

Towards an Australian Digital Communications Strategy

Lessons from Cross-Country Case Studies

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Abstract: In the early 21st century, governments developed national broadband plans to supply high-speed broadband networks for the emerging digital economy and to enable digital services delivery. Most national broadband plans are now focused on moving to ever faster networks, but there is a growing need to develop national digital communications strategies to focus on the demand-side of the broadband “eco-system”. In this paper, we outline the approaches adopted by the United States, Canada, the United Kingdom, Singapore, and Korea to assist in the development (or renewal) of Australia’s national broadband strategy, or, as we prefer, national digital communications strategy. The paper draws on the lessons learned from the case-study countries and the recent pandemic and considers some theoretical aspects of the broadband ecosystem. We conclude by suggesting a process to re-evaluate Australia’s national digital communications strategy as it rolls forward, and to incorporate recent international trends to develop demand-side policies to enable greater adoption and use of existing broadband infrastructure and digital services.

Keywords: Broadband connectivity, broadband demand, broadband supply, digital communications strategy, national broadband strategy

Introduction

In the first decade of the 21st century, governments developed policies to enable residents to have improved access to broadband networks. In Australia, this trend was reflected in the successful 2007 federal election campaign by the Labor Party to support fixed broadband access to all premises, a policy that eventually led to the National Broadband Network (NBN)

provided by a government-owned company. At the same time, Mobile Network Operators (MNOs) were deploying ever more capable mobile broadband services. These deployments represent the *supply* side of a national broadband strategy.

In the second decade of the century and subsequently, attention has turned to the *demand* side of broadband. This is to ensure that all participants in the digital economy and digital society are able to use the broadband facilities that have been made available, driven by a range of social values, such as inclusion, fairness and equity. When TelSoc undertook an assessment of progress in Australia towards a national broadband strategy at the end of 2021 ([TelSoc Broadband Futures Group, 2021](#)), it found that there were some initiatives on the demand side but that they were generally of small scale and uncoordinated. Particularly after the COVID-19 pandemic, when online medical consultations and online education became widespread, it is no longer satisfactory to leave demand-side support to piecemeal solutions. A coherent, strategic approach is required for greatest effect ([ITU, 2022a](#)).

It is important to note at the outset that not all actions are in the hands of the government. Clearly, MNOs and other telecommunications-related companies and industry stakeholders have a major part to play in supplying broadband and digital services and in educating their customers on how best to use the facilities they provide. The role of government is assuredly to intervene directly in those places where the competitive market fails but also, more importantly, to define an overarching direction and set a policy that can offer guidance and can support ongoing investment by private companies. This is what we refer to as a national digital communications strategy.

This paper, then, looks at what has been undertaken in other jurisdictions and how effective these actions have been, in order to identify initiatives that could be undertaken in Australia as part of a national broadband strategy or, as we now prefer, a national digital communications strategy. The paper is arranged into four sections. The first section provides an overview of the policy approaches adopted by the case-study countries. The second section examines supply-side policies and the relevant outcomes on the basis of per capita take-up of broadband services. The third section considers demand-side policies and outcomes (where measurable) and the final section outlines an ongoing renewal process for an Australian national digital communications strategy based on the lessons learned from the case-study countries.

Overview of the Case-Study Countries

All advanced economies and most countries have a “broadband plan” of some sort. Indeed, the ITU ([ITU & CISCO, 2013](#)) encourages all countries to do so. Australia could therefore draw inspiration from a wide variety of sources. We have selected case-study countries not just for

their direct relevance to Australia but also where innovative solutions have been implemented or where relevant challenges have been addressed. This section provides an overview of each of the case-study countries.

The United States is a rich and geographically diverse country in which there is a strong preference for private-sector solutions and a reluctance for government intervention. About 85% of US homes ([Martin, 2021](#)) have an Internet subscription. Nevertheless, the federal government has recognized that access to the Internet is an essential service and has identified unserved and underserved areas of the country ([FCC, 2010](#)). In recognition of the economics of broadband rollout, it has also identified “anchor institutions”, such as schools, hospitals, and government buildings, that should have high-speed Internet access. The interaction between the various levels of government in adopting these anchor institutions requires an interesting form of cooperative federalism, with federal leadership in broadband supply setting supply-side goals: a minimum of 100/50 (100 Mbps downstream towards end users; 50 Mbps upstream) broadband access to 100 million homes (about 82%) and at least 1 Gbps service to anchor institutions. On the demand side, it has recognized that affordability is not the only barrier to broadband take-up: a lack of digital skills or awareness can also limit access.

Canada is a geographically diverse country with responsibility for telecommunications divided between federal and provincial (state) governments and a dependence on private-sector initiatives. The emphasis has been on the provision of high-speed Internet services to rural areas, to match what is available in cities. There have been federal, provincial, and municipal initiatives, with the more populated provinces of Ontario ([Ontario Government, 2022](#)) and Quebec being particularly active.

The United Kingdom has a history of competitive mobile communications and an analytical and effective telecommunications regulator, Ofcom. The government and regulator have encouraged fibre access to homes and businesses over many years and the UK’s broadband supply strategy is focused on producing a 1Gbps service ([Hutton, 2022](#)). On the demand side, the government has recognized the need to encourage digital competence to address social, economic and equality gaps. It has also noted that trust is an important element in the decision to take up and use digital services ([Department for Digital, Culture, Media & Sport, 2022](#)).

Singapore is a country with a strong centralised government and an emphasis on economic development and international competitiveness. It views affordable broadband access as part of a “smart nation” development. On the supply side, it was one of the first nations to offer an affordable 1 Gbps service ([World Bank, 2018](#), p. 185). On the demand side, it has emphasised bringing low-income families and individuals online.

South Korea has used telecommunications technology as one mechanism for economic revival and development over the past 30 years. It established a world-leading mobile communications service through strong co-operation between the government and industry (industrial conglomerates). It then established widespread fixed Internet access through a variety of mechanisms. The continued co-ordination between government and advanced industries maintains South Korea as a high-tech nation. As a leader in broadband supply, it also is a place where social issues related to Internet usage first become apparent. Demand-side initiatives in municipal areas are helping residents to access digital government, transport, health, and financial services through hands-on assistance.

Supply-Side Policies and Outcomes

In the early 2000s, most advanced economies focused on deploying infrastructure to provide access to broadband Internet services as a priority. While countries such as Korea and Canada, both early leaders in broadband supply, pursued deliberate strategies to bridge the digital divide, in other jurisdictions, digital literacy was, for the most part, a secondary matter to the provision of broadband infrastructure in the first decade of the 21st Century. Although the supply-side focus rested on a strategy of “build it and they will come” (ITU, 2012, p. 70), a focus on digital literacy posed a chicken-and-egg quandary for many administrations, with concern that supply and demand might be imbalanced one way or the other for long periods. As with most networked technologies, historical legacies and previous adoption patterns suggest there is no single optimally affordable way to deploy broadband networks: the variety of peculiarly local and national issues influence the type of technologies that have been or can be adopted and therefore the policy approaches that can be employed to stimulate further deployments.

Hughes’ (1993, p. 405) research into electricity systems in Germany, the US, and the UK found that local conditions resulted in distinct technological styles in each jurisdiction. Hughes defined these conditions that existed external to the technology as cultural factors: “geographical, economic, organizational, legislative, contingent historical, and entrepreneurial conditions... factors [that] only partially shape technology through the mediating agency of individuals and groups”. However, electricity systems are passive networks where users have limited choices about how the network is deployed or used, whereas modern communications systems provide suppliers and end-users with a variety of choices about the means of delivery and the use of the services. Rather than “cultural factors”, the various connectivity requirements of users tend to reflect particular circumstances which must be taken into account by policymakers if they are to enable greater take-up of a particular technological function or use of a service. The varieties of particular individual, organisational,

geographic, demographic, and infrastructure situations that policymakers may need to address (while attempting to predict the current and potential uses of communications technologies in such various conditions) might be better defined as the *varieties of particularism* that encapsulate the diverse circumstances in each case-study country.ⁱ These distinct varieties of particularism are evident in the approach adopted by each of the case-study countries in deploying broadband infrastructure.

There are many different ways of achieving high-speed connectivity, and previous technology decisions can influence the policy choices available in the present. For example, Canada's proximity to US television broadcast stations led to the deployment of community antennas that later evolved into coaxial cable networks capable of delivering broadband. This led to platform-based competition between coaxial cable and digital subscriber line (DSL) providers in Canada; a situation that did not occur in Australia on a large scale. Similarly, high-density housing in Korea enabled rapid deployment of fibre networks that could not be achieved in Canada, the US, and Australia due to the large, sparsely populated areas to be connected. Using the measure of broadband subscriptions per 100 inhabitants, Korea ranks first of the case-study countries (and sixth overall in the OECDⁱⁱ) with 44.16 subscriptions per 100 inhabitants, with 87% of those subscriptions utilising fibre networks (see Figure 1). Canada, ranked second in the case-study countries for fixed-line broadband, has 41.48 subscriptions per 100 inhabitants but with 50% of those services delivered over coaxial cable. The UK ranks third of the case-study countries and has 74% of its 41.08 fixed-line subscriptions per 100 inhabitants delivered via DSL. While the US ranks fourth and has 61% of its 38.45 subscriptions per 100 inhabitants delivered via coaxial cable, it must be noted that the US has more fixed-line subscriptions overall than all the other case-study countries combined. Australia ranks fifth and, despite the NBN rollout occurring over the last decade, has only 23% of its 35.53 subscribers per 100 inhabitants connected via fibre. Singapore lags the other case-study countries in fixed-line broadband with 25.81 subscriptions per 100 inhabitants but is ranked first for mobile broadband subscriptions with 144 subscriptions per 100 people, reflecting the mobile connectivity that can be achieved within Singapore's land area of only 728.6 km² (see Figure 2).

There are other interesting statistics that suggest there is an element of supplementation, complementation, and substitution in fixed-line versus mobile subscriptions. For example, all of the case-study countries have surpassed 100 mobile subscriptions per 100 inhabitants except Canada. Canadian mobile subscriptions are notoriously expensive, with facilities-based rather than service-based competition keeping prices among the highest in the OECD ([Barnea, 2022](#)).

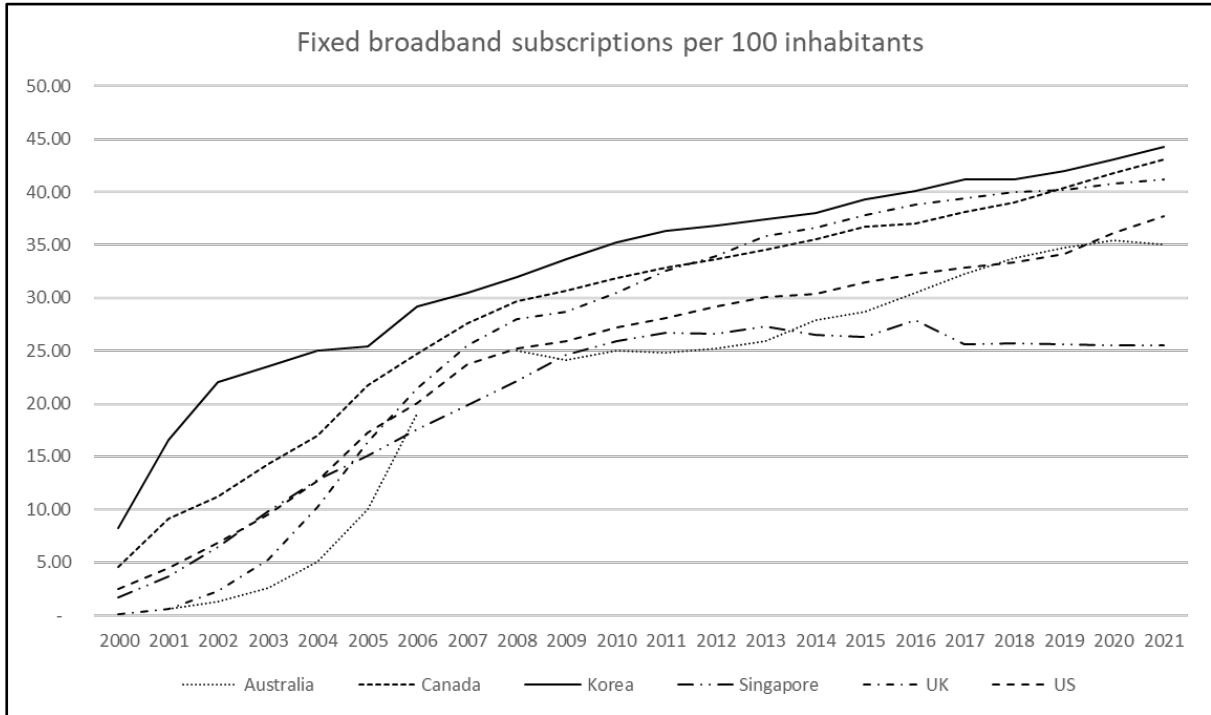


Figure 1: Fixed Broadband Subscriptions per 100 inhabitants (ITU, 2022b)

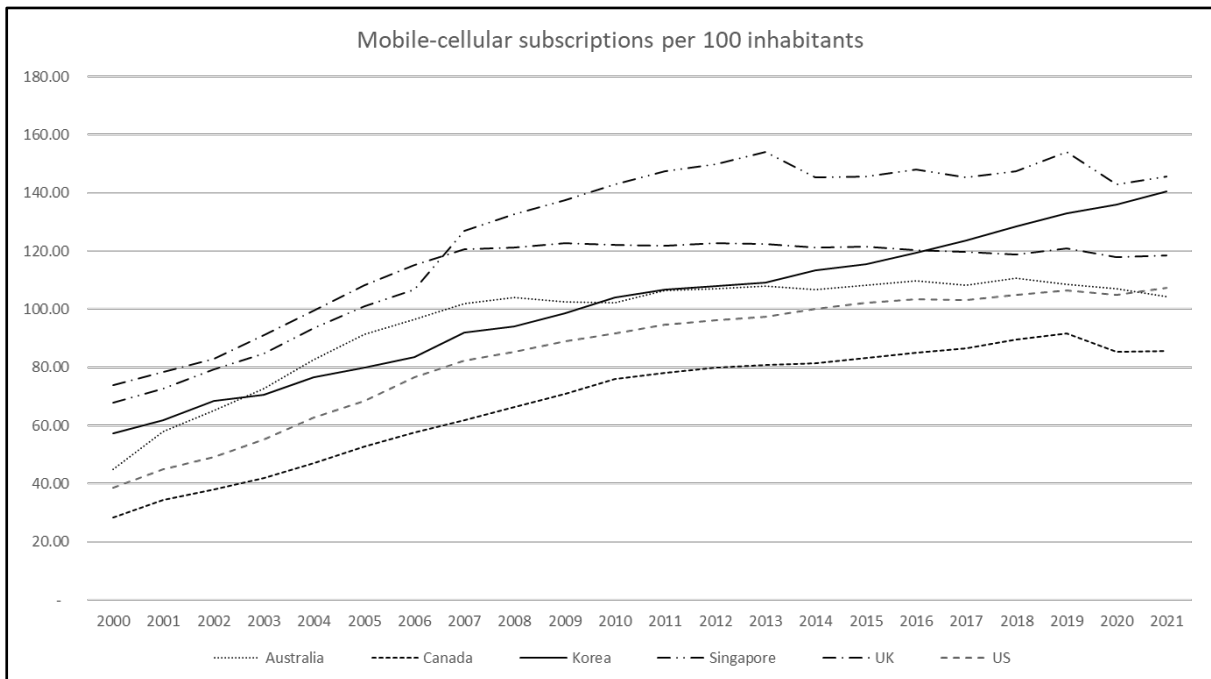


Figure 2: Mobile/Cellular Subscriptions per 100 Inhabitants (ITU, 2022b)

Korea was an early adopter and an early leader in broadband supply. However, the market-based philosophy adopted by Anglo liberal democracies contrasts sharply with that adopted by Korea, where policymakers:

...address all the components of the eco-system in an inter-connected fashion, generating incentives for broadband adoption in the areas of applications and services to follow through the build-up of broadband networks. Additionally, with support of a government research institute, the Korean Information Society

Development Institute (KISDI), policy makers in this country were able to develop and refine a broadband technology strategy based on rigorous economic analysis ([ITU, 2012](#), p. 71).

Korea's approach to deploying broadband and incorporating users early in the national broadband plan was key to addressing Korea's particular circumstances. For example, Korea is home to Samsung and LG, two major device manufacturers, with major research initiatives in next generation communications technologies focused on end-users, and a highly urbanised population with a large proportion living in apartment blocks, which makes it easier to connect subscribers to the broadband network than in large, sparsely populated countries like Australia, Canada, and the US. Koreans, generally, tend to be "tech-savvy" ([Budde, 2022](#)) and, led by the central government, have developed an over-arching strategy that began with the Korea Information Infrastructure project in 1995 ([Strand Consult, 2022](#)). However, government leadership has its limits once communications markets mature, with recent critiques of Korea's limited competition model forecasting higher prices in the near future ([Park & Nelson, 2021](#)).

Like Korea, Canada adopted a global leadership approach to the Internet (and later broadband) and, also from 1995, through the Information Highway Advisory Council (IHAC) and the policy leadership of then Minister for Industry John Manley, focused on "making Canada the most connected nation" ([d'Haenens & Proulx, 2000](#), p. 282). Industry Canada later developed IHAC into the Information Highway Applications Branch (IHAB) in Industry Canada to address areas where markets were not delivering broadband services. A key goal of IHAB was to develop "market aggregations" of local communities (including First Nations communities) to connect with various providers (including municipal and province-owned providers).ⁱⁱⁱ The policy leadership was also implemented in the mandate of Canada's specialist regulator, the Canadian Radio-television and Telecommunications Commission (CRTC), and its policy aim of "regulatory forbearance" to restrict government interference in markets, while at the same time providing swift regulatory solutions to small service providers through an expedited complaints process where larger incumbent service providers were potentially conducting anti-competitive behaviour, especially in smaller communities where small-scale providers might otherwise deploy affordable or subsidised services that the incumbent service providers were reluctant to provide.

Over-arching this approach, according to many industry experts, the federal government focused on "facilitating, stimulating and legitimating" community involvement in the process of infrastructure deployment in areas of market failure (in areas where commercial incentives might be too weak or otherwise inappropriate for generating desired social, community and user outcomes) (see also Note iii). Alongside a technologically neutral approach, supported by

an independent municipal and provincial spirit stemming from constitutional arrangements that traditionally situated telecommunications powers with the provinces, local communities were able to develop broadband networks using a variety of technologies, including fibre, coaxial cable, and wireless. Canada was indeed an early leader in fixed broadband and, until recently, was first in the OECD rankings of the largest federated countries, yet Canada's penetration of mobile broadband has lagged Australia's (see Figures 1 and 2).

The US, largely responsible for the development of the Internet,^{iv} is similar to Canada in that the embedded coaxial cable infrastructure remains the dominant network for broadband services. Similarly, Australia and the UK predominantly rely on DSL broadband services, reflecting the historical legacy of government ownership of the original telephone network and the absence of the pay-TV systems that dominated North America. Korea and Singapore, on the other hand, have some of the fastest fixed-line broadband speeds in the world and are both investing in 6G mobile technology and aiming to boost their fibre networks from 1 Gbps to 10 Gbps in the near future (Low, 2022).

Framing a Technology Policy

There are some theoretical aspects of technology policy that must be addressed before considering the demand-side aspects of a national digital communications policy. Following on from Hughes' (1969) concept of *technological momentum*, a form of "soft" determinism that falls somewhere between *technological determinism* and *social constructivism*,^v it can be said that "social development shapes and is shaped by technology" (Hughes cited in Smith & Marx, 1994, p. 102). Technological momentum is therefore a "more complex concept than determinism or social construction" and it is also time dependent (Hughes cited in Smith & Marx, 1994, p. 102). It can also refer to the:

...increase in the rate of: 1) the evolution of technology, 2) its infusion into societal tasks and recreations, 3) society's dependence on technology, and 4) the impact of technology on society" (Dyer, 1995, p. 255).

Technological momentum, then, is a useful concept in explaining the evolution of broadband services in response to societal needs and the infusion of technology into how we live and work. In the analysis above, there are three groups of countries that have similar characteristics resulting from their cultural and historical trajectories. First, there is the North American model based on coaxial cable stemming from the deployment of cable networks well before the Internet was publicly available, combined with a blend of public, private, and community involvement in deploying broadband networks. Both Canada and the US lag the other case-study countries in mobile subscriptions, most likely resulting from issues of pricing. Second, the UK and Australia, with an historically government-owned Plain Old Telephone Service

(POTS) network with no competing platform, still rely on DSL. Although Australia and the UK have some fibre networks, the deployment of modern mobile networks has seen the take-up of mobile services in the UK and Australia surpass 100 subscriptions per 100 inhabitants. Third, Korea and Singapore, both formerly developing nations that have mobilised their collective efforts to bring greater standards of living and prosperity to their citizens in a matter of decades, have been able to deploy fibre networks and high-tech mobile networks, perhaps leap-frogging the embedded earlier technologies of the other case-study countries, no doubt helped by the high density housing on a small land area reducing the necessary investment when compared to Australia, Canada, and the US.

From the above analysis, three key issues emerge. First, those countries that focused on deploying fixed-line broadband services early on gained a significant advantage that was not readily overtaken by the other case-study countries. For example, Canada's early leadership in fixed-line broadband penetration continues to outpace Australia's, despite Australian taxpayers investing some \$44 billion in the NBN over the last decade (Baird, 2022). Second, solutions that take into account the varieties of particularism inherent in different jurisdictions, including political, economic, cultural, geographical, and historical conditions, *and the needs of users*, tend to result in better-connected populations. Third, a key role for government is not necessarily deploying publicly-owned infrastructure but for providing the leadership that *enables* the deployment of infrastructure, whether through policy incentives, regulatory forbearance or other measures that promote the involvement of all levels of the public, private, and civil society sectors in signalling demand or acting as anchor tenants for networks. The next section focuses on the most important component of the particular characteristics of a given jurisdiction, the users.

Demand-Side Policies and Outcomes

Global COVID-19 lockdowns motivated an upsurge of digital interaction, encouraging government services, the health sector, educational institutions, and many employers to transition from traditional face-to-face to online interactions. Similarly, social distancing rules encouraged many families to commemorate births, funerals, marriages, graduations, birthdays, and other traditionally face-to-face events as online events using various digital platforms. It is interesting that the enabling technologies for online interactions on such a global scale were not *deterministic*, but rather *constructivist* in that social institutions adopted the technologies to adapt to pandemic restrictions (see Note **Error! Bookmark not defined.**). The motivated changes to the way we live and work resulted in an explosion of use of online interaction in all aspects of work and family life, in addition to streaming services adopted as a supplement for face-to-face entertainment activities (Weinschenk, 2020).

While demand for online interaction and entertainment increased the uptake of the gamut of digital services, it also exposed the importance of digital inclusion and demand-side policies to enable vulnerable groups, such as the elderly, to develop the digital literacy skills necessary to benefit from the available technologies ([Martínez-Alcalá et al., 2021](#); [Wheeler, 2020](#)). In advanced economies ([Muñoz-Najar et al., 2021](#), p. 24), the rapid uptake of pre-existing digital services during the pandemic suggests that, in addition to supply-side policies, there is considerable scope for making better use of existing services if appropriate demand-side policies can encourage more people to adopt these services. This section, then, discusses the relevant demand-side policies adopted by the case-study countries and the outcomes of these initiatives.

The demand for digital services during the pandemic highlighted institutional barriers that hinder the take-up of digital services. Indeed, the importance placed upon access to digital services resulted in initiatives to ensure ongoing supply of broadband services, particularly for those who could not afford the services as a result of income loss during the pandemic ([FCC, 2020](#)). Pandemic-related demand aside, institutional arrangements that may have previously been a barrier to take-up of digital services (such as the absence of subsidisation for telehealth consultations) were gradually removed as pandemic restrictions were applied in most jurisdictions.^{vi} For example, justice systems enabled the use of electronic signatures and remote hearings ([Legg & Song, 2022](#)), and educational institutions that had previously only half-heartedly adopted online learning were forced almost overnight to move face-to-face classes and examinations completely online ([Muñoz-Najar et al., 2021](#)). Further, many legal, financial, and property services quickly adopted remote application and approval processes; and retail, food, and beverage firms adopted home delivery and other non-contact ways of buying and selling goods digitally. Again, most of these services were already available but the social and institutional arrangements had not kept pace with the available technologies ([UNCTAD, 2021](#)). Whether the post-pandemic era will perpetuate the “hybrid” way we live and work remains to be seen, but it is clear that many of the barriers to digital services were institutional rather than technological.

Pandemic-driven demand for digital services raised three key issues for accessibility, particularly for those who otherwise had avoided either using digital services or otherwise had no opportunity to develop digital skills. First, online health, medicine, financial, and government services are accessible for some, but not all residents. Elderly people and people with disabilities, for example, may find it challenging to navigate their way through digital services and often require hands-on assistance. Ng, Lim & Pang ([2022](#)) argue that the people who are least able to use online health, medicine, or government services and assistance may be those who require these services the most. The authors draw attention to the fact that “some

online services are accompanied by online guides, [but] these are not always easy to comprehend, especially for the less digitally or language literate” (Ng, Lim & Pang, 2022). To improve accessibility, the Singapore Government requested social service volunteers to step in and help their clients with booking appointments at clinics and employment agencies, and provide assistance with scanning, uploading and submitting online forms and documents. However, Ng, Lim & Pang (2022, pp. 7-8) highlight that, although these professionals can help the vulnerable, their “primary role is to provide social services and not technical support”. Therefore, to bridge this gap, the Singapore Government employed over 1,000 full-time professionals as part of the Digital Ambassadors initiative to provide one-on-one digital consultation. Furthermore, these ambassadors adopted an effective technique that categorised the targeted people into two groups: people who need additional support such as the elderly (Seniors Go Digital); and stallholders from food centres (Hawkers Go Digital) (Ng, Lim & Pang, 2022).

Not all accessibility programs were pandemic-driven. For example, over the previous decade, the UK’s “Get IT Together” program run by BT (formerly British Telecom) and “Go ON UK” program run by the Government Digital Service aimed to provide Internet access, skills training, and advice tailored to individual needs, in particular to the elderly, the disabled, and job seekers with no Internet access, and to do so in all four countries of the Kingdom and in the regions (Cabinet Office & Government Digital Service, 2014). These and other programs brought together the central and local governments with businesses and not-for-profit entities to provide a coherent and coordinated response to promoting digital inclusion. Similarly, in the US, the National Broadband Plan implemented by the Obama Administration considered policy interactions as part of an “ecosystem” approach to enabling “broadband capability”. The Plan focused on competition, efficient allocation and access to assets (such as spectrum, poles and wires, rights of way), and reform of laws, standards, and incentives to enable access in high-cost areas underserved by markets (FCC, 2010, p. xi). Further, the FCC’s (2022, p. 9) “ecosystem” approach to funding innovative programs to improve broadband capabilities complements markets by making all levels of government, tribal (Indigenous) organisations, educational, public service, and not-for-profit organisations and so on eligible for federal funding (see also [Broadband Technology Opportunities Program, 2010](#)). Nevertheless, the pandemic increased first-time digital customers in all sectors (including digital government services) at rates that, based on previous trends, might have taken years (SAS Institute, 2021).

Second, people require suitable devices (in addition to skills and a broadband subscription) to access digital services. For example, as online learning became the norm during the pandemic and students were obliged to participate, many institutions did not consider problems with access to devices in a low-income household, particularly those with more than one child

([Cain, 2021](#)). For example, pre-existing Singapore Government programs that enabled device ownership for low-income households were restricted to one laptop per household. These were subsequently amended to the “one device per learner” policy ([Ng, Lim & Pang, 2022](#)). Canadian school boards predominantly provide devices for students, but not generally to those in earlier stages of education. Some First Nations’ communities were forced to close schools altogether due to a lack of devices for students, many without home-based Internet connections. Even wealthier communities were affected by device shortages. For example, in January 2022, Ontario school boards, amid a shortage of devices, delayed the beginning of term to allow distribution, with some boards opting for a “one device per household” policy ([Alphonso, 2022](#)). Each case-study country has adopted a different approach to providing access to digital devices. For example, the US Government, under the Affordable Connectivity Program, provides low-income households with subsidised Internet connections (up to \$30 per month) and discounts on digital devices (up to \$100 per device), but only one per household ([The White House, 2022](#)).

Third, and given the swift uptake of digital services during the pandemic, cyber criminals have taken advantage of increased online users ([Dziedzic, 2022](#)) through hacking and identity theft, to the point where personal data has been ransomed in Australia. According to Rubinsztein-Dunlop *et al.* ([2022](#)), recent attempts by foreign criminal groups to ransom Australians’ personal data from the Optus and Medibank breaches are “only the tip of the iceberg”. Although a detailed assessment of cybersecurity is beyond the scope of this paper, for digital services to be advantageous, trust in the system and therefore its security are a major concern for any national digital communications strategy.

In the Australian context, there is a disconnect (that is not so evident in the other case-study countries) between the level of government responsible for telecommunications infrastructure (the Commonwealth) and the level of government responsible for most of the daily digital services that citizens access (the States and Territories). Most federal government digital services, such as taxation, social security, health, and veterans’ services, are currently operated through MyGov, whereas the various States and Territories and local governments have different platforms and approaches for licencing, registrations, and transport.

The NSW Government’s Service NSW app, for example, contains numerous services relating to an individual’s digital identity. Much like the leadership necessary to deploy broadband infrastructure, similar leadership is required to ensure digital services are delivered in a way that is most effective for users of the services. In NSW, the Hon. Victor Dominello MP holds the distinct portfolio of Minister for Customer Service and Digital Government. The Service NSW app has outclassed the Commonwealth’s attempt to establish the CovidSafe app during the pandemic, and, unlike the Australia Card in the Hawke Government era and recent

attempts to establish digital identities for Australian citizens, is now considered a world standard for digital government service delivery ([Bajkowski, 2022](#)). Importantly, Service NSW shopfronts provide an educative function by which a customer is assisted by staff to use the computer terminals to conduct their business. This level of service is replicated in regional areas where even services such as births, deaths, and marriages can be accessed on a regular basis via travelling Service NSW staff in purpose-built caravans who assist residents in regional and rural communities to access digital services that years previously required travel to large metropolitan centres like Sydney, Newcastle, or Wollongong.

From the analysis above, there are varieties of particularism that require bespoke solutions – there is “no one fits all” solution to the different needs of customers or the requirements of different cultures or jurisdictions. Even attitudes towards trust and privacy require different approaches and, oftentimes, coaching. The recent development of PayID functionality on mobile phones, for example, has changed the nature of socialising. Previously, many hospitality venues would not allow bill-splitting (typically due to the high cost of merchant fees), whereas digital services such as PayID enable customers to quickly and safely transfer funds between individuals in real time. Such advances suggest that an ecosystem approach, cognisant of the varieties of particularism and the momentum created between technology-driven services and socially constructed practices around the technology, requires an ongoing system of renewal that can adapt a national digital communications strategy to changing technologies and social practices. Governments can play a key role here in promoting the use of digital services and making proprietary services accessible through government-related transactions and other interactions with citizens and end-users. The next section, then, considers a conceptual renewal process for a national digital communications strategy.

A Digital Communications Strategy Renewal Process

A broadband strategy lasting for 10 years cannot be just “set and forget”. A strategy should be re-evaluated periodically to ensure that it remains best positioned to deliver its aims. If it is not, it should be adjusted. In advanced economies, the shift in focus from infrastructure towards users is an important conceptual change in how we view broadband; hence, our preference for an Australian digital communications strategy (as opposed to a broadband strategy) that encompasses not only the deployment of infrastructure, but the opportunities for improvements in standards of living for users, including the most vulnerable in our societies.

One way to ensure that a strategy is periodically evaluated and adjusted as necessary is to put in place a *system* that provides regular feedback on the outcomes being achieved. In the case

of a national digital communications strategy, this involves tracking services, applications and users, as well as the availability and performance of broadband access networks.

Kim, Kelly & Raja (2010), in a report for the World Bank, think of this as an “ecosystem”. Their conception is presented in Figure 3. We can think of this as defining a broadband [re]evaluation cycle. As the authors say, a “broader conceptual framework leads to rethinking of the areas of focus for broadband policies and strategies” (Kim, Kelly & Raja, 2010, p. 16).

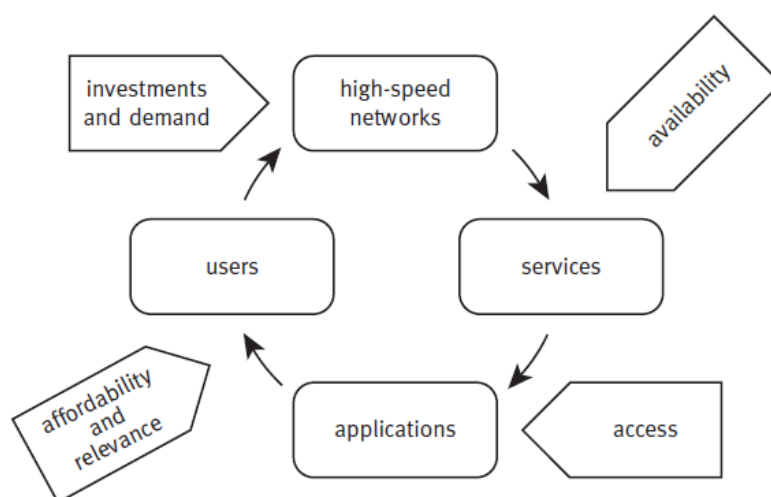


Figure 3. The Broadband Evaluation Cycle (Source: Kim, Kelly & Raja, 2010)

High-speed networks

The focus in a national digital communications strategy has often been just on the availability and performance of high-speed networks and network access. This was, for example, the original conception of the NBN: provide network access to all premises in Australia at a specified minimum performance or better. But this, then, raises numerous questions. Should the network access really be provided to all premises? What about the ones which already have alternative access? At what level should the minimum performance be set? And why? These questions cannot be resolved without a wider understanding of the drivers for network availability. This is where an understanding of the broadband evaluation cycle is useful.

Services

With greater availability of high-speed networks (both network access and high-speed long-distance transmission) comes greater availability of services. At the end-user level, services include IP connectivity and the attendant benefits of improved web browsing, cloud computing, access to corporate networks for remote working, and video streaming, for example. In addition, other services, not directly visible to end users, become economically feasible. Data centres can be built to supply vast data stores and computing facilities. Content Delivery Networks (CDNs), essentially private IP networks and data centres, can be deployed.

CDNs enable the mirroring of websites and storage of popular content nearer to end users, for example. All these generic services add greater capability and improved end-user performance to the underlying, high-speed, IP-based networks.

Applications

Applications are built on and for high-speed networks and services. The more capable the networks and services, the more capable the applications. Social networking applications, for example, are able to synchronize content across many sites and users in near real time: this feature is built on high-speed networks and cloud computing. Banking applications are able to keep their customer data secure through public-key cryptography, secure firewalls and security features widely deployed in data centres. An important cluster of applications are those for e-government. The public sector is “a producer and user of digital content and applications – including those for education, health, culture, and economic activities” (Kim, Kelly & Raja, 2010, p. 25).

Users

Users are people and other entities who use applications for interactions with businesses and government, or between themselves, or to upload content to or download content from the cloud. Users must be equipped with a suitable device, typically a computer or smartphone, for using applications, and a high-speed network access, either fixed or mobile, for interacting with other entities. In the end, a *national* communications strategy can only be considered successful if all citizens and residents are able to get access to and to use, effectively and efficiently, the applications they need to participate in the digital economy and digital society.

In periodically re-evaluating a national broadband strategy, the four participants – users, networks, services and applications – in the broadband development cycle need to be considered. A re-evaluation need not necessarily take in all aspects at once. The process is a *cycle*, meaning that identifying and overcoming a barrier to use in one aspect can lead on, around the cycle, to the development of greater capabilities in other areas.

Re-evaluating a broadband strategy

Even in a country like Australia, where fixed and mobile broadband networks are well established, it is still worthwhile to ask periodically if they are achieving and maintaining appropriate support for the digital economy and digital society. For example, one might ask if the current take-up of fixed broadband – about 74% of households and businesses – is satisfactory. There may be operational barriers to connecting rental properties, for example, yet only if all rental properties come with a broadband access already in place will renters face

no physical barrier to taking up fixed broadband. The government could introduce incentives for landlords or tenants to install and use a fixed broadband connection.

The following subsections provide some notes on possible insights that could be obtained through periodic reviews.

Investments and demand

While mobile broadband may be widely available, there is still a question if users are actually using the applications available. Some indirect data, like the distribution of monthly data volumes consumed by users, may indicate groups who are missing out through low cost, pre-paid plans with restrictive data limits. The distribution of data limits in actually used post-paid and pre-paid plans may also be informative. Of course, mobile service operators have extensive information on data usage and payments by their customers, but this information may not be made available either to government or publicly. Regulation on the industry to provide suitable customer data in an agreed form may be appropriate.

Availability

Services are built on the availability of high-speed networks. For example, if only low-speed accesses are available in a certain area, then cloud computing will be severely restricted or non-functional in that area.

Evidence for the deployment of services may be gained from actual user data or may be found in business expansion or investment. For example, nine new data centres are being built in regional NSW in response to the expansion of the NBN and NSW government initiatives ([Adams, Inglis & Proctor, 2022](#)).

Access

Applications need access to high-speed networks and the services they provide. Applications are built on the assumption of some level of access. If an application, such as a social-media platform, for example, depends on cloud computing and the cloud computing services are not readily available in an area, then the application will work less effectively or not at all in that area. Understanding what applications are popular and being used will give some information on what network and service capabilities are required. Customer complaints about the unavailability of an application or problems with using it will identify services or network capabilities that should be provided. The use of e-government applications can provide direct data for government.

Affordability and relevance

If an application is not relevant to users, they will not use it. If an application should be relevant to a wide range of users (e.g., e-health records) and is not being used, then one needs to ask what barriers are stopping it being used. This could involve a lack of appropriate network or service support, or it may be due to access to the application being unaffordable.

On the other hand, popular applications, such as video streaming or 4K-quality television, may be affordable in some areas and not in others. This may indicate a mismatch between where the revenue is received and where investment costs are incurred. The apparent mismatch in revenues between “over-the-top” applications and telecommunications operators is an ongoing issue and is likely to be resolved only through government action or regulation. (The Australian government undertook to resolve a similar mismatch in advertising revenues between online news disseminators and newspapers ([Wilding, 2021](#))).

Conclusion

TelSoc’s earlier focus on a pathway towards an Australian National Broadband Strategy was a necessary first step in supporting the ongoing enhancement and usage of the National Broadband Network. And, while there is still some way to go in terms of bringing this important infrastructure to all Australians, the pandemic proved that more needs to be done to enable citizens to take advantage of digital services. To that end, we recommend that future iterations of the strategy refer to an *Australian Digital Communications Strategy*, which is broader in scope than just broadband network development. This would bring Australia’s policy focus into line with the latest international thinking on broadband services being one part of an “ecosystem” approach, as outlined above.

One major challenge for an Australian Digital Communications Strategy is that many aspects of our daily lives are intertwined with three different levels of government. Health and education services, for example, and many identity-driven services, such as transport and recreational pursuits, are regulated by State governments. This means that any national strategy will require the co-operation of the States and local governments for it to be effective. Government financial support for telecommunications networks and associated accessibility programs under the authority of section 51(v) of the Australian Constitution tends to avoid direct support for State and local governments and community groups. This is in contrast with the US, where the focus is more on unserved and underserved communities in bringing digital services to the people.

Rather than a coordinated approach, the Republic of Korea provides a coherent approach that encourages action in the ecosystem, rather than trying to direct results as tends to be the case

in Singapore. The lessons from Canada point to an interesting combination of coherence and coordination that do not prevent local and provincial (state) initiatives from functioning, while at the same time coordinating actions where these intersect with the various jurisdictions.

Given the write-down of some \$31 billion of NBN recovery of capital costs at the time of writing (Baird, 2022), there is an opportunity to re-focus. The strategy needs to cover many moving parts and needs to involve and engage many diverse groups and stakeholders. Although this means the ecosystem is very complex, the strategy needs to be definite and certain. Although the semantics of rebadging the Australian Broadband Strategy as an Australian Digital Communications Strategy may seem petty stuff, we suggest that thinking beyond the NBN and adopting an ongoing process of renewal that encompasses all elements of the ecosystem in any strategic plan is key to our digital future. The most successful case-study countries examined in this paper all displayed policy leadership in adoption and use of digital communications technologies. An Australian Digital Communications Strategy provides the Australian government with an opportunity for such leadership.

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Endnotes

- ⁱ The term is borrowed from moral philosophy where it is used to explain a form of morality in which particular circumstances dictate particular approaches to morality, on a case-by-case basis, as opposed to a single moral principle that dictates all action (see [Sinnott-Armstrong, 1999](#)).
- ⁱⁱ OECD Broadband Portal, <https://www.oecd.org/digital/broadband/broadband-statistics/>.
- ⁱⁱⁱ According to interviews with industry elites conducted by one of the authors in Canada in 2007.
- ^{iv} Through the Department of Defense's funding of ARPANET – the hardware – as opposed to the UK's claim to have developed the World Wide Web – the software – under the auspices of Tim Berners-Lee.
- ^v There are two key opposing theories of the interaction between human society and technology: *technological determinism*, where technology shapes human action; and *social constructivism*, where human action shapes technology ([de Percy & Batainah, 2021](#), pp. 43–44). Clearly, the pandemic revealed that societal needs prioritised the adoption of pre-existing online interaction technologies *en masse*, as opposed to the technologies being the driver for large-scale societal change. Technological

momentum sits somewhere between these two key theories, acknowledging that a theory that claims to both affirm and deny a particular phenomenon is tautological.

^{vi} There are many examples of policies designed to keep people connected during the pandemic. These included enabling the Medicare Benefits Schedule for some telehealth consultations in Australia ([Services Australia, 2020](#)), and a raft of programs in the US through the Keep Americans Connected program ([FCC, 2020](#)). Whether such barriers will remain permanently removed in all jurisdictions remains to be seen.