

INVESTMENT AND INNOVATION—WHAT FACTORS WILL DRIVE INVESTMENT AND INNOVATION IN THE AUSTRALIAN COMMUNICATIONS SECTOR?

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Introduction

The Australian communications sector has historically been a globally leading sector, particularly in the area of telecommunications, but has also been a laggard in the introduction of new services in the area of broadcasting.

It is in the context of a mixed history of innovation, that this essay investigates the factors behind investment and innovation in a broad and converging sector. The essay posits the view that the only driver of investment is the expected return on the investment. It also suggests that innovation is driven by the same profit motive and demonstrates that innovation requires investment. However, investment of itself will not generate innovation.

Some concepts

A useful way of thinking about innovation is provided by [Schumpeter](#), who proposed considering the rate of innovation in graphical form. On this graph, the degree of competitiveness (which may be the number of vigorous competitors) forms the x axis and the rate of innovation is mapped on the y axis. The curve in this situation has the shape of an inverted 'U'. With a single monopoly provider, the rate of innovation is low. Similarly, if there are a large number of competitors, the environment looks like the supply of a commodity and the rate of innovation is also low. The result that flows from this concept is that a (small) number of vigorous competitors is required to maximise the rate of innovation.

It is useful to consider investment and innovation at three levels, which correspond to some of the layers in network communications systems. Layer 2 provides connectivity between two points where the physical location of each of the points is known. Layer 3 provides connectivity between two points where the logical location of each of the points is known but where the physical location of each of the points is irrelevant. Above these layers is the applications layer. For this analysis, we can generalise that content is simply another application. Although this simplifies analysis by ignoring the [link and transport layers](#), little is lost by this simplification.

Layer 2

The separation into layers is helpful in considering the quantum of investment. Layer 2 is where the large capital expenditure is focussed. In telecommunications networks, the last part of the fixed Layer 2 network is the access network and in mobile networks it is the radio access network.

In broadcasting, the equivalent is the transmitter and tower network. It is in this area that Australia has been both a laggard and a leader. FM radio and subscription television were launched in Australia more than 20 years after they were introduced in other countries. Television, colour television and digital radio commenced ten years after they started in other parts of the world. On the other hand, digital satellite and digital cable delivery of television services were introduced into Australia very early in comparison with other countries.

RESEARCH ESSAY

INVESTMENT AND INNOVATION—WHAT FACTORS WILL DRIVE INVESTMENT AND INNOVATION IN THE AUSTRALIAN COMMUNICATIONS SECTOR?

It is the distinction between fixed and mobile which has the biggest implications for Layer 2 investment and innovation. In this layer, investment is more important than innovation. To minimise investment risk, prudent operators deploy technologies which are well standardised. Examples include standards for hybrid fibre-coaxial cable modems from [DOCSIS](#) and the 3G high speed packet download and 4G Long Term Evolution (LTE) standards made by the [European Telecommunications Standards Institute](#) and developed by [3GPP](#).

In the mobile space, there are three vigorous infrastructure-based competitors. Innovation in investment is demonstrated by Australia mobile network operators being among the first on a global basis to deploy newly standardised technologies. Part of the motivation in this is to either differentiate offerings or 'catch up' with the other Australian operators. However, newer technologies also offer a lower production cost measured in dollars per megabyte served. LTE has a lower production cost for data than 3G. [Voice over LTE](#) is more efficient than running a parallel circuit-switched network. In each case, the mobile operator has all of the costs on an end-to-end basis with the consequent incentive to improve efficiencies in a manner that also improves each retail customer's experience or perceived value for money. One of the critical inputs for mobile Layer 2 deployment is spectrum. Spectrum is licensed by mobile network operators from the Australian Government and continued innovation requires that internationally harmonised spectrum is made available at a fee, when it is reasonably required.

In the fixed space, nbn co limited (nbn) is now substantially the sole Layer 2 investor. It provides wholesale services between the 121 points of interconnection to the national broadband network and each customer premises on a wholesale basis. The idea of Schumpeterian innovation is also useful to take a view on the likely level of investment innovation in Australia's fixed Layer 2 network. nbn does not have incentives to innovate in the way seen in the same layer in the mobile sector. Worse, nbn is likely to seek to 'scope creep' in the usual manner of monopoly providers engaging in horizontal or vertical integration. There are protections against some potential scope creep provided in the *National Broadband Network Companies Act 2011* (Cth), especially in section 9 and each of sections 17 to 20. However, there have been [reports](#) that nbn would [like to offer](#) services beyond wholesale carriage services between points of interconnection and customer premises. The policy response to scope creep risk in the private sector led to the structural separation undertaking being given by Telstra.

In both areas, there is plenty of advice for telecommunications providers with [Accenture](#) and [PWC](#) emphasising the opportunity for innovation that exploits the Layer 2 investment and [EY](#) emphasising the risk of absence of innovation.

Layer 3

Layer 3 is the layer where services are provided on an 'over-the-top' or [OTT](#) basis. This is the sector which can either be seen as a threat to the Layer 2 telecommunications providers or as an opportunity for integration and deeper customer relationships. If non-telco Layer 3 service providers dominate the sector, then the telecommunications providers (both mobile and fixed) run the risk of becoming the providers of 'dumb pipes' and getting close to a utility return on their Layer 2 investments. However, the telecommunications providers that can offer or appear to offer OTT services can get much better returns as their cost of Layer 2 access may be lower depending on their regulatory arrangements. The 'appear to offer' occurs when telecommunications providers facilitate access to OTT services that they do not provide. An example is the [Telstra TV service](#) that provides access to Netflix, PLUS7 and Presto, despite Telstra only having an economic interest in the last of these.

In the mobile space, there is a high degree of integration between the services offered by mobile network operators and these are used to create a range of retail products. However, Layer 3 access, like Layer 2, can also be sold at the wholesale level. In the mobile environment, this creates a range of mobile virtual network operators ([MVNO](#)) and these operators offer products that target a specific demographic or ethnographic group. MVNO are often the source of product or service innovation.

RESEARCH ESSAY

INVESTMENT AND INNOVATION—WHAT FACTORS WILL DRIVE INVESTMENT AND INNOVATION IN THE AUSTRALIAN COMMUNICATIONS SECTOR?

For example, bonus data for prepaid users on Sundays was driven by MVNO demand. It is important to note that MVNO are not simply resellers. The form of network access that provides scope for a successful MVNO business model requires the ability to innovate rather than simply offer low prices on a low margin. The latter course has been tried and is not a sustainable business model in the [MVNO sector](#). At the retail level, it is also possible for applications to use the logical address of a mobile device to offer OTT services. These can be dedicated by-pass services for the delivery of voice, video or messages. Alternatively, they can be integrated offerings that offer users a complete platform based on social networking.

In the fixed area, Layer 3 retail services are used for the delivery of similar OTT services as mobile. However, the importance of the delivery of video in the fixed space is also important. Rather than having separate quality of service paths for video, streaming subscription video on demand (SVoD) service use the broadband capability that their customer has to deliver video at the best quality that the OTT path will allow. The level of innovation in the OTT space, including by fixed network telecommunications service providers has the potential to be high at the retail level. As there are layers in the wholesale level, Layer 3 services could be used to deliver mediated wholesale access to the national broadband network. Indeed, that is the likely outcome when the capital cost of interconnecting to every point on the national broadband network is high. However, if nbn engages in the scope creep mentioned above, then innovation in wholesale fixed Layer 3 services will be chilled and investment limited. That is, there is the potential for regulatory certainty to be just as important in fixed Layer 3 wholesale services as in Layer 2 wholesale services.

Applications and content

The area which has the highest potential for innovation but with a relatively low investment cost is the area of applications and content. Although the search for the mythical 'killer app' is a potential course for innovation, in practice most applications are designed to meet the same requirements as programs in the *Broadcasting Services Act 1992* (Cth). Applications are designed to 'entertain, educate or inform'. In many cases, applications are simply ways of solving problems more readily than existing alternatives. The investment required to be able to produce applications for mobile devices is now reasonably low.

The biggest challenges to innovation in applications in Australia are the same challenges that face any start-up. This challenge is not just one of investment but finding potential investors. For concept phase, the usual sources of funding are family, friends and (very expensive) credit card debt (up to \$100 thousand). Once the application is developed, Australian sources of funding include venture capital or private equity in the 'A' and 'B' rounds of \$2 million or more. The more [problematic funding area](#) is broadly between \$100 thousand and \$2 million. This is the funding level where angel investors have traditionally provided funding in the Silicon Valley model. These 'angels' are prepared to make a large number of relatively risky equity investments in the expectation that the value of the equity in the small number of successful ventures will provide a return that reflects the risk.

The same funding range is addressed using crowd equity funding in the US and the UK. The current Australian investor protection regime does not facilitate crowd equity funding. However, there is an expectation of a change to these rules in early 2016, following a [Treasury public consultation](#). This change is essential as allowing customers to invest in the equity of their potential applications providers is a critical step in encouraging investment in applications development.

Investment in audio visual content continues. Some of that content is made in order to make a return. Some of it is produced in order to meet regulatory requirements and some falls in both camps. Most of this content demonstrates creativity. Some demonstrates innovation, particularly in the area of television show formats. In the past, the export channels for this work is were well understood.

RESEARCH ESSAY

INVESTMENT AND INNOVATION—WHAT FACTORS WILL DRIVE INVESTMENT AND INNOVATION IN THE AUSTRALIAN COMMUNICATIONS SECTOR?

The challenge for the content production sector is to deliver content into the evolving SVoD sector. The ratings suggest that the most popular programming genres on free to air television are news, current affairs, reality television and sport. This reflects the shift that has occurred to SVoD from broadcast television. The investment and innovation challenge for the content sector is to take advantage of the new opportunities for distribution of audio-visual content.

Near term future

One of the major developments that will shape both innovation and investment in the communications sector in Australia is the Internet of Things ([IoT](#)). [Conceptually](#), IoT just means that many more pieces of equipment that are currently standalone will be connected to other devices. Some of these will need to communicate with the internet. However, many will simply talk to each other. For example, on rural property, a pump might need to talk to a rain gauge and a dam level measure but none of them require web access. Part of the standards setting for 5G is working on IoT. Telstra and other Australian businesses have been active in the standards setting process. This will determine what the Layer 2 solution looks like. However, in terms of both investment and innovation, it is likely that Australian businesses will develop solutions that meet the requirements of both advanced cities and remote agriculture and that these innovations will be applicable around the world.

Summary

Investment is driven by the expectation of returns on a risk weighted basis. Innovation is a form of investment that has higher level of risk and higher associated returns. There are good prospects for investment and innovation in all of the layers of the mobile sector and this is driven by a competitive environment. The prospects in the fixed sector are less certain as nbn is a monopoly provider at Layer 2 and is [showing signs](#) of creeping its scope to compete with its customers at Layer 3.

The major prospect for innovation is in the development of applications. The driver at this layer is the ability for start ups to raise funds.