Deloitte.

National Broadband Network

A user's perspective

September 2009

Contents

Executive summary

The Federal Government's 7 April 2009 decision to build a $43 billion national broadband network (NBN) signals the advent of a new digital era in Australia

The NBN, created and run as a wholesale only, open-access network by the government-owned NBN Company, will operate independently of existing copper-based broadband such as ADSL2+ or legacy cable broadband networks, but may draw on some existing infrastructure in this space.

The single largest investment by any Australian government, the NBN will play a critical role in advancing key national indicators including GDP, employment and productivity.

Deloitte believes the NBN has the potential to rival the impact of other technology milestones such as the widespread adoption of personal computers in the 1980s and the mass market adoption of mobile phones during the 1990s and 2000s.

While the results of the proposed NBN implementation study will not be known until early 2010, the NBN's future impact can already be anticipated. The proposed implementation study will need to identify what impact the NBN will have on specific industries and businesses to properly consider the likely drivers of end-user demand such as design, pricing, return on investment and funding issues.

It will need to consider uptake in the consumer market and the drivers for this. Until now, not enough attention has been given to these likely end-user demands and key NBN stakeholders must incorporate these elements into the network design in order to achieve operational success.

Now is the time to shift from the technical discussion to the applications and innovations that are really going to transform Australia and the way we live and operate.

This report, by Deloitte's Technology, Media & Telecommunications industry team, highlights many of the likely end-user demands that should be factored into the design of the NBN.

For consumers and small-to-medium businesses (SMEs), a 100 megabit per second fibre-to-the-home (FTTH) network will usher in a new era of digital products and services. Businesses and governments will deliver more services through this network.

It forecasts the arrival of a world where high-speed broadband delivers new video content, security and utility applications directly to the home. Smart metering devices will record most household's energy consumption in small units of time and facilitate new green-energy delivery options by national utilities.

At an even more transformational level, the NBN will unify the ability of households to deploy automation technologies such as lighting controls, heating, ventilation and air conditioning (HVAC) systems and home security networks. Widespread adoption of home automation technologies will give utility providers or telecommunications carriers the opportunity to consolidate billing services through a single provider connected directly to the home via the new network.

Above all, it provides the opportunity to create a digitally-based country better connected both inside and outside Australia.

The NBN must also meet the demands of national objectives relating to emergency response and homeland security. Environmental and social policy objectives will also influence the network solution, including ensuring the network extends to remote areas, fringe areas and offshore islands. In addition, the NBN must over-achieve on environmental targets for energy efficiency, provide an effective basis for indigenous and SME empowerment, achieve world competitive cost levels and fuel the export of electronic business services.

Deloitte has identified seven primary challenges that threaten the success of the NBN and the future applications and services expected to be delivered using this infrastructure:

- End-user retail packaging and migration
- Competition and regulation
- NBN Company funding and structuring
- Design and construction
- Support for innovation and delivery of new applications
- Disruption due to the Federal Government election cycle
- Vertical and horizontal integration of private sector industries, and government departments and utilities.

These challenges are outlined in further detail in this report.

Timings for the NBN

Australia has failed to keep in step with the development of broadband networks in other advanced countries in terms of adoption, cost and speed

Australia ranks 16th out of 30 OECD countries for broadband adoption and Australians pay more for broadband than most OECD countries. Australia also has the third most expensive fixed line services for SMEs.[1]

An analysis of current OECD figures by Deloitte, reveals Australia's ranking for the fastest advertised speed was 15th of 30 with just 30 megabits per second in 2008. Australian Internet speeds are significantly slower than the one gigabit speeds enjoyed by Japan and 100+ megabit speeds available in Denmark, France, Iceland, Korea, Sweden and Finland[2].

Further analysis of these figures reveals Australia is one of the top ten most expensive countries for DSL subscriptions – ranking seventh when local currencies are converted to AUD[3]. Luxembourg, Austria, Norway, Belgium, Netherlands, Finland, Denmark, Ireland and Spain are all significantly cheaper, as are the two countries with the fastest download speeds, Japan (ranked 24th out of 30) and Korea (ranked 27th out of 30).

Much comment acknowledges the relative ease of deploying high-speed broadband in countries like Japan and Korea which have high levels of population density. Yet given the obvious difference in population densities and associated FTTH funding costs between these countries and Australia, studies show broadband development and adoption will thrive when it becomes a national priority[4].

The research highlights the failure of previous Australian broadband policies and regulation that has left broadband subscribers with slow download speeds and high costs when compared to other nations. Some would say one reason for Australia's delay in embarking on a large scale, long-term broadband investment, is the difficulty faced by political parties when it comes to extracting an equivalent electoral 'reward' given the short three year federal electoral cycle.

[1] Federal Government *21st Century Broadband Report* – http://www.dbcde.gov.au/__data/assets/pdf_file/0009/110016/21st_Century_Broadband_-_Brochure_low_res_web.pdf
[2, 3] Conversion rates accurate at 6 May 2009.
[4] *Lessons from broadband development in Canada, Japan, Korea, and the United States* Penn State University – http://front.sjtu.edu.cn/datacomm/reader/Lessons%20from%20broadband%20development.pdf

It remains incumbent on the wider business community to examine the impact of a FTTH network on 'traditional' operations and to immediately start planning

Despite this political limitation, the Federal Government announced on 7 April 2009 that FTTH broadband would not be complete until 2017 and would include the following elements[5]:

- 100 megabits per second network connecting 90 percent of homes, schools and workplaces
- 12 megabits per second connecting the remaining ten percent of locations with wireless, satellite or other network technologies
- National wholesale only, open-access network
- A 'future-proof' fibre-optic network that can be upgraded in the future to deliver download speeds greater than one gigabit per second[6] (this will bring Australia in line with present day download speeds in Japan and Korea)
- Create an average of 25,000 jobs every year for eight years, with a peak of 37,000 jobs directly supported by the NBN.

Senior Australian technology, media and telecommunications executives interviewed by Deloitte as a part of compiling this report, praised these details as financially and politically sound while unanimous about the need for Telstra's assets to be involved.

Without prompting, the executives immediately identified the NBN's long-term economic and productivity outcomes for their field of expertise and industry, and others that 'are just common sense'. The executives drew heavily on the experience of other nations deploying FTTH as part of the justification for the network's value. It was felt that it remains incumbent on the wider business community to examine the impact of a FTTH network on 'traditional' operations and to immediately start planning.

[5] Department of Broadband, Communications and the Digital Economy website: http://www.dbcde.gov.au/communications_for_business/funding_programs__and__support/national_broadband_network

[6] Department of Broadband, Communications and the Digital Economy website: http://www.dbcde.gov.au/__data/assets/pdf_file/0009/110016/21st_Century_Broadband_-_Brochure_low_res_web.pdf

NBN opportunities: short, medium and long term

The scope of the NBN guarantees it will touch almost all segments of the Australian economy. Significant opportunities therefore exist for a range of companies, institutions and organisations of all sizes.

From a high-level perspective the greatest opportunity – for consumers and business alike – is the social and economic benefit to be derived from participating in one of the fastest ever examples of technology deployment in Australia's documented history.

The Internet, in its current state, is recognised for having been adopted more quickly than electricity, the car or television. Yet, its rapid ascent to mainstream status didn't occur until approximately 1995 when the Netscape browser arrived. Adoption of pay TV followed a similar trajectory. If this uptake pathway is used as a proxy for widespread NBN adoption, it is likely that prolific use may not occur until after 2020 or later as many to many access (across a meaningful percentage of the population) is critical to driving uptake momentum.

The NBN will be exploited and adopted by an ageing Generation Y and Generation Z – or the 'digital natives' – for whom broadband and mobile phones have always been a reality

Companies that develop or tailor NBN specific applications and services, according to the unique traits of specific users and generations, stand to make the greatest gains. This is, no doubt, one reason why Arqiva (previously 54% owned by MCG, now CPP Investment Board) recently got involved in the iPlayer technology from BBCW, ITV and Channel 4 (Project Kangaroo).

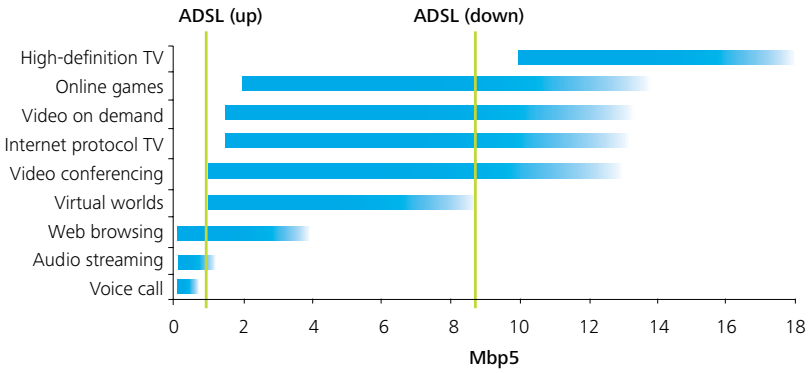
Regarding the business drivers and opportunities, a joint report by Deloitte and the Australian Industry Group (AIG), published in October 2008 and titled 'National CEO Survey – High Speed to Broadband', revealed CEOs believe faster broadband speeds will lead to greater levels of innovation, productivity and business growth. Forty percent of CEOs who responded to the survey anticipate large increases in the external exchange of information and data, across manufacturing, supply chains, transactions and customer relationship management.

Significantly, 36 percent of CEO participants believe faster broadband will create new e-commerce related efficiencies and business opportunities.

Indeed, Australian consumer and business appetite for broadband services should not be underestimated. Household access to the Internet more than quadrupled from 16 percent to 67 percent between 1998 and 2007–08.[7] Access to computers grew from 31 percent to 75 percent during the same period.

[7] Graphic from OECD Broadband Portal: http://www.oecd.org/sti/ict/broadband.

As the following OECD graphic illustrates, once a nation moves beyond 1.5 megabits per second download speeds, a range of new services become immediately accessible by homes and businesses.



Source: OECD

In that context, NBN opportunities can be seen within the following timeframes:

1. Short term (one to two years)

- Private sector contracts for advisory, consulting and engineering, network infrastructure and equipment sales
- Political gain from amicable negotiations with Telstra, Optus, VHA and other telco's, ISPs and industry constituents
- Internet and technology startups to receive venture funding for the development of applications and services that will leverage the NBN.

2. Medium term (two to five years)

- Business appetite for new services will rise in line with public awareness of the NBN's advantages
- Key technology innovations and business models will emerge to deliver advanced services for the telecommunications, media, health, education, and consulting industries
- Utility providers, building specifiers and developers will work through regulatory and competitive hurdles to establish standards-based methodologies for smart metering and home automation products
- Consumers and business will benefit from more competitive broadband packages that include lower pricing, larger download limits (if any – a debate for another day) and faster speeds. This is a critical objective already expected in the wider business community. The *National CEO Survey – High Speed to Broadband* report revealed 39.7 percent of respondents cited lower telecommunications costs as very important.

The Internet becomes the primary infrastructure channel for high definition video and audio content streaming and downloading

3. Long term (five plus years)

- Deployment of new services and business models to support Internet protocol television (IPTV), e-commerce, and advanced security networks
- Utilities such as a power, water and gas – possibly combining with telecommunications carriers, financial services providers, media, technology and retail operators – to offer consumers single-bill options for the household via secure payment services that leverage FTTH infrastructure. For example, a set-top box (or similar features embedded in high definition TVs) could manage the majority of a household's regular bills and metering
- The Internet becomes the primary infrastructure channel for high definition video and audio content streaming and downloading
- Advanced social networking and digital media applications leverage fixed and mobile devices that operate on the home network and seamlessly roam to public wireless data networks. Current examples include Skype which, via a single bill, maintains live mobile video calls between private and public networks
- Eventually the Federal Government generates revenue from the planned sale of the NBN Company.

Learning from others

Australia has the opportunity to learn from many relevant international examples, such as the British Telecom (BT) experience in the UK

Deloitte worked with BT on many of the regulatory and strategic challenges in establishing Openreach – the stand-alone, independent wholesale company created in 2006 – as well as the functional separation of BT's retail, global services and wholesale business.

The Openreach experience is relevant due to its similarities with the Australian situation: the roll out of a high speed national broadband network involving the functional separation of wholesale and retail networks (a possibility being considered for and by Telstra), in an English-speaking, common law society, with similar industry characteristics.

Benefits already on offer to end-users in the UK include the establishment of fixed prices for more than six million copper lines unbundled from the BT network[8]. BT also expects to offer its fibre-to-the-cabinet (FTTC) services with download speeds of 100 Mbps to more than one million premises next year[9].

It must also be noted that Australia's NBN Company could significantly benefit from the opportunity to employ, or use as contractors, some of the experienced engineers among the 15,000 employees retrenched from BT's services unit in May 2009[10]. While care must be taken not to 'give away' jobs within our own economy, experienced engineers who have worked at BT and Openreach would help mitigate the technical risks associated with the NBN.

Australia also had the opportunity to learn from numerous Asian FTTH network rollouts. South Korea currently has the highest market penetration (44%), followed by Hong Kong (28%), Japan (27%) and Taiwan (12%). In terms of total fibre-connected homes, Japan leads with 13.2 million households, followed by the United States (6.05 million) and the People's Republic of China (5.96 million)[11].

From an industry perspective, the Fibre To The Home Council reports that FTTH subscribers spend between 20 and 30 percent more than DSL subscribers, not because the basic services are more expensive, but because they purchase the premium services offered by network retailers.

[8] *Ofcom confirms new wholesale telecoms prices for BT's Openreach* – http://www.publictechnology.net/modules.php?op=modload&name=News&file=article&sid=20112
[9] *BT doubling pace of fibre rollout* – http://www.businessweek.com/globalbiz/content/may2009/gb20090518_437752.htm?chan=top+news_top+news+index+-+temp_global+business
[10] *15,000 jobs to go at BT after pension-costs hike* – http://networks.silicon.com/telecoms/0,39024659,39430895,00.htm
[11] *Fiber to the Home Continues its Global March* – http://www.ftthcouncil.org/?t=311

The benefits to workers are also clear. According to a survey by the US FTTH Council more than 13 percent of FTTH subscribers work from home more often – an average of 7.3 more workdays at home per month[12].

Other countries of note, each for different reasons, include Singapore, Germany and some parts of the US.

* For more information regarding the British Telecom experience and Deloitte's involvement go to **www.deloitte.com.au** and click on the interview with Jim Sloan, Deloitte UK's Vice Chairman and Lead Partner for both our British Telecom account team and the engagements referred in their report.

[12] http://www.ftthcouncil.org

Uses for the NBN

Mass adoption of the NBN across business sectors, government and households will serve as the catalyst for a number of trends that Deloitte expects will provide both positive and challenging elements of disruptive change

'Smart home' automation

An industry-wide push by companies in the electronics, consumer technology and home automation fields has resulted in an expanding set of standards that can be exploited in the 'smart home' to offer features such as integrated lighting controls, HVAC and advanced security monitoring.

While the smart home automation market will not reach mass adoption until the cost of acquiring and installing home automation technologies falls dramatically, researchers including ON World predict that by 2012 the Wireless Sensor Network (WNS) smart home market will be worth US$2.8 billion worldwide, up from just US$470 million in 2007. ON World also reports the fastest growing smart home segment will be home health[13], a view shared by the Federal Government which believes the NBN will spur a range of new e-health initiatives.

e-health

E-health will provide consumers with electronic access to the information needed to better manage and control their personal health outcomes. It will enable multi-disciplinary teams to electronically communicate and exchange information and provide better coordinated health care across the continuum of care.

According to the 'National e-health strategy for Australia' (Dec 2008) developed by Deloitte, the success of e-health is reliant on the establishment of a national infrastructure that can enable the sharing of data across geographic and heath sector boundaries by all Australian care providers.

The National e-health strategy outlines the importance of ensuring that 'national communications infrastructure will be fit for e-Health use and is priced in a manner that does not discourage the sharing of health information across geographic and health sector boundaries.'

The NBN could become the foundation that enables the delivery of e-health benefits to all of Australia.

[13] http://www.onworld.com/smarthomes/index.html

Examples of fibre networks delivering e-health and IPTV services already exist. In 2007, ASX-listed IBA Health established a joint venture in China with Shanghai People's Health Information Technology to connect doctors and patients over a fibre network. The company simultaneously developed a health channel broadcast using China's only IPTV services, BesTV[14].

The company has continued to expand this service beyond the initial trial of 20,000 patients connected to 11 hospitals within the Shanghai Changning District[15].

Smart metering

Victoria is already investing in the adoption of smart metering technology for energy consumption. In 2009, the state began a four year process of installing 2.9 million new 'AMI meters' to give Victorian consumers detailed information about their energy consumption.

This technology represents a significant step beyond simple electro-mechanical accumulation meters that only record total consumption and are manually read every three months.

The new meters provide micro measurement and help consumers reduce their power bill and in turn greenhouse gas emissions.

The adoption of smart metering paves the way for a broader push by the government to adopt smart grid technologies, as detailed in the 2009 Federal Budget. The government has allocated $100 million to create a smarter and more efficient energy network using smart grids, and is investigating how it will leverage the NBN to make the system more effective[16].

The future of telecommunications

The NBN will accelerate a phenomenon already unleashed since the advent of personal digital assistants and the popularity of mobile phones in the 1990s. Carrier revenue growth will shift from simply exploiting broadband and telecommunications infrastructure to also creating value at the edge of the network where mobile devices and Internet-based applications are used by consumers.

As NBN adoption reaches critical mass, consumers and businesses will become increasingly aware that the technology itself is not important. Value shifts from the straight sale of telecommunications networks to the services carriers and third-party businesses, can offer consumers in a highly targeted and segmented fashion.

[14] http://www.ibahealth.com/html/iba_china_update.cfm
[15] http://www.ibahealth.com/html/iba_selected_for_china_e-health_projects.cfm
[16] http://www.minister.dbcde.gov.au/media/media_releases/2009/042

In practical terms, this means carriers will seek to extract more revenues from applications and services. Telstra is among a number of global carriers already pursuing this opportunity through either directly or indirectly monetising content provided by its BigPond division and the recent launch of a software-as-a-service (SaaS) offering called T-Suite[17]. T-Suite seeks to capitalise on interest in SaaS by aggregating messaging, collaboration and business process software from companies including Microsoft, and delivering it as a hosted service.

It can be expected that the NBN Company will usher in a wave of tighter industry regulations that create more certainty around the margins carriers can make from selling basic FTTH services

The telecommunications industry must therefore examine and deploy new revenue-generating IP based applications and services. In the UK, BT played a leading role in the design, development and now management of the country's National Health System. It can be expected that the NBN Company will usher in a wave of regulations that create more certainty around the margins carriers can make from selling basic FTTH services. SaaS-style services create new growth opportunities, particularly in the lucrative small to medium enterprise (SME) market.

The future of television

Television's traditional advertising-centric business model will continue to evolve as content owners, carriers and ISPs license television and movie content to stream via IPTV.

All content providers will have the opportunity to adopt low-cost paid content models where consumers use the NBN infrastructure to buy TV shows, movies and other programming or content using a variety of methods that mirror present-day mobile phone plans: monthly caps on downloads, pay-per-view, or monthly subscriptions. A similar model already exists with Apple's iTunes Music Store (whilst the consumption of audio has very different characteristics when compared to the consumption of video). Free content will of course continue to exist, as will advertising but in a more targeted, dynamic fashion. Ubiquitous Internet access will cause changes to some markets more than others (print in particular), but it will be speed and bandwidth that will revolutionise the video market.

Opportunity will also exist to integrate these television content services with software and hardware devices that manage home-based shopping and e-commerce services, as outlined previously. This same infrastructure will also support the growth of multi-player gaming services that merge with social networks – already a major leisure activity for Generation Y.

[17] http://www.telstrabusiness.com/t_suite

At the same time, consumer-generated content will leverage the NBN to find new audiences. The medium term impact of the global financial crisis (GFC) in conjunction with a fully operational NBN, will be a shift away from 'pure brand' advertising to more targeted models. The former may never return to what it was. The NBN, which will expedite the process of making every home essentially an IP address for which a profile can be established and made available, will encourage more targeted advertising through multiple media channels. The challenge of measurement will have to be overcome. TV in the home won't be the same again. This will also drive strategies that embrace highly targeted and niche media channels where clearly defined customer segments are located.

Video streaming services such as Ustream.com already offer in-stream advertising and integrated support for social networking services. Advertising revenues derived from mass adoption of video streaming represents a new revenue stream.

The future of television hardware and software

While sites such as Hulu.com are currently restricted to the US, local carriers and content providers such as Telstra, Optus, VHA, Foxtel – and of course each of the major TV broadcasters – will have the opportunity to deploy video technology to deliver TV programs and movies via dedicated hardware and software devices that leverage Australian consumers' existing comfort level with pay TV in the home. Not least more of this content is likely to be delivered in HD. Hulu.com and Vimeo already support HD video and recommend download speeds above 2.5 megabits per second.

New video sharing software is also likely to emerge as consumer-generated video content continues to grow in use and sophistication thanks to falling prices for personal video recorders and the growing ease, with a high speed NBN, with which such content can be sent and received, even direct from each device connected wirelessly to a network. Video in the medium term will become the norm.

New video sharing software is also likely to emerge as consumer-generated video content continues to grow

The future of the home phone

In the home, video phones will become commonplace and begin to rival free Internet-based services such as Skype and Google Talk if pricing and quality issues are adequately addressed.

In Australia, we also have 'digital switchover' occurring on a similar timeframe to the proposed rollout of the NBN. Perhaps, it should have been an 'IP switchover' program. That aside, at some tipping point in the near future we will start to see more traditional software bundled with what we currently know as our TV. Not just embedded software helping the TV function, but software exposed and interacted with by the end user. Software that will be aimed at managing not just the home's connection to the network, but aspects of the home itself – think not Microsoft Office, but more a Microsoft Home or equivalent. One package with a core suit of applications.

Telepresence technology

Faster broadband speeds are likely to herald the migration of corporate video conferencing from the boardroom to the office desk.

In this way, the NBN can play a significant role in reducing travel costs and the carbon footprint of businesses and other organisations. A recent article in the Australian Financial Review[18] highlighted the increased use of such technology.

That is, Internet protocol-based high definition communications technology. This involves the use of a high definition plasma, LCD or desktop screen via an IP link and high-powered broadband connection to conduct videoconferencing.

Companies such as HSBC and EasyNet in the UK have been using this technology in recent times, with the latter claiming to have cut staff travel costs by 20 per cent as a result.

The article points out that organisations can save millions of tonnes of carbon emissions by using such technology. It cites the example of the UK Minister for the Environment, Phil Woolas who, in 2008, spoke from London by telepresence at the 2nd Annual Climate Change Summit in Sydney, saving 6.2 tonnes of CO2 emissions, 60 hours' travel and about $10,000 in costs. Another example cited is HSBC. The bank has set up six identical boardrooms with the latest telepresence technology and by the end of the year it 'aims for every person with HSBC Holdings in the UK to have a desktop monitor that has an in-built web camera with the ability to link to one of the banks' 1000 or so video conferencing meeting rooms'.

According to the AFR article, only 14% of organisations are using this technology in Australia. The NBN would enable more to use this high quality videoconferencing solution.

[18] Suttie, Angela 2009, Big bandwidth paves a path to the world, Australian Financial Review, 4 June, p.10, Special Report (Meetings and Events)

The future of education

Internet-based learning will become even more widespread in primary schools, secondary schools, universities and the workforce as international collaboration and IP video-based education becomes commonplace.

The federal government's $2 billion 'Education Revolution' includes spending of $807 million for computer-related infrastructure. The government's goal is to have a 1:1 computer to student ratio by 2011[19]. The NBN will clearly support the adoption and use of computers through high-speed access at homes and schools, even content sharing with one or more classrooms or campus. Our children will wonder why we ever wrote formulae or answers on the back of a ruler or inside of a calculator. Clearly ensuring how this money is spent and how contracts are structured to provide some flexibility and agility is critical.

With this in mind, it is no wonder Google are on a campaign to digitise the many libraries around the world – maybe they are not looking as far forward as many of us may believe.

The future of commerce

Australia's still nascent online retail industry will be forced to re-invigorate digital sales channel and marketing strategies as consumers increasingly look offshore for certain products in key sales categories such as fashion, electronics and entertainment. Major retail operators will have the opportunity to convert today's catalogue-based websites into dynamic sites that combine customer feedback and forum-style conversations (video, audio and text), with embedded e-commerce and home delivery functionality.

Greater competition between carriers and ISPs will lead to a new generation of Internet service providers looking to provide innovative new value-added services. This scenario may forge an opportunity for carriers to partner with hardware manufacturers and financial institutions to create 'payment portals' that operate on a low-margin 'clip the ticket' model.

These devices, directly connected to a FTTP network, could simplify the payments landscape and integrate two previously disparate groups on the IPTV screen: transactions with private business and government departments.

[19] http://www.deewr.gov.au/Ministers/Gillard/Media/Releases/Pages/Article_090512_182902.aspx

The NBN's critical success factors

Deloitte has identified seven key factors that must be considered for the proposed NBN to be successfully adopted by mainstream Australia

1. End user retail packaging and migration

In simple terms, the services sold by carriers using the NBN Company's wholesale service must compete directly with existing ADSL and cable-based broadband services.

Pricing must compare favourably with these services to promote the switch to new services. Deloitte believes that speed alone will not be a strong enough driver to convince the vast majority of households to adopt a premium service.

2. Competition and regulation

While a common NBN wholesale company will create a 'level playing field' for retail operators, the Australian Competition and Consumer Commission (ACCC) will continue to play a critical role in setting wholesale access prices and monitoring the competitive landscape.

If any incumbent telco's network continues to have a significant price and performance advantage over the incoming NBN Company and retailers using it, clearly there will be issues.

3. NBN Company funding and structuring

NBN funding arrangements include an assumption that consumers will invest in essentially government bonds. This, if correct, exposes the scheme to fluctuations in the bond market. Recent gains in the bond market due to heavy government borrowing are a positive sign. However, continued uncertainty in the global economy means the tax payer may yet further subsidise the NBN. There are also questions as to how a network offering speeds of greater than 50mbps (in a geographically dispersed country like Australia), can achieve the government's objectives without the bulk of current infrastructure being vended in.

However, driving a commercial return is one of the Government's stated objectives. Whether it can or cannot, the NBN is still a national building program to which the current Government is committed in order to realise the short, medium and long term benefits for Australia.

4. Design and construction

In the event that Australia does not have enough genuinely skilled engineering and project management capability to complete the NBN, offshore contractors will be required to complete the task. Detailed studies are yet to demonstrate the depth of engineering skills required to complete a project of this size.

5. Support for innovation and delivery of new applications

The government must sustain, and build on, existing support for Australian research and development institutions, including National ICT Australia and CSIRO. In addition, further support and development of Australia's nascent technology startup industry is required to develop a range of software applications and services that will drive demand and uptake of the NBN, as well as products that potentially can be commercialised as other markets around the world follow suit.

6. Disruption due to the federal government election cycle

Previous attempts to develop a national framework for developing Australia's broadband capabilities have been hindered by many things, including the three year election cycle.

There would naturally be a level of uncertainty for the NBN completion, in its current proposed form, should the political landscape change in Australia.

7. Vertical and horizontal integration of industries and government departments and utilities

Sustained government-led coordination is required to ensure that the industry and market sectors impacted by the NBN are progressively aligned to exploit the NBN.

For example, the delivery of e-health services will require further investment in the adoption of standards for maintaining medical records and privacy. Pharmaceutical companies, doctors and hospitals will all need to be required to engage new and currently unprecedented levels of coordination and cooperation to make e-health services a reality.

The following time-line horizon discusses these challenging issues that could hamper the NBN in further detail.

1. Short term (one to two years)

- Funding or bureaucratic delays related to the completion of research and the proposed feasibility study. A detailed bottom-up planning, costing and benefits assessment must be completed to explain the solutions for (and impact on) local communities, states and the nation
- Difficulties finding consulting and engineering partners who can deliver the complete NBN and who have actually done it before (in the telco space)
- Achieving the commercial objectives of the NBN will be difficult unless full cooperation with Telstra is gained

- The negotiating framework for clearly establishing what various existing assets are worth to the future NBN solution and their value to the current owners must be determined and viewed dispassionately with a real understanding of capabilities and legacy constraints
- The policy and regulatory issues must be developed to encompass both the new NBN network and legacy networks of current telecommunication service providers. Failure to do so will undermine the NBN's capacity to achieve commercial rates of return, ensuring appropriate consumer safeguards and remain aligned with the Government's policy objectives
- Being clear about the financial trading model between NBN, other operators and third parties
- Building-in the supporting systems for the customer into the solution from the outset (speed of connection, fault rectification, billing quality, greenhouse gas mitigation etc.). In most very high bandwidth rollouts worldwide, the OSS & BSS and associated processes have been ignored at the peril of the undertaking. These systems are complex and risky, and getting them wrong can derail broadband access rollouts in powerful ways causing underperformance, delays or cost overruns
- Getting the Tasmanian rollout established.

2. Medium term (two to five years)

- Inefficient rollout of the network could create budget-blowouts and associated political fallout
- A change of government threatens the long-term vision of a FTTH network
- Slow uptake of NBN subscriptions by business and consumers could be a reality unless broadband packaging is competitively priced. Lessons can be learnt from the UK in this regard
- Similarly, take-up could be slow unless applications are developed by operators and third parties to encourage usage (the example of the Apple iPod and the now many applications for it is a classic example of how to create demand – open it up to the community, early).

3. Long term (five to ten years)

- Core elements of the network, such as network nodes, will require costly upgrades at regular intervals
- Satellite and wireless networks will require heavy investment, and possible subsidies, to ensure they meet the minimum download speeds
- Technical, political and business process-related complexities could hinder the adoption of innovative opportunities such as IPTV, e-health, and smart metering
- Constraints around our current bandwidth links to the rest of the world
- Upgrade profile of the network to even greater speeds as affordable technologies evolve.

Conclusion

Deloitte believes it is now time for the end-user and business operators to be more heavily factored into the public debate and planning of Australia's NBN. Above all else, these groups will drive the success or failure of the NBN. They need to be considered from the outset and not at the conclusion of the building of the NBN's infrastructure or even at the implementation study stage.

What the last five or ten years has taught us is that to create an open network you must design it in an open way – that includes open consultation, formally, informally and early.

Creating a strong and competitive operating environment is essential, as are the consumer propositions required to ensure steady migration to the new network

The NBN is likely to surface a number of unexpected issues. As such, government legislation will also be progressively required to cope with a converged digital economy where issues of privacy, service provision, access regimes, regulation, competition and security are redefined as a consequence of faster broadband speeds.

In the short term, the Federal Government's role as the owner of the NBN requires it to carefully and deliberately encourage sustained private sector investment in the consumer applications and the services that will drive the NBN's adoption. This planning needs to begin sooner rather than later and be heavily featured in the NBN design.

About us

The Deloitte Touche Tohmatsu (DTT) Global Technology, Media & Telecommunications (TMT) Industry Group consists of TMT practices organised in various member firms of DTT. It includes more than 6,000 member firm partners, directors, and senior managers supported by thousands of other professionals dedicated to helping their clients evaluate complex issues, develop fresh approaches to problems, and implement practical solutions. There are dedicated TMT member firm practices in 45 countries and centers of excellence in the Americas, EMEA, and Asia Pacific.

DTT's member firms serve nearly 90 percent of the TMT companies in the Fortune Global 500. Clients of Deloitte's member firms' TMT practices include some of the world's top software companies, computer manufacturers, wireless operators, satellite broadcasters, advertising agencies, and semiconductor foundries – as well as leaders in publishing, telecommunications, and peripheral equipment.

Our Australian firm is an active member of this community and locally has worked on some of the largest and most significant transactions in the TMT industry over the last decade. Globally we've supported governments and corporations on programs of work almost identical or similar to the NBN in the UK, US, Germany, Canada and elsewhere.

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Designed and produced by Aqua Media, AM_Mel_09/09_038896