections.⁴ An increase in mobile data usage will also promote the search for more effective compression.⁵ These developments will tend to reduce incremental willingness to pay for bandwidth and advantage wireless and copper relative to fibre.

• Fixed and mobile will be complements in some ways since:

- The gap in the cost of adding incremental capacity to wireless versus fixed networks will drive mobile networks and consumers (via tiered pricing and other incentives) to offload traffic onto WiFi-fixed rather than carrying all traffic on the wide area mobile network.
- Growth of mobile device use may promote content creation and sharing which will create demand for higher upload speeds and capacity. Whilst LTE offers a significant upgrade in upload speed, the combination of upload speed and capacity may be expensive to meet via wireless given the need to minimise device transmit power and therefore to have a dense cellular network.
- Reallocation of spectrum from terrestrial broadcasting to mobile broadband will reduce capacity on terrestrial broadcast platforms (particularly for HDTV), which will increase demand for fibre and satellite distribution. In this sense, mobile and fibre are indirect complements.

• Fixed and mobile will be substitutes for some since:
• Growth of mobile-only voice households will raise the effective price of fixed DSL broadband for such households since the opportunity cost of maintaining or adopting fixed broadband then includes the line rental.

• Mobile will offer low monthly tariffs for low traffic volumes as LTE lowers the cost per gigabyte (GB). Additional spectrum would also lower the cost per GB and increase average speed.

• If fibre investment involves price increases it will encourage wireless substitution for fixed for those with relatively low monthly data requirements (particularly if regulation constrains opportunities for price differentiation, thereby limiting the scope for both higher and lower prices for fibre service differentiated by, say, bandwidth).

The way in which these considerations play out will depend on the preferences and behaviours of individuals and households and on the specific wireless and fixed costs functions for current and next generation access. Whilst our understanding of behaviour is poor (since there is no revealed preference information available for a next generation fixed and wireless environment), our understanding of supply side costs functions is reasonably good.

Figure 3 shows estimated supply side costs (not necessarily market prices) of current and next generation fixed and mobile access as a function of traffic volume.

![Figure 3 Incremental costs of broadband](source: Plum cost modelling, Analysys Mason, European Commission)

Two observations flow from Figure 3:

• Investment in NGA fixed access (fibre) raises costs, whilst investment in NGA mobile (LTE) lowers costs and will make very low tariffs feasible for low users. The investment case for fibre is therefore dependent on incremental willingness to pay (and potentially price differen-
tiation in order to convert willingness to pay into incremental revenue) whilst the investment case for LTE is not.

- The incremental cost of traffic over fixed lines is very low whilst the incremental costs of traffic over mobile remains relatively high. Tiered pricing per GB and potentially other approaches to managing traffic levels will be necessary for mobile but not fixed. This is a relevant consideration in relation to the debate over the open Internet and 'net neutrality.'

As mobile traffic volumes grow, mobile network operators will have an incentive to lay fibre to mobile base stations. Mobile network operators will also have an incentive to offload traffic onto WiFi hotspots and picocells supported by copper or fibre connections. With the end of 'unlimited' mobile data plans, consumers will also face incentives to offload traffic either at home or elsewhere.

As LTE is anticipated to increase download speeds to around 8–12 Mbps (McAdam 2010) and upload speeds to around half that or 4–6 Mbps, and as mobile devices and applications improve the consumer experience with lower speed connections, the primary difference between fixed and mobile for many consumers may be capacity rather than speed. For modest bandwidth high monthly capacity consumers, copper may be perfectly adequate – delivering around 5 Mbps and almost unlimited capacity. Upload speed and capacity may also be an important differentiator between copper, LTE and fibre. Figure 4 illustrates 3G, LTE, copper and fibre according to their capacity and speed characteristics and reflecting the cost functions illustrated in Figure 3. Upload speed (not shown) and capacity may also be an important differentiator between copper, LTE and fibre.
What we do not know is how customers will be distributed in this space now and in the future given changes in devices and applications and a cost premium for fibre over copper of around 50 per cent.\(^\text{8}\)

Across all these segments, WiFi will complement mobile as a means of offloading traffic to fixed (copper or fibre) at home and in public places such as cafes and high traffic density locations. Fibre will also complement wireless as a means of offloading traffic from base stations. However, we note that the density of the fibre network in terms of points of connection required for this is three orders of magnitude lower than a fibre to the home network since there is a ratio of around 2,000 households per base station in developed countries.

Having considered consumer preferences, network costs and the possible evolution of fixed and mobile current and next generation access we now consider whether there are wider external/social benefits which suggest a role for policy intervention to achieve outcomes that would differ from market outcomes.

**WIDER EXTERNAL SOCIAL BENEFITS**

From a policy perspective material difference between private costs and benefits and wider social costs and benefits are an important consideration. For services and applications where all, or part, of the value is social rather than private one can think of this value as attributed to citizens rather than consumers. An externality may also arise in relation to spectrum reallocation since, even though the value for mobile use may exceed that for say broadcast use, the gains from trade may not be privately appropriable if spectrum rights are not privately held and/or tradable.

The question we are interested in here is whether external benefits are material and how they relate to technology and service choices. If external benefits are material, and particularly if they differ between current and next generation access and fixed versus wireless, then they might justify public policy intervention, for example, to promote Internet use or network enhancement.

**SOCIAL BENEFITS FROM INTERNET ADOPTION AND USE**

There is a growing view that wider Internet adoption and use is socially desirable on grounds that: the Internet is now so important that non-adoption may result in economic and social exclusion; wider Internet adoption will promote productivity growth; and near universal adoption might allow more costly means of government service delivery to be shut down. An important question is therefore why some people do not use the Internet and what might be done to promote wider Internet use and broadband adoption.

Available evidence points to supply-side issues playing a small part in explaining differences in Internet adoption in developed countries (Lewin 2010). Key considerations in explaining within-country and cross-country differences appear to be education by age segment and workforce participation. Both factors are linked to complexity barriers and perceived relevance in adoption and use decisions.

We note that mobile devices including, in particular, smartphones and tablets may significantly reduce these barriers for three reasons. First, the user interface and experience is simpler and more intuitive. Second, the user can interact directly with applications and services rather than accessing these via a browser. Third, the device can be carried into social settings where users can learn from one another and where non-users are exposed to Internet based applications that
may be relevant to them. Public policy interventions designed to promote Internet adoption might therefore be re-focused on mobile devices and mobile broadband rather than on PCs and fixed broadband.

**EXTERNAL BENEFITS OF APPLICATIONS OVER FIBRE AND MOBILE BROADBAND NETWORKS**

A number of studies have claimed significant external benefits from the transition from copper to fibre. However, such studies may fail to distinguish the incremental costs and benefits of fibre from the benefits of fixed copper and mobile broadband (including LTE in the near term).

They may also include categories of benefit which do not constitute genuine externalities (Marks and Williamson 2008), including changes in GDP and productivity, which may mostly reflect private benefits, and reductions in greenhouse gas emissions which may only come about if other policies such as a carbon price are in place (particularly given that communications and transport may be complements rather than substitutes) (Choo et al. 2007).

Mobile broadband and devices have two distinguishing features which may open up much greater scope for external benefits in excess of private benefits:

- First, mobile broadband coverage can be expected to be high once sub 1 GHz spectrum is made available for UMTS (Moral et al. 2010) and is not restricted to premises. This makes applications such as emergency response services (FCC 2010a), social networking, and location-based services possible. Furthermore, health monitoring and assistance applications, such as 'Glucose buddy' for those with diabetes, always need to be tailored to the individual to be effective. Applications such as these are not always possible over fibre.

- Second, mobile devices incorporate sensors and are location aware, a combination that may lend itself to social applications and greatly lower the costs for individuals performing civic functions. For example, apps exist for reporting litter or potholes by photographing the problem and sending the photo, plus location, automatically to a publicly accessible local government database which allows tasks to be prioritised and progress tracked.

**EXTERNAL BENEFITS OF SPECTRUM REALLOCATION**

Potential sources of additional spectrum for mobile broadband use include UHF spectrum currently utilised for broadcasting and spectrum utilised by governments, including that currently set aside for military use. However, potential gains from trade may not be privately appropriable since the spectrum rights are not privately held and/or tradable. In the absence of rights and trade, government intervention and/or expenditure is required to reallocate spectrum. In the US, the FCC (FCC 2010c) has identified the need for measures to ensure the timely reallocation of spectrum, including the possibility of forward auctions (FCC 2010b) which would allow broadcasters to profit from voluntarily relinquishing spectrum and then sharing auction proceeds (which amounts to the creation of de-facto property rights and government expenditure via potential revenue foregone to expedite spectrum transfer). (FCC 2010c and FCC 2010b).

**CONCLUSION AND POLICY IMPLICATIONS**

Human preferences and revealed behaviour point to a premium on mobile and nomadic applications. In the communications sector, technology has only recently made many of these applica-
tions feasible. As Risto Linturi was quoted in Wired magazine as saying, pervasive mobile will (Wired 1999):

...bring us back to behaviour patterns that were natural to us and destroy behav-

iour patterns that were brought about by the limitations of technology

Demand for mobility and mobile applications is driving demand for mobile broadband and, in turn, additional spectrum for mobile broadband use. Alongside mobile broadband, fibre will provide high capacity and speed to offload traffic from base stations and to businesses and households where willingness to pay is sufficient to justify investment. Obstacles to private fibre investment should where possible be removed. In particular, a framework for copper network retirement (to avoid dual running costs) is required and may require a reassessment of the approach to universal service. In addition, a regulatory approach which allows price differentiation to support timely investment and the possibility of low user fibre tariffs should be adopted.

ACKNOWLEDGEMENTS

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ENDNOTES

1 Utilising the World Bank definition of high-income countries as those with incomes over $12,196 in 2009 – a total population of a little over 1 billion (World Bank 2010).

2 We have utilised UK pricing as this enables the various components to be separated; iPhones can be purchased contract-free and SIM-only plans are available with and without data allowances. Prior to the launch of the iPhone4 some tariffs had included ‘unlimited’ data.

3 Some data and measures may not attribute revenues correctly, particularly if monthly connectivity charges are not separately identifiable for data. In other words, data revenues may be understated relative to overall revenues.

4 For example, the bandwidth requirements for a two-way video call using Apple FaceTime (initially only available on the iPhone4) are relatively modest at around 0.2–0.4 Mbps, whilst watching on-demand video on an iPad (which could substitute for 2nd and 3rd TV sets) over broadband will require significantly less bandwidth than on a large screen TV.

5 For example, Verizon have noted that they are working with partners to get the bandwidth requirement for HD video down from 10 Mbps to 2 – 3 Mbps over LTE (McAdam 2010).

6 There is perhaps more uncertainty regarding consumers’ demand for and willingness to pay for capacity than bandwidth since the total quantity of data consumed in the home including TV and computer games is very large compared to existing levels of data carried over broadband connections (Bohn and Short 2010).
Costs for copper DSL include both the fixed line charge and the additional broadband charge (on the grounds that the fixed line is retained primarily for broadband) and are based on estimates for Europe. Fibre costs are estimated based on US pricing by Verizon for fibre to the home (broadband only packages). The traffic-dependent element of fixed line costs is based on incremental cost estimates for 2012. (Analysys Mason 2008).

The cost estimates for 3G and LTE were made by Plum, based on assumptions regarding equipment costs and spectral efficiency. We assume 372 kbit/s per MHz per site for 3G HSPA and 1125 kbit/s per MHz per site for LTE long-term, and that additional spectrum is available per network for LTE (2 x 20 MHz) compared to 3G (2 x 10MHz).

Note that satellite and local storage for HDTV and LTE for Internet applications could be complements for some customers if the combination is cheaper than fibre.

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NOMADICITY AND THE EVOLUTION OF APPLICATIONS, NETWORKS AND POLICY FIXED VERSUS WIRELESS ACCESS 62.11
CREATIVE COMMONS

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This paper written by one of the Creative Commons project leaders for Australia outlines the background and operation of Creative Commons (CC) licensing which has emerged as a new form of copyright management for the Web 2.0 era. It documents examples of how CC licensing is being used including the recent adoption of it by government departments. The paper highlights that CC licensing is a voluntary mechanism and ultimately its use is a matter of choice for the copyright owner. The paper also considers key criticisms of the licence and concludes by cautioning against rejecting this new approach without further investigation.

THE BEGINNINGS

In May of 2001, after meeting at Harvard Law School, a group of people embarked on a project to develop a copyright licensing model for creative content that would better meet the distributed and serendipitous nature of the World Wide Web (WWW). (See generally Bollier 2008). Little did they know that within 10 years their ideas would go from being ridiculed and pilloried by the established copyright industries to becoming a mainstream copyright licensing tool that is nowadays embedded as a key component of the digital economy.

What that group was able to see – well before the label Web 2.0 became fashionable – was the increasing importance of information flow to our lives and the economy (Cutler 2008; Metcalfe 2007; Fitzgerald 2010a). Furthermore they understood that traditional approaches to the management of copyright were creating friction in the digital economy and that things had to change.

WHAT WAS THE PROBLEM?

The key problem was that our way of thinking about how copyright could be managed had become stagnant and was ill equipped to meet the challenges of the networked world that we faced. Four factors had combined to create the perfect storm.

Firstly, copyright law is built on the premise that you need permission (a licence) to exercise the exclusive rights of the copyright owner such as reproducing or ‘communicating to the public’ copyright material. While there are some ‘free use’ (no permission and no fee required) exceptions to this rule such as fair dealing (fair use in the USA) they are narrowly drawn and uncertain in operation. Statutory based permissions or statutory licences exist in a number of areas (e.g. the statutory licence allowing the reproduction of a musical work and associated lyrics in certain circumstances) and will normally require the payment of a set fee. (On copyright generally see: Fitzgerald et al 2007).

Secondly, in the 300 years since the enactment of the first modern copyright statute – the Statute of Anne 1709 (UK) – which was designed to regulate the ‘printing and selling of books’ the scope of copyright law has grown to the point where every conceivable (unauthorised) use of information in the digital environment runs the risk of being seen as copyright infringement.
Thirdly, the mere use of digital technology – which reproduces material in order for it to be seen – and the subsequent transmission or communication of this material over the Internet puts us in the copyright zone.

Fourthly, the attitude of the established copyright based industries was that if digital distribution could not be controlled (by them) it needed to be slowed down if not eradicated.

Combined, these factors meant that if copyright ownership was used as a tool for extracting reward at the gate then the distributed and serendipitous innovation made possible by the network would be stifled. Could we envision a future in which copyright control was relinquished in favour of new distribution models that generated benefits through greater access and distribution of content? In other words, how could we transition from a model based on control enforced through a permissions culture of restrictive licensing to a model based on access facilitated by what has become known as open licensing?

**WHAT WAS THE SOLUTION?**

The idea was to develop a copyright licence that could be used by copyright owners who wished to share their copyright material. Why would they willingly share through an open licence? As time has shown, the ability to reuse copyright material licensed under an open licence can lead to better public policy, economic, social and educational outcomes.

The group that met at Harvard in 2001 were not necessarily starting from a blank page. The free and open source software movement led by American software developer Richard Stallman had charted this course some 20 years earlier, but now it was time to transition those ideas from the copyright licensing of software code to the licensing of copyright content. Stallman, building on age-old common sense that tells us ‘in sharing knowledge we can do great things, in isolation our opportunity is limited’, developed a new approach to copyright licensing. As the owner of copyright in the computer code that he developed, Stallman was able to condition re-use of the code on the sharing of improvements made by the downstream user. Stallman had lamented the fact that the culture of distributing software with the source or human readable code (as opposed to code that only a machine could read – machine readable code) accessible had been disowned by a new breed of software entrepreneurs, who argued that the only way to properly exploit copyright in software code was to employ restrictive licences and to not tell people how it worked. Not distributing the source code created a commercial advantage for them.

Stallman was concerned by such an approach, as it limited the opportunities made possible by sharing knowledge, and orchestrated a movement known as ‘free and open source software’ which encouraged developers to distribute their programs on liberal licensing terms with the source code accessible. Stallman wanted to establish an innovation environment where people were able to understand how the program worked upon its receipt and were free to reuse, improve upon and redistribute it. This sharing ecology was underpinned by – of all things – copyright law, for Stallman knew that if he simply gave away his code the big companies would take it and improve upon it and exclude him and his collaborators from accessing the improvements. That was not the environment Stallman envisaged. In order to achieve his model he licensed his software code under the GNU General Public License (GPL) (a copyright licence) (GPL 2010) which said (in advance and to the world) that you can use my software code – but if you improve
upon it and then distribute the improvements to the world you must share those back with the recipient and in essence the whole community (GNU 2010).

In creating a legal tool that provided a conditional and voluntary standing permission, Stallman turned traditional notions of copyright management on their head. He used copyright licensing not to restrict reuse but to ensure greater access to and reuse of source code (Fitzgerald & Suzor 2005). In doing so he presented us with a way of thinking and a legal tool that was ready-made for the user-driven world of Web 2.0 which we inhabit today. In this world, access and sharing become cornerstones of (social and firm based) production (Benkler 2006; Cunningham 2010).

The Harvard meeting in 2001 was tasked with ‘simply’ transitioning the Stallman model from code to content. Some interesting and yet far reaching adjustments were made.

**WHAT IS CREATIVE COMMONS LICENSING?**

The Creative Commons licence is a copyright licence that grants people permission (in advance) to reproduce, adapt and ‘communicate to the public’ copyright material on certain conditions. The licences say that you can use copyright material according to the terms outlined in Table 1.

<table>
<thead>
<tr>
<th>Attribution (BY)</th>
<th>means that whenever the work* is copied or redistributed the author or other attribution party (unless otherwise stated) must be credited in a manner reasonable to the medium;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Commercial (NC)</td>
<td>the work can be used for non-commercial purposes only;</td>
</tr>
<tr>
<td>No Derivatives (ND)</td>
<td>only exact copies of the work (not derivative works based on the original work) can be made, displayed, distributed and performed, and</td>
</tr>
<tr>
<td>Share-Alike (SA)</td>
<td>users may distribute derivative works, but only under a licence identical to the one that governs the original work.</td>
</tr>
</tbody>
</table>

* ‘Work’ is defined in Cl. 1 as follows: ‘means the material (including any work or other subject matter) protected by copyright which is offered under the terms of this Licence. This may include (without limitation) a literary, dramatic, musical or artistic work; a sound recording or cinematograph film; a published edition of a literary, dramatic, musical or artistic work; or a television or sound broadcast.’ For example see: Creative Commons Licence (CC 2010n).

For example, an Attribution-Share-Alike (BY-SA) licence allows others to use the licensed material as long as they provide the requisite attribution and they license any derivative material that they create under the same type of licence. Of the four terms the only ones that are incompatible and may not feature in the same licence are the No Derivatives (ND) and Share-Alike (SA) terms (because the Share Alike (SA) term applies to derivative works).

These four terms, together with the baseline permissions, can be combined to create six licenses, as outlined in Table 2.
Other key points to note are that the CC licences prohibit using ‘technological measures’ or DRM ‘that restrict the ability of a recipient of the Work from You to exercise the rights granted to them by this Licence’ (CC 2010j) or in the case of a share alike licence to use technological measures that ‘restrict the ability of a recipient of the Derivative Work from You to exercise the rights granted to them by the Applicable Licence’. (CC 2010k) This means that once a work is licensed under a CC licence, rights to reproduce and ‘communicate to the public’ the work (or in the case of the SA licence the derivative work) cannot be impeded by DRM.

CC licences also prohibit the recipient or licensee from in any way suggesting the original author or other attribution party has endorsed their use of the material in any particular context without separate and express permission. (CC 2010l) Furthermore the Australian CC licences do not purport to – nor could they – ‘override’ any moral rights existing under law such as attribution or integrity. (CC 2010m) It is also important to note – as was highlighted in the litigation against Virgin Mobile – that the licences are copyright-based and do not purport to provide permissions or clearances for other legal obligations that might arise in relation to privacy or personality rights under US law (Chang v. Virgin Mobile 2009; Brown 2009; Carroll & Coates 2010).

A recent case in the USA Court of Appeals for the Federal Circuit – Jacobsen v Katzer – confirms the validity of CC type licensing. In doing so the Court noted:

Public licenses, often referred to as open source licenses, are used by artists, authors, educators, software developers, and scientists who wish to create collaborative projects and to dedicate certain works to the public. Several types of public licenses have been designed to provide creators of copyrighted materials a means to protect and control their copyrights. Creative Commons, one of the amici curiae, provides free copyright licenses to allow parties to dedicate their works to the public or to license certain uses of their works while keeping some rights reserved.
Open source licensing has become a widely used method of creative collaboration that serves to advance the arts and sciences in a manner and at a pace that few could have imagined just a few decades ago. For example, the Massachusetts Institute of Technology (MIT) uses a Creative Commons public license for an OpenCourseWare project that licenses all 1800 MIT courses. Other public licences support the GNU/Linux operating system, the Perl programming language, the Apache web server programs, the Firefox web browser, and a collaborative web-based encyclopedia called Wikipedia. Creative Commons notes that, by some estimates, there are close to 100,000,000 works licensed under various Creative Commons licences. The Wikimedia Foundation, another of the amici curiae, estimates that the Wikipedia website has more than 75,000 active contributors working on some 9,000,000 articles in more than 250 languages.

Open Source software projects invite computer programmers from around the world to view software code and make changes and improvements to it. Through such collaboration, software programs can often be written and debugged faster and at lower cost than if the copyright holder were required to do all of the work independently. In exchange and in consideration for this collaborative work, the copyright holder permits users to copy, modify and distribute the software code subject to conditions that serve to protect downstream users and to keep the code accessible. By requiring that users copy and restate the licence and attribution information, a copyright holder can ensure that recipients of the redistributed computer code know the identity of the owner as well as the scope of the licence granted by the original owner. The Artistic Licence in this case also requires that changes to the computer code be tracked so that downstream users know what part of the computer code is the original code created by the copyright holder and what part has been newly added or altered by another collaborator.

Traditionally, copyright owners sold their copyrighted material in exchange for money. The lack of money changing hands in open source licensing should not be presumed to mean that there is no economic consideration, however. There are substantial benefits, including economic benefits, to the creation and distribution of copyrighted works under public licences that range far beyond traditional licence royalties. For example, program creators may generate market share for their programs by providing certain components free of charge. Similarly, a programmer or company may increase its national or international reputation by incubating open source projects. Improvement to a product can come rapidly and free of charge from an expert not even known to the copyright holder. The Eleventh Circuit has recognised the economic motives inherent in public licences, even where profit is not immediate. See Planetary Motion, Inc. v. Techsplosion, Inc., 261 F.3d 1188, 1200 (11th Cir. 2001). (Program creator derived value from the distribution [under a public licence] because he was able to improve his Software based on suggestions sent by end-users. . . . It is logical
that as the Software improved, more end-users used his Software, thereby increasing [the programmer’s] recognition in his profession and the likelihood that the Software would be improved even further) (Jacobsen v. Katzer 2008).

Creative Commons licences can be represented on three levels. Firstly at a code or metadata level (CC 2010f):

![Figure 1 CC Licence – code or metadata level](image)
Secondly, as a commons deed or summary for the layperson (CC 2010e):

**Figure 2**  CC Licence shown as commons deed or summary

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**CREATIVE COMMONS INTELLECTUAL PROPERTY**
Thirdly as a traditional legal licence in the following way (CC 2010h):

![Creative Commons licence shown as a traditional legal licence](image)

**Figure 3** CC licence shown as a traditional legal licence

Creative Commons licences can be generated and embedded in your web page by going through the steps of the ‘licence generator’ at <creativecommons.org/license>. The standard CC licence now in version 3.0 has been ported or translated into local legal requirements in over 50 countries (CC 2010g). In Australia we have just released the Creative Commons Version 3.0 Australia licence (CCA 2010a).

Institutionally Creative Commons is a not-for-profit company incorporated in Massachusetts in the USA and has international affiliates (CC 2010d). In Australia QUT is the Creative Commons affiliate and home of the CC Australia project (CCA 2010b).
HOW IS IT BEING USED?

Creative Commons licensing and Creative Commons licensed material is nowadays heavily utilised.

By 2010 we have seen people and entities as diverse as the US President Barack Obama (White House 2010), Yoko Ono (boingboing 2009), the Australian Bureau of Statistics (ABS) (ABS 2010a) and the Australian Parliamentary Library (Parliament of Australia 2010) using CC licensing. There are over 350 million CC licensed objects available over the Internet (CC Wiki 2010a) and major search engines Yahoo and Google (Google 2010) have advanced search options that can search for CC licence material utilising the licence’s machine-readable metadata (CC 2010a).

Two of the largest institutional users of CC licences are the photo hosting service and community known as Flickr (http://www.flickr.com/) and the online (and on CD) peer-produced knowledge resource known as Wikipedia (http://www.wikipedia.org/). Flickr provides its members with the option of applying a CC licence when they upload their photos. Currently there are over 147 million CC licensed photos available through Flickr. Since 2009 Wikipedia, which has many millions of entries in a variety of languages, has required contributors (peer producers) to license their material under a CC BY-SA licence. Flickr is a for-profit company owned by Yahoo Inc while Wikipedia is run by Wikimedia Foundation a not-for-profit organisation.

Interestingly recent statistics suggest that Australians are increasingly using the most liberal of the CC licences. 36 per cent or 200 000 objects licensed under the CC Au licences are under the CC BY licence (CCA 2010e). This perhaps reflects the strong uptake of CC licensing in the government sector in Australia in relation to government owned copyright.

A dominant view supported through economic modelling is that the active release of ‘public sector information’ (PSI) under liberal copyright licensing terms (that allow reuse), at no cost and in reusable formats can sponsor better public policy and decision making, health and emergency management outcomes, research and education and untold opportunities for business. At the height of the Victorian bush fires in February 2009 (it was reported that) Google sought and was denied access to crown copyright data (Braue 2009) which it sought to use to populate its Google fire maps (Google 2009). These maps allowed people to find out the location and direction of fires through their mobile phones. In hindsight most agree that this kind of access to PSI in times of emergency is important to saving lives and that for this reason freely licensed and reusable data is the benchmark.

Access to PSI is not just about managing emergencies. The general idea is that the sharing of knowledge especially that which is publicly funded (such as PSI) can provide a tremendous platform for research and innovation. Much of the access to PSI movement has not been generated by ‘freedom of information’ advocates but rather businesses seeking access to things like spatial data to found and drive new mobile location businesses, devices and applications. Already iPhone application developers that feed off PSI have been caught in disputes over whether they can use PSI without first getting permission (Moses 2009). While some of those disputes have already been resolved cultural and other barriers remain. Many businesses around the world bemoan the fact that governments adopt distribution models of a bygone era that inhibit reuse (Nicholson 2008; de Vries 2010; State Services Commission (NZ). 2009). The Australian government in its endorsement of the Final Report of the Government 2.0 Taskforce (Gov2.0 2010a) – Engage: Getting on With Government 2.0 (2010) (Gov2.0 2010b) supports the policy that the CC BY
A key recommendation of the Government 2.0 Taskforce was:

**Recommendation 6:** Make public sector information open, accessible and reusable

6.1 By default Public Sector Information (PSI) should be:

- free
- based on open standards
- easily discoverable
- understandable
- machine-readable
- freely reusable and transformable.

6.2 PSI should be released as early as practicable and regularly updated to ensure its currency is maintained.

6.3 Consistent with the need for free and open reuse and adaptation, PSI released should be licensed under the Creative Commons BY standard as the default (Engage 2010). (Footnotes omitted).

A common criticism is that Creative Commons licensing robs creators and the corporations that invest in them of their just rewards. We need to remember that CC is a voluntary system and no-one is demanding that any individual use it. As well the idea that creators or the corporations that invest in them should never explore an access-based business model is misguided and limits the range of opportunity and potentially revenue. While vested interest can easily suggest that there is only one way to do things – that is the old way – many people want to both create and consume in ways that flow with the network. CC licensing is built for that.

In 2009 Nine Inch Nails (NIN) released 36 instrumental tracks on a CD known as Ghosts I-IV. All tracks were licensed under a CC (BY-NC-SA) licence. The first nine were available for free download with the remaining 27 subject to a variety of payment options including a $5 download. There was also an ultra deluxe and limited edition (2500 units) package priced at $US300 which sold out in 48 hours. In the first week NIN took in $1.6 million from over 800,000 transactions.

While NIN is a world famous rock band and one might expect that they could do anything and be successful there are an ever-increasing number of entities using CC as part of their business model. Journalism sites like GroundReport set up by former UN reporter Rachel Sterne with the aim of ‘democratising media’ are setting new benchmarks and winning awards in the process. GroundReport ‘crowd sources news reports’ and subjects them to an editorial process. Contributors retain their copyright but are required to license their contributions under a CC BY, CC BY-NC, CC BY-ND or CC BY-NC-ND licence (Ground Report 2010). Revenue based on advertising and partnership fees is shared with the contributors (Bloomberg 2010). Revver (www.revver.com), a video sharing website which shares up to 40 per cent of advertising revenue with the creator, requires contributions to be licensed under a CC BY-NC-ND licence (CC Wiki 2009b). Jamendo, (www.jamendo.com) an innovative music website, requires all uploads to be
CC licensed (Jamendo 2010) and shares up to 50 per cent of advertising revenue and close to 100 per cent of tips or donations with the artists (Jamendo 2009). Magnatune, (http://www.magnatune.com/) yet another interesting music space, requires all uploads to be under a CC BY-NC-SA licence. Magnatune is a great example of what might called the ‘CC Plus’ methodology. By requiring the Non-Commercial term to be used the Magnatune platform reserves commercialisation rights to the copyright owner and this produces the opportunity for negotiated commercial deals which can be mediated and implemented online. 50 per cent of this commercial revenue is shared back to the artists (Magnatune 2009).

In the education sector MIT has released much of its courseware – educational materials – under a CC BY-NC-SA licence (MIT 2010) and in the research sector the world leading Public Library of Science (PLOS) (http://www.plos.org/) uses CC BY on its open access academic journals. In the government sector the Australian Bureau of Statistics (ABS) and Geosciences Australia (GA) have used the CC BY licence as the default standard for their websites. This means (that unless otherwise specified) the CC licence applies to all content on those websites. This move to clearly signal and legally implement the fullest possible reuse of PSI has the potential to bring enormous benefits to industry, research and education and the community more broadly. In light of the government’s endorsement of the Gov 2.0 Taskforce Final Report one would expect this approach to become the norm. To this end it is interesting to note that the federal Budget in Australia in 2010 was released under a CC BY licence (Budget 2010).

The producer of Cafune, a Brazilian film, reported that the licensing of his film under a CC BY-NC-SA licence at the same time as it was released in the cinemas allowed the film a broader audience and ultimately a second season in the mainstream cinemas (Garlick 2006a).

One last example is worth noting. In 2009 the Al Jazeera Network (http://cc.aljazeera.net/) launched a repository of broadcast quality footage that is licensed under a variety of CC licences including CC BY. The initial focus has been on footage of the conflict in Gaza, which has been released under a CC BY licence. This allows the broadest possible reuse (including commercial use) and no doubt meets the goals of making people more aware of these issues as well as profiling the Al Jazeera Network throughout the world (Steuer 2009).

A good resource for keeping up with these new initiatives is the Creative Commons Case Studies wiki at http://wiki.creativecommons.org/CasestudiesFrom

WHAT DO THE CRITICS SAY?

Much of the criticism levelled at CC is at the level of conjecture. People do not like the name or the licence or the idea of sharing because they like the way things are or they might come up with a better idea or their model better protects creators. No-one is arguing that the licences are not an effective legal tool.

In the free software arena people quickly became wary of commentators creating Fear Uncertainty and Doubt (FUD) about the methodology being employed. Creating FUD is an age-old
strategy employed by incumbents and their supporters to ward off new challenges or what Schumpeter might have called ‘creative destruction’. Ultimately not much FUD sticks as it lacks substance and that seems to be the case with CC. We started off with a barrage of ‘why nots’ to the point where we are now down to two core issues that need to be understood but are certainly not game breakers.

Firstly, people have criticised the ‘perpetual’ and ‘irrevocable’ nature of CC licences. CC licences run for the duration of copyright. Once you have licensed material under a CC licence the recipient has the authority to use it for the term of the copyright; in essence forever. CC licences terminate automatically upon breach (for example see: Cl 1 CC Attribution-Non Commercial 3.0 (BY-NC) Australia CC 2010i) and there are further technical and most likely correct arguments that the licences can be revoked on certain conditions at the behest of the licensor (Fitzgerald et al 2010). In practical reality, though, once someone has utilised CC licensed material to their detriment, that is, they have sunk costs, time or effort into using and building on the material on the basis of having permission it will be difficult for the licensor to go back on their word because of the legal doctrine of estoppel (Fitzgerald & Suzor 2005; Loren 2007). A licensor can take down material so that it is no longer available, but once someone holds a lawfully licensed copy of it the practical reality is that in most cases they can use it forever. It is not impossible to conceptualise a limited term open licence, yet its practical operation and effectiveness is unclear. At this point in time the enduring nature of the grant brings certainty to people relying on the licences and if licensors are worried about this aspect they should not use CC licences; ultimately it is their choice.

The fact that the material is out there for people to use forever does not mean, as some would argue, that you might never commercialise your material. For instance, you could offer your work under a non-commercial (NC) licence; thereby reserving your right to control commercial re-use. An interesting example of this idea is leading science fiction writer Corey Doctorow who since his 2003 novel Down and Out in the Magic Kingdom has been successful in commercially publishing his books while at the same time releasing CC licensed versions online. Alternatively you might use a very liberal licence, CC-BY and seek to build a business model based on or arising from (monetising) access to your material.

The other concern is the vague nature of the term ‘non-commercial’. The licence explains that commercial means ‘primarily intended for or directed towards commercial advantage or private monetary compensation’ (CC 2010h). CC has released guidelines (Garlick 2006b) and done a recent study on the meaning of this term (CC Wiki 2009a). There are some clear cases of what is non-commercial – private and domestic use – and some clear cases of commercial use – corporations using the material to gain revenue. What about an individual who runs a website and has advertisements on it to defray the costs? The CC study suggests that ‘... creators and users generally consider uses that earn users money or involve online advertising to be commercial...’ (CC Wiki 2009a).

Many terms used in the legal system are broad. The term ‘reasonable’ is an example. Language by its very nature is indeterminate and it will only be over time as we are confronted with hard cases and sensibly resolve them that we will fully understand the definition of non-commercial. However it is important to note that ‘non-commercial’ is nowadays both a term of general use as well as a term that is increasingly being used in legal documents. It is also worth noting that
the concerns over the definition of ‘non-commercial’ are not an issue when using the CC BY, CC BY-SA or CC BY-ND licences.

The CC licence is a tool that allows an individual or entity to express their free will to share their copyright. Sadly the critics of CC offer no alternative. A freedom to share our own copyright where for strategic advantage or otherwise it suits our needs should be something we are all able to ‘lawfully’ exercise especially in the networked age in which we live. It is not good enough to say it cannot be done. That is disentitling and leaves creators and copyright owners powerless. CC licences are a workable and clear legal tool that can be employed to exercise this freedom and express this intent; they are nowadays ‘emblematic’ of a freedom to share our own intellectual property.\(^1\)

**CONCLUSION**

Modern innovation theory posits information flow as one of the key ingredients of a successful innovation system.(Dopfer & Potts 2008) The permission based culture of copyright when applied to the networked economy of today produces uneasy results. Established industries have tried to use the permission culture as a way of thwarting new business models; as a form of control over the market. This has led to endless actions against end users and intermediaries but as the recent iiNet (Roadshow v iiNet 2010) and Viacom (Federal Court of New York 2010) cases highlight the courts’ patience is running out. There is little doubt that we have reached a point where key stakeholders need to join together to provide consumers with new business models that accommodate modern social practices and adequately monetise information flow.\(^14\)

Creative Commons is not implicated as a wrongdoer\(^15\) in these ‘culture wars’(Lessig 2010) It does not advocate anything unlawful; rather it aims to create a commons of material that can be lawfully re-used (where that suits the needs of the copyright owner). Nor does it provide a magical solution to the dilemma that is faced by the traditional copyright industries in the Internet era. However what it does do in this time of turbulence and transition is to provide some interesting and useful insights in relation to copyright management if not the future of copyright law itself. To a large extent CC has been an exploratory process over the last five years and we are now seeing some of the results. Importantly what it shows is that we can tailor new business models and legal tools for the networked economy and with significant success in some instances. The doubters remain cynical about these achievements but having seen the system work from the inside out one would have to say that only the foolhardy would dismiss it without further investigation.

**ACKNOWLEDGEMENT**

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**ENDNOTES**

1. See for example: sections 55 and 59 Copyright Act 1968.
“To grow the commons of free knowledge and free culture, all users contributing to Wikimedia projects are required to grant broad permissions to the general public to re-distribute and re-use their contributions freely, as long as the use is attributed and the same freedom to re-use and re-distribute applies to any derivative works. Therefore, for any text you hold the copyright to, by submitting it, you agree to license it under the Creative Commons Attribution/Share-Alike License 3.0 (Unported)’ (Wikimedia 2010).


See further: ‘NIN’s CC-Licensed Best-Selling MP3 Album’ (Benenson 2009).


See generally: Australian Bureau of Statistics (www.abs.gov.au); ‘ABS Copyright’ (ABS 2010a); and ‘Creative Commons licensing’ (ABS 2010b).

See generally: Geoscience Australia (www.ga.gov.au); ‘Copyright’ (Geoscience Australia 2010); and ‘More on Government Data – Geoscience Australia Goes CC’ (CCA 2010d).

‘But in capitalist reality … it is not the kind of competition which counts but the competition from the new commodity, the new technology, the new source of supply, the new type of organisation … competition which commands a decisive cost or quality advantage and which strikes not at the margins of the profits and the outputs of the existing firms but at their foundations and their very lives’.

(Schumpeter 1943).

See generally: ‘Common Understanding: 10 Things Every Music Creator Should Know About Creative Commons Licensing’ (McGivern 2007) and ‘Engage: Getting on with Government 2.0. (Taskforce 2009).

His online versions normally contain the non-commercial (NC) term. See generally: ‘Corey Doctorow’ (CC Wiki 2010b).

See: Adam Curry v Audax (Curry v Audax 2006) and GateHouse Media, Inc. v. That’s Great News, (GateHouse 2010).


See for example: ‘Judge seeks commercial copyright solution’ (Colley 2010).

Interestingly, in the leading Internet copyright cases MGM Studios, Inc. v. Grokster, Ltd. 545 U.S. 913 (2005) at 954 and Universal Music Australia Pty Ltd v Sharman License Holdings Ltd [2005] FCA 1242 at [183]-[184], parties seeking to highlight the ‘non infringing uses’ of peer-to-peer technology pointed to Creative Commons licensed material.

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CREATIVE COMMONS INTELLECTUAL PROPERTY 63.17

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This book was published earlier this year, although the preface is dated June 2009 and most of the developments discussed are timed to a point in mid-2009. It is always difficult to pick the right time to publish a major piece on issues that are having continuing impact across the ICT sector.

Marsden is a lawyer and academic researcher who has been involved in various aspects of the issue set associated with net neutrality over the past two decades. He is based in the UK but has a sound appreciation of the developments in net neutrality in the United States as well. In fact, in his search for solutions to the fundamental challenges that the net neutrality debate throws up, he mines the opportunities in the United States, the UK and Europe generally.

Marsden has pitched his book to non-technical and non-lawyer audiences and does that fairly well. This is a solid background brief not only on net neutrality, narrowly defined, but on the broader issues that are intertwined in the same subject.

Of course, the nature of the preferred solutions depends on the characterisation of the problems and of the consequences. It is not giving anything away to talk of Marsden’s preferred approach, because he telegraphs that in the title of his book. However, co-regulation itself is, as he well points out, a slippery term that covers a lot of ground.

Net neutrality for Marsden is about connection to the Internet with a certain quality of service, and about the rules of the road for Internet users. He spends some time in the book making it clear what net neutrality is not. It is not about free access, nor is it about preventing the offering of higher service quality access, for example. The issues that he lucidly describes and analyses are all about the fundamental relationships that should, could or might be in place between users and service providers, and the balance of controls and obligations that might usefully result.

Part of the problem that has arisen recently is the development and refinement of deep packet inspection (DPI) technologies that enable service providers to examine the nature of the content being passed through their platforms and, potentially, to control it. Should users trust that the use of DPI technology will be benign, or should they insist that protections be established in legislative form to limit service providers? Not surprisingly, Marsden finds both outcomes to be unsatisfactory and his view of co-regulation is well worth pursuing, both in the book and more generally.

The existence and general availability of technologies such as DPI raises risks for ISPs as well of course. It limits their ability to argue that they should not be responsible for any illegal content that passes over their systems, and this in turn leads globally to the issues that were recently considered by the Federal Court of Australia in the iiNet case. In the latter case the ISP was exonerated, but it is inconceivable that this is the end of the matter or that the case will not be taken on appeal or that the issues will not be re-litigated in other contexts (see e.g. Lindsay 2010).

Marsden considers the state of net neutrality policy discussion in the United States under the Obama FCC and in the light of the Comcast case. It had already been established in
the relatively clear-cut Madison River Communications decision that an ISP cannot degrade the broadband service that customers had signed for in order to protect its telephone service against customer use of the service of a competitor (in that case the VoIP service from Vonage). Comcast used ‘throttling’ technology to slow high bandwidth applications that were not part of its applications suite. These were mainly P2P applications. The FCC found that Comcast had anti-competitive motives (not just network management imperatives as they had argued) and ordered Comcast to submit a plan of how it would move to non-discriminatory network management practices. The issue of FCC’s authority to regulate Internet services (long regarded by some as value added or data services outside the FCC’s common carriage remit) is now subject to appeal through the judicial hierarchy. An American version of co-regulation (or even direct regulation) of net neutrality, especially given the failure of the US Congress to legislate over the past decade, seems to be out of reach.

The approach to co-regulation that Marsden explores and argues for compellingly is informed by the recent regulatory experience in Europe. The approach he prefers is one where some basic provisions relating to net operations are established by the State in legislation, and the detailed rules and standards are provided via industry forums. The threat in this is that the State’s role will expand if the industry activity is inadequate or tardy. Some might regard the current approach to industry code and standard development in Australia, via industry forums such as the Communications Alliance, as reflecting such an approach. However, I think that Marsden’s co-regulatory universe has a much more proactive role for the State, and a much more responsive role for industry, with sanctions for delay (and, of course, dereliction). A distinction needs to be made between co-regulation and self-regulation. He uses the term in the European sense as ‘the mechanism whereby a Community legislative act entrusts the attainment of the objectives defined by the legislative authority to parties which are recognised in the field.’

In the end Marsden recommends a net neutrality lite approach secured by co-regulation in a light-touch regime characterised by transparency, reporting requirements and monitoring for abuse. Readers will need to refer to the book to see how he believes this might work. This is a course of action that I recommend. They will also be exposed to the full issue set, not just to Marsden’s specific solution.

ENDNOTES


2 FCC Order of 1 August 2008

3 Marsden, p.222, referring to the 2003 EU Inter-institutional Agreement.

REFERENCES

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Amongst career highlights, he has been an engineering executive in Telecom/Telstra successively leading network research, network product development, planning and network strategy (until 1993); subsequently a professor of telecommunications at two universities (RMIT and then Melbourne); and the founding CEO of a publicly listed company (Melbourne IT: from 1996 to 2000). From 1993 to 2003 he was Chairman of the Telecommunication Society of Australia Ltd.

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Dr David Warner is CEO of ELTHAM College of Education and Melbourne City School, independent, co-educational K-12 schools that have committed to transforming to relevant and challenging schooling for the 21st century knowledge era. Dr Warner has been a Senior College, TAFE and Higher Education Director and involved in education and labour market policy and research. The Australian Council for Education Research published his book, Schooling for the Knowledge Era, in 2006. Dr Warner has been a Key Note Speaker at International Conferences in Italy, Belgium, USA, Germany, Mexico, UK, China and New Zealand and invited presenter at several National forums.

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