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Telecommunications Disruption

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Summary: In this issue we consider how telecommunication companies around the world have been disrupted by the demand for improved network speeds, capacity and reliability, and the growth of the smart device manufacturers that have become more closely linked with the handful of global digital giants. The pace of change has increased, if that is possible, and it is not unthinkable that further consolidation of the telecommunications market might occur in the next decade.

In this issue

In this issue, the *Journal* contains papers that focus on *Public Policy*, *International Competitiveness* and *Telecommunications in Industry*, as well as a book review and an interesting historical article on *Aluminium Distribution Cabinets Resistance to Rifle Fire*. Who would have thought there was a need to protect aluminium distribution cabinets from bullets? Possibly the answer lies in our well-peppered regional road signs.

Key questions that affect the telecommunications market are discussed in this issue, including the need for further standardisation to ensure that services can be provided globally, what are the competitive pressures facing consumers and how affordable is our ever-increasing desire to remain connected.

Disruption everywhere

At a time when the thought that increased market disruption could not be possible, the leaked draft international Trade in Services Agreement highlights the roller coaster that could be just around the corner. Removal of Telstra's protection from international takeover and the potential for a foreign purchase of part or all of the National Broadband Network (NBN) later this decade should focus our attention on what might occur as the push towards increased globalisation and reduced protection for local markets.

Later this month Telstra's national Wi-Fi network will be formally launched and another giant step will have been taken along the path to improved broadband connectivity. Telstra's positive move to provide Australia with a national Wi-Fi network should, over time, force its competitors to move into this market and the end result will be a significant improvement to mobile broadband coverage.

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The Federal and State governments have collaborated on the recently announced mobile cellular blackspot reduction program and regional and remote areas will begin to benefit from the rollout of new mobile cellular towers later this year. Australia is a large country and mobile cellular coverage is vital along major arteries and in key regional and remote areas, and a feature of the mobile cellular blackspot program is the requirement that facilities built using the funds provided through the blackspot program are to be available for all mobile cellular operators to use. But before we see true competition in regional and remote areas there is a need for a significant backhaul and facility usage price reduction.

Also this month we have learned that one of the key challenges for improved optical fibre communication has been achieved, heralding what is likely to be an explosive growth in low-cost optical fibre communications capacity over much longer distances than are currently possible. Australia's telecommunication companies are certain to be early adopters of improved optical fibre communications capability, due to the costs association with Australia's size and rapidly increasing demand for additional capacity.

And the second agreement between NBN and Telstra has been signed off by the Australian Competition and Consumer Commission, bringing to an end the 18-month process to move the NBN from being principally fibre-to-the-premises to the multi-technology-mix technology solution. Over coming months the migration from ADSL2+ to VDSL2 with vectoring should ramp up and Telstra's HFC network will be upgraded and integrated with the existing NBN.

Looking forward

Papers are invited for upcoming issues. The September issue will include two themes: *Telecommunications Policy and Regulation* and the *Internet of Things*. To round out the year the December issue will have three themes: *Economic Research*, *Telecommunication Legacy Issues* and *Universal Service Obligation*.

The hard work of the theme editors ensures that the quality of the papers included in the *Journal* are of interest to the *Journal's* readers and reflect the status quo. The Editorial Board appreciates the hard work and time that the theme editors commit to their task.

As each issue is published the Editorial Board turns its attention to future themes and it is likely that in early 2016 we will see themes on *Network Infrastructure Security, the NBN and the Economics of New Services*.

We actively seek you help to ensure that the *Journal* provides the readership with topics of interest that reflect the broad nature of the local and international telecommunications industry and the global digital economy. If you have a theme for an upcoming issue that you

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would like to recommend to the Editorial Board please let us know. And papers submitted to the *Journal* are welcome and do not need to be associated with a theme issue.

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Nation Building Now in the Hands of Cities and Communities

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Abstract

For a number of reasons over the last five to ten years we have seen a shift in politics, moving away from the centre towards the extreme edges. Many people have been dragged along with this, as many of the mass media outlets are highlighting and fuelling this polarisation. At the same time the power of the cities is increasing, and here it seems still to be possible to gather much broader support for 'national' interest projects in relation to digital infrastructure, sustainability and smart city platforms for interconnected LED street lighting, waste and water management, smart parking and other applications. What however, is often still missing is a holistic approach towards the development of smart cities; this needs to be led from the top and to be supported by a 'smart council'. A major stumbling block towards the development of a smart city is the many silos within a city, resisting the sharing of infrastructure and other relevant assets, resisting open data and open government. There are however, good examples both nationally and internationally of councils that are moving in the right direction.

Governments fail to build national consensus

For a number of reasons over the last five to ten years we have seen a shift in politics, moving away from the centre towards the extreme edges. Many people have been dragged along with this, as many of the mass media outlets are highlighting and fuelling this polarisation. This is not about shooting the media messenger, but about the media becoming active players in the politicised debates.

What has also become clear is that the longer this polarisation continues the more difficult it becomes to find common ground around the centre. That is happening in particular in America, but it is also taking place in Australia. This development is much less pronounced in Europe, partly because it has an extra body on top of the national politics – the EU – that is still able to provide high-level 'common interest' policy directions that are positioned much closer to the centre.

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Polarisation makes it increasingly difficult to build national consensus around issues that traditionally received bipartisan support, such a national infrastructure, social institutions and the longer-term future of the country.

What is happening now is that in each election cycle we see an almost complete demolition campaign from the opposition party of the policies that are introduced by the sitting government. This, of course, is putting us further and further behind countries that are able to build more constructively on top of the policies of the past. By all means make changes and adjust focus, but continue the process, especially in projects that require long-term vision and long-term implementation with long-term outcomes.

The role of government on all levels should be to provide the vision and broad high-level strategies; but then to work up from the grassroots level, with the people, to fill in how we are going to get there. As is clear from overseas examples, with the appropriate policies in place and with appropriate government facilitation, private industry will provide most of the investments needed.

In Australia , there now seems to be a significant divide between, on the one hand, federal and state policies and, on the other, what the people actually want – be it in healthcare, education, infrastructure such as the NBN, sustainability and renewable energy, taxation or elsewhere.

People are rather for smart environments

Also we see councils, disillusioned by not receiving the infrastructure such as FttH and smart grids, essential in becoming a smart city (Zygiaris, 2013). BuddeComm (BuddeComm, 2015) has discussed the smart city concept with over 50 councils since 2000. Towards the end of that decade many local councils slowed down their smart city process as they got the message that the federal government would deliver them the first-class broadband infrastructure for this. A similar position was taken in the wake of the Smart Grid Smart City project announced by the previous Federal Government, as they linked that to a policy that would lead to the national rollout of smart grids. Both nation-building projects fell victim to the lack of continuity from the next government.

At the same time we see many people continuing to do what they believe makes sense for them. They install PVs, oppose CSG and other fossil fuel mining projects. They save energy, they continue to support projects such as FttH (Bakaul et al, 2011); they bypass the healthcare system and use new apps, internet services and wearable technologies.

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Cities are leading where federal policies fail

This brings me to the cities and local communities. This is where these activities are taking place, and we see an increased interest at this level for far more progressive policies that are linked to what the people actually want.

Moving on from their disappointment regarding federal projects such as the NBN and smart grids, the first local councils are now once again picking up the smart city developments they started a decade ago to see what they can do to improve the situation for their citizens.

They know how essential these developments are for them. With federal and state governments faltering they deliver the bi-partisan continuity needed to develop a smart city; it is now the cities that are looking at nation-building policies and nation-building projects, albeit on a community level. One significant problem is that in Australia city councils have significantly less power than most of their counterparts in other parts of the world.

Nevertheless we see cities working towards net-zero plans in relation to carbon emission and the generation of renewable energy. Most new corporate buildings follow a similar trajectory and many businesses are now seriously looking into alternative energy plans, micro-grids and battery storage.

City-based infrastructures for LED street lighting, waste and water management, smart parking and other applications are now being looked at again, and by sharing infrastructure and linking it to Wi-Fi networks and the NBN, cities can start implementing their smart city concepts. By creating intelligent city-based platforms – which cut across silos – great efficiencies can be created and, supported by big data and data analytics across the silos, new services and applications are being made available to the citizens. From here the broader community can be engaged and the platform can be used for a range of add-on developments such as Apps for the city. This opens up new opportunities, innovations and the development of new entrepreneurial small businesses as well as new jobs, especially in the 'sharing economy'.

PPPPs – cities collaborating with citizens and private enterprise

Interestingly, as I have mentioned over all these years, hardly any new money is needed in order to get these projects off the ground. What is needed, however, are good policies that stimulate the private sector, in collaboration with the city, to make the necessary investments. Local councils can facilitate these processes and work closely with their citizens, businesses and other organisations to create a fertile environment for this to

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happen. If cleverly done, much of this can be done in a PPPP with limited out of pocket costs to the cities involved.

PPPP stands for Public Private People Partnership.

In the projects we have been involved in, we established stakeholder groups, leading people within the city who represent the broader community: they include business, education, health, transport, community services, welfare organisations and so on. The council supports this group by providing a secretariat and a coordinating and facilitating function. Through community meetings the stakeholders assist council in explaining and promoting the smart city concept, inviting people to participate and creating citizen engagement: a smart city is a city where people are connected and actively engaged.

The need for leadership from the top and 'smart councils'.

It is however, essential that these initiatives are taken by a 'smart council'. This means that first of all leadership will need to be provided by the mayor, as he or she stands above the silos and can direct the silos to collaborate. The greatest blockage to a smart city are the ivory towers within councils; a smart city can never be achieved unless it is led by a smart council. This requires open ICT systems, open data, open government and the sharing of infrastructure and other critical assets.

Most smart city projects currently under development in Australia don't have that overall vision in place and are not yet supported by a 'smart council' and as such the projects that are developed are silo-based; sometimes such projects are even based on proprietary infrastructure technologies, making it impossible to use the infrastructure for other applications. There are a number of councils that are worthwhile watching as they are moving forwards developing a holistic approach; they include: Adelaide, Perth, Newcastle, Maroochydore and Lake Macquarie.

Another issue that needs attention is what I call 'death by pilots'. Many cities have developed many pilots and even when successful they die because of lack of scalability, but mostly because of that lack of a holistic approach and a lack of that all essential leadership from the top.

Rather than everybody running their own pilots and projects, collaboration should be applied: for example LED street lighting is high on the agenda of many councils and if this is done smartly that should be linked to a WiFi network (in order to facilitate other applications). If this works in one city it is important to learn from that city rather than starting yet another pilot to test the same project in another city. Regional collaboration is an obvious solution, and the councils in SE Queensland are a good example of such

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collaboration. I am involved in a project supporting the creation of a similar collaboration platform for the councils situated between Sydney and Newcastle.

There are also plenty of examples around the world that we can learn from. Below I have highlighted the cities where I have had first-hand experience on their smart city developments: Barcelona, Amsterdam, Tokyo and Chattanooga (Tennessee, USA).

Barcelona – One of the Smartest Cities in the World

Over the last 10 years Barcelona – the second-largest city in Spain, with a population of 4.5 million – has excelled in adopting new technologies to make itself smarter.

The origin of this approach can be traced back to the hosting of the Olympic Games in 1992. They used that opportunity to transform the city from an old and dreary place to one that has taken a front-row position in the modern age. At the start of the process it was one of the most unprofitable cities within the developed economies; now it is one of the most profitable, with an annual budget of US$1.8 billion. Ever since embarking on this journey – with, of course, its ups and downs – the city has continued on this path and, since the early 2000s, it has been in the top ten of the smartest cities in the world, often reaching the top position.

Its mayor Xavier Trias is a much sought-after person on the international smart scene circuit. Colleagues from all over the world are visiting his smart city. He is one of the world's best champions of the smart city concept and his city leads the world in developing the international standards essential to create open and interconnected systems that underpin the concept. They are truly creating a 'hyper-connected' city. In March I stayed in this city for a week and I had a good opportunity to test this out.

Outdoors one notices the smart elements of public transport, which is highly efficient, with excellent information about when the next bus or train departs (often at intervals of three minutes). There are several apps for GPS-based parking advice (Zhou & Golledge, 1999), integrated public transport travel information and a range of (virtual) tourism applications. The flow of cars through the city and all-encompassing WiFi coverage (over 700 public hot spots, apart from the hundreds of private ones in restaurants and other premises, basically providing access everywhere in the city, including metro stations, parks, main streets, etc), are other noticeable elements. This also means that QR codes and NFC applications are available everywhere and are used with coupons and special offers by the businesses providing services based on these technologies.

For citizens there are many other services, which are accessible through the 'Apps4Bcn' (Walravens, 2014) portal, allowing full interaction with all elements of council, as well as access to some of the most obscure information people need or want. It also links people

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together, and people with experts, and it covers all sorts of topics (sport, culture, business, etc.). It is an excellent platform for networking, spotting business opportunities, organising events and forming partnerships.

The extensive nature of access has also prompted the city to become one of the first to adopt a Mobile ID, providing secure personal authentication by means of digital certification. Once set up (this has to be done in person) citizens can have access to the electoral roll, pay municipal taxes and fines. This development is currently in its pilot phase.

Some of the ICT elements Smart Barcelona (Bakici et al, 2013) focusses on are:

- Urban traffic management (roads, tunnel and air), aimed at more efficient and sustainable urban mobility;
- BCN airport monitoring and control;
- Irrigation smart management
- Scada for escalators and fountains (urban control);
- Urban works monitoring.

Its vision is based on building a resilient city that is self-sufficient through social integration, social cohesion and more efficient and sustainable urban mobility; a city where its citizens are provided with the tools to maximise their productivity and lifestyle requirements, including universal access to culture, education and healthcare. This focus includes a business-friendly environment with a special focus on SMEs.

Environmental sustainability is high on the agenda and the aim is to become a zero-emission city. The city's airport is another example of its smart city approach. This fully-controlled environment handles over 1,000,000 signals and includes control of all escalators, elevators and passenger-moving walkways; power management; air conditioning; and fire safety systems. It also involves monitoring support for the automated luggage transport system.

As we are seeing elsewhere, a smart city is a significant cost reducer. By using a holistic approach, it cuts through the silos and uses ICT as a horizontal layer, sharing infrastructure and other resources. This is reducing the overall investment costs in infrastructure as well as in energy consumption. Such a smart city also reduces travelling times and avoids unnecessary delays. By simply being smarter the city will automatically reduce pollution – for example, a highly efficient and effective transport system is increasing the use of public transport, something that is very visible on the train and metro systems (Dohler et al, 2011).

Being an early adopter, the city is now also well-positioned to reap the benefits of connected information management (big data). It had been aware of the need for better insight into the effectiveness of its local government and has been an early pioneer in open data government. For that reason the GPS, M2M and IoT technologies are widely used.

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Apart from its own data sources it also includes data from social media and a range of other data sources relevant to the operation of a smart city. They use cloud-based systems to gather, connect and analyse the data in order to get good executable outcomes. Still in its pilot phase, the big data exercise provides near-real-time insight into structured and unstructured data, using any internet-connected device that can enhance services and business opportunities, improve safety, and boost collaboration between the city, its citizens, and businesses.

Amsterdam Smart City

In April Frans-Anton Vermast, a strategic advisor on connected communities of Amsterdam Smart City travelled through Victoria and NSW, where he presented on smart city developments to state governments as well as to the cities of Melbourne, Sydney, Bendigo, Newcastle, Lake Macquarie and Gosford and Wyong.

Key projects within Smart City Amsterdam (Baron, 2010) include:

- City-zen – Smart Grid – Largest Smart Lab in Europe – In the City-zen project several innovative solutions are demonstrated in the field of smart grid, heat networks and sustainable housing;
- Smart Electric Energy Boat;
- E-Harbours – ReloadIT;
- Ship to grid;
- Vehicle2Grid;
- Flexible Street Lighting.

Amsterdam Smart City was initiated by the Amsterdam Economic Board, telco KPN and electricity operator Liander back in 2008.

KPN the Dutch Telecom incumbent says: “The core objective of the new partnership is to give (SME) companies the opportunity to test innovative applications in practice. For the last two years Amsterdam Smart City together with Liander, AIM and the City of Amsterdam have already been making this possible for various stakeholders with a strong focus on energy transition.”

Liander the Amsterdam electricity operator says: The aim is “to offer the people of Amsterdam smart technological options that enable them to save energy and make optimal use of the latest developments, such as electrical transport and domestic generation of clean energy.”

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Tokyo

One striking element in my visit to this city was that everybody I met and discussed this topic with mentioned 'the disaster'. This is how they refer to the Fukushima nuclear disaster. They almost never specify the 'nuclear' disaster; if they don't just use the word 'disaster' they refer to it as 'the earthquake'.

There has still been no decision made regarding the restarting of the 50 nuclear power stations in Japan. Businesses are calling for it but public opinion is still very much against it; especially women. In the meantime the cost of providing the country with other (fossil) resources is costing them billions of dollars.

The official policy of the government is:

- Priority 1: energy saving
- Priority 2: renewables
- Priority 3: developing export opportunities from all of this for economic growth.

I had a very interesting presentation with Professor Kazuhiko Ogimoto. A key element that he adds to the above priorities is 'flexibility' – his view is that a multi-energy mix will have to be developed in order to safeguard the way of life, affordability and sustainability.

Smart communities have become a central policy issue in Japan (Samuels, 2014). As in many countries this is now the broader concept, moving away from the more limited smart grid focus. But the definition of smart communities that is used in Japan is much broader even than what is being talked about elsewhere in the world. It is seen more as a social experiment than an energy or ICT issue. It broadly includes the following elements:

- Strengthening community help (self-help) – comfort, health, safety, security (community awareness)
- Urban revitalisation (resilience) – life and business defence against disasters
- Business continuity and energy independence in the event of emergencies

With increased climate change events around the world, the new definition of 'smart community' as set by Japan is also relevant to other parts of the world. The key is that this can only be implemented through smart policies and smart management. Lack of holistic national policies and the will to implement them is a serious area of concern.

Following the Japanese line of thought, the infrastructure that underpins this is the power grid; on top of it is the layer that manages the energy for buildings, communities, factories, homes, hospitals, transport (rail), etc. This is made possible through the ICT tools.

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This approach is very much driven by the 'emergency scenario', and it made me rethink my conceptual approach to smart communities. It is an interesting subject for further discussion.

Despite many good initiatives Japan also suffers from the 'death by pilot' syndrome. Upscaling pilots and projects to regional, nationwide or even municipality-wide levels remains elusive; the issue being that the investments needed cannot be monetised by the private sectors involved. The benefits are social and economic and this requires government investments and/or governments taking the financial risks for the projects. Furthermore any of these benefits are long-term, while significant upfront short-term investments are needed.

It looks as though it takes events such as 'the disaster' to spur governments into action; but even then large-scale implementation is becoming increasingly entrenched. Political stalemates – a global phenomenon – are making decisive action in the national interest very difficult.

Chattanooga Smart Grid / Smart City

Chattanooga's municipal utility Electric Power Board (EPB) serves some 150,000 households and businesses across 600 square miles. In the decade up to 2010, the energy company developed a plan for the upgrading of its electricity network. The city needed to find a way to ensure that the investment achieved far greater advantages than just automating meter readings. EPB sought a solution that not only benefited the utility, but more importantly delivered value to the community by improving quality of life and opening up economic opportunities (Budka et al, 2014, Davidson & Santorelli, 2014).

They built an FttH network providing 1 Gigabit-per-second Internet speed to every premises – urban or rural, business or residence – with Internet speeds that are unsurpassed in the Western Hemisphere – from 50 Megabits-per-second all the way up to one Gigabit-per-second are accessible here.

As a consequence of its smart city policy, Volkswagen established its North American headquarters here and Amazon opened a larger distribution centre in the town.

Furthermore, the network serves as the conduit for 80 billion data points on electricity use per year that help the utility run more efficiently, reduce outages, and give customers more control over their monthly electricity expenses.

With power outages previously costing $100 million/year to private businesses served by EPB, the new FTTH network enables a much smarter network that will radically decrease those outages and thereby make businesses more productive.

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Conclusions

Councils will have to take a leadership role in developing smart cities in order to keep pace with the technological developments that their citizens are embracing and the expectations they have in relation to the economic, social and lifestyle aspects of their city. Increasingly less leadership can be expected from other levels of government yet at the same time it are the councils who are facing the brunt of issues such as economic transformation, the need for job growth, sustainability and liveability, city infrastructure and the life style of their citizens.

With leadership from the top – typically the mayor – a smart council should form the basis of any further smart city projects. One of the major stumbling blocks is the many silos that operate within the city and this needs to be replaced by a more horizontal approach, whereby ICTs can play a key role in achieving this.

Based on a vision of the medium and long term future of the city and with leadership from the top councils should establish smart city platforms that would allow for the sharing of infrastructure and other resources as well as for open data and open government initiatives.

Once such an environment is created, councils should look for PPPs who can use the platform and develop the smart city projects, basically without any significant out of pocket costs to the cities.

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Whither Netflix?

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Abstract: In March 2015 Australia became the 50th country in which US video streaming company Netflix had set up a local operation to supplement its planned global expansion in 200 countries. Newcomers Presto and Stan also joined in to further add to the extraordinary rate of growth of all forms of video traffic in Australia, now over half of Telstra's Internet business. So who is Netflix, and how well might it expand its business in addition to those customers in Australia who are already using virtual private networks (VPNs) to access and pay for their programmes? The company began as a DVD on-line mail rental service in the US over fifteen years ago, but its management always saw the huge potential to use the Internet as –"direct mail on steroids"– for the on-line delivery of movies to homes. Whilst Netflix commendably offers more choice of programmes for Australian viewers, an examination of its business model could hardly support the notion that the established commercial television networks now face a fundamental *existential* threat. Nor should the notion of "mass digital connectivity" be taken for granted – not only because Australia still has so far go to reach ubiquity of the connection of homes to high capacity broadband, but also because of the serious lack of affordability of direct user pay services for so many Australians. The most likely future scenario is the on-line streamers will be welcomed by a growing number of paying customers, but as a complementary sector to the strong network television incumbents.

Introduction

Speaking at the April 2015 CommsDay Summit, Telstra's Chief Operating Officer, Kate McKenzie, outlined the extraordinary growth of video downloading:

> It is increasing as a proportion of overall network traffic and we got an average of 50 to 60 gigabits per month, growing at about three gigabits per month. Each month there's more than 27.5 gigabits of video carried over the fixed network. That's the equivalent of about 13 million hours of high definition video per month. (Mason, 2015).

She added that many modes of delivery, including subscription video on-demand, You Tube, internet protocol television (IPTV), apps, and Facebook now accounted for well over half of

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Telstra's internet traffic. Commenting on another Internet service provider's traffic at the same conference, Claire Reilly reported that iiNet's Chief Technology Officer, Mark Dioguardi, had said that Netflix now accounts for 25% of iiNet traffic, adding that "about 15 days ago Netflix made up 15% of traffic but today (April 20) its 25%. And that "Australian households were now all asking "the same five word sentence – shall we watch another episode?"

So who is Netflix?

The Netflix aggregation model

Netflix was co-founded in California in 1997 by Reed Hastings, born Boston, Massachusetts, and a one-time teacher of mathematics in Swaziland who has become the face of the company over the last few decades. The other co-founder Mark Randolph brought invaluable experience to Netflix from his computer mail order company, Micro Warehouse. Within a year or so Netflix had built the largest online DVD mail rental service in the USA. Hastings saw the Internet as offering "direct mail on steroids" and the choice of the company title *Netflix* conveyed the dream of simply providing heaps of good movies delivered over the net. In 2003 Netflix patented a hard drive that could download movies, but it cost consumers $300 to install, and it generally took up to eight hours to download a two-hour film partly because of poor network capacity. Then in 2007 Netflix launched a new service, "streaming movies to users" computers in the USA. Late in 2010, the company began its "watch instantly" streaming content service essentially to be delivered to PCs, but with the added prospect of delivery to set top boxes *for television* as well. Netflix announced the new service plan (again only for Americans) late in November 2010:

> We are now offering a new $ 7.99 a month plan which lets you watch unlimited TV episodes and movies streamed to your computer or TV... The new plan, which does not include DVDs, is a great option for the increasing the number of members who only want to watch instantly. (Becker, 2010)

The "unlimited episode and movie offer" was an exaggeration, because its content rights agreements inevitably constrained what Netflix could offer its customers. It held rights to movie titles from Paramount Pictures, MGM, 20th Century Fox, Sony Pictures, and Time Warner – all big movie studios, but the Netflix service was restricted to back list movies.

Netflix also initiated the bold idea for its time of providing multi-platform ready access – referred to as –"hybridity" - by promising that subscribers could:

a. 'Watch instantly' on a computer – including a Mac
b. Connect devices such as Wii, PS3 and Xbox 360 to a television set.
c. 'Watch instantly' on iPad and iPhone (Netflix marketing brochure 2011)

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However, its customers soon pointed out that only a few subscribers in the USA "have a broadband speed capable of giving them Blu-ray quality or even DVD quality"(Taub, 2010), and that the quality of the picture often varied according to the device used, irrespective of the speed of connection. Taub estimated that only 8% of Netflix customers in late 2010 viewed the content exclusively on their television set. And that substantial investments in high capacity broadband networks were needed to efficiently deliver its content directly to television sets in the future.

Not unexpectedly, the company had plenty of sceptics who raised difficult questions – how could it build a base of "sticky" consumers just with old movies; how many of the studios might desert it; or bleed it of product; and then how could it possibly ever afford the capital to commission plenty of its own titles? And also face the competitive might of the established commercial television networks, cable television operators, and possibly Google? Investment banker Jonathon Knee pointed to Netflix's alleged identity crisis:

> Netflix is primarily in the business of aggregating entertainment content created by other companies and selling access to it as a subscription service to consumers. In a media culture committed to the proposition that 'content is king' the robust success of a mere distributor is something incomprehensible and frankly, a little unnerving, especially while those responsible for the creative lifeblood that flows through its veins struggle for profitability. (Knee, 2011)

Yet its subscriber base kept growing and growing. Sandvine argued back then that traffic levels showed impressive growth, such that by October 2010 Netflix accounted for 20% of the downstream Internet traffic in the United States between 8.00pm and 10.00 am – remarkable indeed, if accurate (The Online Reporter, 2010). And there was some speculation about the cannibalisation of cable/ pay television networks in the USA where some 37% of Netflix subscribers between the ages of 25 and 34 stated they choose Netflix instead of a pay television service (Cerra & James, 2011). The notion of "cord cutters" emerged then in major web cam discussion forums among astute video production editors: i.e. that people were increasingly cancelling their pay cable boxes in favour of Netflix TV viewing via iPad (Cohen, 2011). One of the difficulties in making these kind of market assessments is that Netflix has long been reluctant to publicly release data about its traffic flows and customer base.

It has been a remarkable journey for Netflix over a rocky road for many years. There were multiple bitter managerial disputes about corporate directions that led to Hastings and Randolph having a major split, resulting in the talented Randolph, so technically crucial to

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the creation of the company, leaving angrily. Subscriber crises were common, notably when the company announced during the third quarter of 2011 that it had "lost" 800,000 subscribers. Then a hackers group, Anonymous, initiated a well-organised boycott of Netflix after it had initially decided not to support the Stop On Line Piracy Act (SOPA). And there were serious services outages: one most notably in 2012 lasting for more than 20 hours for all of its customers. Gina Keating's institutional study, *Netflixed: The Epic Battle for America's eyeballs* (Keating, 2012) suggests that "the history of Netflix is a long struggle for greatness marked by multiple disasters, lucky breaks, personal betrayal, and broken hearts. It has more drama than most of the movies Netflix rents."

Despite all of that, Netflix is now one of the darlings of the New York stock exchange, currently with an astonishing share price on offer at $ US 560.54 (as at 6 May, 2015) per share on the NASDAQ, with a market capitalisation of $US 34 billion on that day. Some trading speculators go as far as predicting that Netflix may reach $US 900 a share within the next two years. Taking the most generous estimate of its audience size – its own data – Netflix's world-wide video streaming services topped a 62 million subscribers in April 2015 which prompted Lucas Shaw to write "*Netflix now worth more than US giant CBS"* after its most original watched programme *House of Cards* drew in record viewer numbers globally with a reach of 20 million domestic households.

But wait. Contrast CBS, the leading overall yearly ratings US commercial television network, on that same day (6May 2015) had a share price of merely $ US 61.12 on the NYSE, and with a lower market capitalisation of $30.6 billion. The annual revenue base of CBS for 2014 was $US 14 billion, one of three of the major US commercial television networks, compared with Netflix at $US 5.5 billion according to *The Statistics Portal* of 29 April 2015. CBS, of course, relies on advertising whereas the prime Netflix revenue is generated from charging the viewers to who watch its programs. The gross audience numbers measurement game still spectacularly favours the incumbent network which broadcasts "free" into some 115 million US households. According to *CBS: About Us* its flagship program *60 Minutes,* now in its 47th season, drew an average audience of 12.2 million viewers per week during 2014. The *Dateline* ratings show that CBS"s *Superbowl* set a new record with a direct viewing audience of 111.5 million for one night. Such is the entrenched position for network broadcasters of live sports.

In March 2015 Netflix set up local business offices in Australia, its 50th country, in a plan to establish local operations in 200 countries. It was though not really a beginning for Netflix here, as it is estimated that somewhere between 200,000 and 320,000 Australian-based customers were already accessing US Netflix using location-faking technology for credit cards with valid credentials in the US. Not piracy, nor torrenting, but using a virtual private network (VPN) and usually paying about $15 a month for the connection cost combined with

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the US Netflix subscription charge. Klan (2015) cites an email sent to UnblockUs subscribers stating that the pool of impressive global titles available this way was 15,000 streaming titles, contrasted with the initial Netflix offer via the new Australian arm of an estimated 1,600 titles. But the local Netflix web site is visually impressive and has a neat summary of what it has to offer its local customers:

Netflix Australia at a glance

- **Netflix Australia Release Date:** 24 March 2015
- **Price:** Starting at $8.99 a month
- **Plans available:** Single-stream standard definition, two-stream high-definition, four-stream 4K ultra-high definition.
- **Broadband providers:** All major broadband providers will be able to stream Netflix.
- **Smart TV compatibility:** Netflix will be available on Smart TVs by Samsung, LG, Sony, Panasonic, Philips and HiSense, and Fetch TV's second-gen set-top box.
- **Game console compatibility:** Netflix will also be available using: Sony's PlayStation 3 (PS3™) and PlayStation 4 (PS4™), Microsoft's Xbox 360 and Xbox One, and Nintendo's Wii U
- **Other compatible devices:** Apple TV, Google Chromecast, and Apple and Android tablets and smartphones.
- **What shows will be available:** Specifically we're personally eyeing: *House of Cards, Downtown Abbey, Vikings, Marco Polo, Homeland, Luther, The Killing, Doctor Who, Spartacus, Arrow, Orange is the New Black, The Originals, The IT Crowd, Arrested Development, Pompeii, Unbreakable Kimmy Schmidt, Torchwood, Summer Heights High, Great Expectations, Top Gear, House Suits* and a plethora of children's titles. Because who else is going to babysit them, right?

Source: http://www.finder.com.au/netflix-australia-launch-date, Accessed 28 May, 2015.

Netflix has long tried to counter the criticism that what it basically offers its customers is backlist movies and television shows. No, its differences with the past apparently go deeper than that. Ted Sarandos, Netflix's Chief Content Officer, played up his view of the shortcomings of network television in an interview with Chow and White, suggesting that ad-free services offer a "purer creative experience" than linear television:

> Traditional television is less appealing, with bugs (graphics) across the screen, ad breaks – all those things make it a less satisfying event for writers and show creators. I don't want them to come in and say "Hey, here's my passion, but I'll completely change it for you." (Chow & White, 2015)

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So many Netflix executives make great play on the innovation they have created over many years. Carlos Gomez Uribe, (such an imaginative name for a netflixer!) Vice President of Product Innovation, invariably talks in his media interviews about their "magical algorithms." He argued in an interview with David Michael Brown:

> This enables us to develop Netflix as a platform that will find the right audience for any piece of content. When you think about a movie or a TV show in the traditional television world, unless the content demands a big enough audience it doesn't make sense for a channel to broadcast that programme, especially at prime time. For Netflix it's a completely different question - it only depends on the cost of acquiring or producing the content relative to what we think the audience will be. And with the algorithms, we can take any piece of content and find the right audience. It's a crucial advantage. Who ever knew that applied mathematics could help you watch TV? So the game is learning about you learning all about content and matching that together, choosing the top 20 and arranging them in a compelling way that helps you to choose between them. (Brown, 2015)

Brown wrote that the 2,600 Netflix employees back in the U.S are housed in five buildings with the several floors themed by genre with rooms named after movies. But there are no floors for news, current affairs or sports because none are offered on the Netflix menu anywhere. (And mercifully Netflix does not have its own island to film reality shows!)

Advertisers who have been frustrated with the alleged failings of the conventional television ratings system to show them clearer quantification of the value of individual audience responses for their substantial investment are overjoyed to hear about this matching system. Some viewers, however, wonder how much of their private data may become available to on-line providers in ways with which they are not entirely comfortable.

A growing number of key television industry figures suggest that such substantial advertising revenues for the incumbents are now built on shifting sands. Danny Bass, Group M"s Chief investment officer, when interviewed by Paul McIntyre in "Ad boss says it's make or break for free to air this year," summarised the key issues of the rising cost of Australian content at a time of declining advertising yields, together with the new viewers" choice of screens offered by the new band of on-line streamers:

> Market forces are going against the networks because it's costing them more money to produce content but the average yield and rate they have been receiving over the past few years has been decreasing as well. Their model has to change. They can't continue to do business in a way they always have

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> because as CPMs (cost per thousand TV) viewers get cheaper and the cost of programs gets more expensive, unless they have additional business around that, what will they do to survive? (McIntyre, 2015)

The viewer model of Netflix varies from that of the broadcasting incumbents by employing different platforms for delivery of its content and charging its audiences directly on the basis of user pays. However there are some commonalities in terms of the overall financial assessment of both the old and the new providers. Taking the initial Netflix launch basic subscription cost of $8.99 a month per subscriber as its base funding in Australia, and assuming it could sign up two million customers in its first two years, its operating subscription revenue would total $A 216 million per year. By contrast, by doubling the advertising revenue for the three commercial television networks for the six months July to December 2014, as published by their association FreeTV, their annual advertising revenue totals $A 4.014 billion! And the three city-based operators' share is roughly split as 40% each for Channels Seven and Nine, and 20% for Channel 10. This is an enormous disparity of basic revenue and shows the business mountain that Netflix will have to climb in Australia.

The networks also enjoy inherent cost advantages over the new streaming players. Both groups obviously share some common operational costs, such as their general overheads, cost of purchase and transmission of programmes, and marketing expenses, but the streaming providers have the additional expenses for their content delivery networks, direct customer interconnection, encoding, software licensing and billing. The sad history some time ago of a start-up telecommunications carrier, OneTel, shows that poor customer service with dreadful billing practices can cripple a company. Netflix though has a long history of efficient customer interaction processes – but it has to pay for the additional layer of costs. No detailed comparative data is available which compares such costs to those of the television networks, who do have modest web sites. But it must impose a more substantial cost impost of the on-line streamers.

Presto and Stan

Several major Australian media and telecommunications companies knew well in advance of Netflix's intention to set up in Australia, and they created two new rival entities, Presto and Stan, launched around the same time as Netflix came to town in March 2015.

Presto emerged out of a somewhat unexpected partnership between Seven West Media, of Channel 7 fame, and Foxtel, jointly owned by Telstra and News Corporation. The Presto home page (6.4.15), under the heading "What Do I Pay?" offered three subscription levels:

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- Presto TV: Unbelievable TV for only $9.90 a month
- Presto Movies: Unbelievable Movies for only $9.90 a month
- Presto Entertainment: Unbelievable TV and Movies for only $ 14.99 a month

Presto customers are offered selections from Seven's drama backlist titles, together with programmes that are usually six months old from Foxtel's HBO catalogue, for $9.99 a month. Television industry executives are quick to defend their dependence on screening backlist titles on the grounds that "a repeat is only a repeat for viewers who have already seen it!" The monthly subscription fees are debited directly from the customers' accounts.

The programmes on offer can be sourced across ten genres: Action and Adventure, Animation, Comedy, Drama, Horror, Kids and Family, Mystery and Crime, Romance, SciFi and Fantasy and Thriller. No sport, news or current affairs programmes are currently on offer by Presto or any other new player.

So why such an unusual institutional alliance? It appears that the Foxtel strategy, coming from the leading subscription television provider in Australia, may be partly to keep a defensive foot in several new camps by joining with Seven West. From Seven West's perspective this move offers them the great advantage of drawing upon Foxtel's wide experience of direct interaction with customers for building good customer experiences and dealing with the complexities of billing individual households.

Stan, another newcomer, is an unusual corporate joint venture between Channel Nine and Fairfax Media. Its printed promotion material offers customers "unlimited access to awesome TV and movies to screens where you are – to your computer, smartphone, tablet or television set via Chromecast or Airplay and streamed at full 1080p HD with an account at $10 a month". It appears that part of its strategy is to target the ballooning popularity of streaming to smart phones and tablets.

Stan sources programmes from commercial relationships formed with US powerhouse Amazon, as well as BBC Worldwide, CBS Studios, MGM and World Movies. The menu is strong, including British favourites *Luther, Wallander, Doctor Who, Sherlock Holmes, Ripper Street* and comedy greats *Fawlty Towers, The Office, Absolutely Fabulous,* and *The Vicar of Dibley*. And in a refreshing innovation for television in Australia, Stan offers a discussion forum for its viewers on the home page. But a major issue for all of the new streaming players is how much Australian content will eventually be offered. Stan management has indicated that it intends to commission Australian made titles, including a series based on the life of Lionel Murphy, the controversial Attorney General who launched a raid on ASIO during the term of the first Whitlam government.

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Management of both Presto and Stan are clearly aware of many of the market complexities they face in embarking upon these new enterprises. This can be seen in the somewhat guarded statements made by their senior personnel around the launch of both services. Presto director Shaun James was quoted in *The Age* (16 January 2015) as saying that the SVoD market was evolving quickly.

> It's a very exciting space, it's a very competitive space. We are under no illusions of that. But people can come and look now and see what's in there and it will continue to grow and evolve over the coming weeks and months.

And Fairfax Media chief executive, Greg Hywood, was quoted by Dominic White responding cautiously to rivals who questioned its role in the Stan venture:

> We're a media company. Why shouldn't we be in streaming video on demand? What we did was to provide marketing inventory and expertise in subscriptions and, sure, some money but let's see who's laughing in three years. (White, 2015)

Fairfax does have prior experience in the streaming on line space since October 2010 with its digital version of the *Sydney Morning Herald*. However, one wonders to what extent the past failures of Fairfax administrations regarding the premature sale of investments in other online platforms, notably the job platform SEEK, and car sales.co.au – both to subsequently become five star investments for their new owners – might have influenced their judgement to go with Stan.

Mass Digital Connectivity?

We've come a long way as a nation in recent years with major investments in high-capacity broadband through NBN that will offer many opportunities for new players, new services and new investment. All of this is so critical to creating a more dynamic and innovative Australian economy. However there is a tendency to exaggerate how far we have come in terms of the number of Australians who are currently able to share in the associated benefits, and we have a long way to go to reach a desirable level of national equity. The notion that we have now reached an age of "Internet for all" is almost taken for granted in so many quarters, notably in calls to abandon the "two out of three station rule" for the commercial television networks; in many of the reports commissioned by government in recent years into NBN; and to some of the futurists offering studies of projected demand for Internet-based services.

In the context of this paper we have a long way to go to reach the streams of nirvana for everyone in Australia to be able to have the pleasure that streaming video services can offer. ABS household data for 2012-13 states that "more than three quarters (77%) of all

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households had access to the internet via a broadband connection. The corollary, of course, is that 23 % of households do not. The same ABS data adds that "as in previous years, the greater the household income the more likely there is internet access at home. In 2012–13, 98% of households with household income of $120,000 or more had internet access, compared to 57% of households with a household income of less than $40,000 with no household access. Malcolm Turnbull's web site commendably canvasses these issues in "Affordability the biggest barrier to Broadband Access" adding that "those households in the bottom 20% of income earners were 10 times more likely to have no access to the Internet at home than those in the top 20%."

Steve Martin, CEDA Chief Executive, CEDA noted in the CEDA Report: *More than a million Aussies living in poverty a disgrace*:

> . . . the past 20 years had essentially been a massive failure by successive governments to address entrenched disadvantage and policies have been economically short-sighted. It is a disgrace given more than 20 years of economic expansion in Australia that four to six per cent of the population – one to 1.5 million Australians – is classed as being in entrenched disadvantage, with little to no hope of getting out of that situation. (CEDA, 2015)

So why are we so often assuming the term "mass" in debates about the new media revolution?

In this context we might also point to some of the work that has examined how different groups in society still remain dependent on the "old" media services. Bittman and Sipthorp's longitudinal study of children's use of Australian television shows a continuing dependence on established network television because most homes, irrespective of income, can somehow scrabble together a television set to watch "free tv."

> There has been, and is, much talk about how children today have been born into a world of new, digital media. In contrast to their parents – who have been described as "digital immigrants" because they have had to assimilate to the newly developed electronic environment – these children have been described as "digital natives". They have never known a world before digital technology. However, despite this breathless talk, it is not until children are well into their teens that their engagement with this new media rivals the time devoted to the older medium television (Australian Communications and Media Authority, 2009). Nor is it clear that the era of broadcast television has come to an end and that television is metaphorically "dead".

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> At least one television set is found in 99% of Australian households, and nearly half (48%) of all private dwellings not only have two or more televisions, but all these sets are on standby and ready to use. Access to a DVD player or recorder is also very high, with this device found in 88% of Australian homes (Australian Bureau of Statistics [ABS], 2009). Australian adults spend, on average, about 2 hours and 46 minutes per day watching television as a main activity or have it running in the background while they do something else (ABS, 2009; author's own calculations). Consequently, television is likely to be an integral part of most Australian children's experiences of growing up. (Bittman & Sipthorp, 2011)

Another statistic in this area is that the Smith Family's analysis of the Australian Bureau of Statistics *Children's Participation Survey* showed that in Australia's most disadvantaged communities, only 67.8% of children aged 5 to 14 years accessed the Internet at home over a 12 month period.

So how many Australians might be able to get access to the NBN services in future years and how many will be able to pay the costs involved? Yet are affordability issues on the public agenda? Telecommunications network providers have long been subjected by regulation to contribute financially to a *universal service obligation (USO),* with Telstra carrying the prime responsibility to roll out more networks to regional and remote areas. But this equity-based social policy has essentially been designed around the geographic maximisation of network access for customers. USO policy has largely been restricted to *voice services* but in the age of broadband, which is reaching the status of a necessary utility service for all, there is surely a need for the "O" for obligation in universal service to become the "O" for opportunity with broadband. Robert Morsillo's 2012 seminal paper, "*Affordable broadband for all Australians" (*Morsillo, 2012*)* called for this significant issue to be more widely discussed in the public policy domain and he offered a thoughtful and well documented call for review. In the context of this paper, USO discussions are most pertinent in regard to access to these new forms of streaming media content and delivery.

Conclusion

So where might the new streaming video players be placed in a few years' time in the Australian media and telecommunications market place? Bodey has reported that for the first three weeks following the launch of new TV services in Australia, Netflix more than doubled the daily visits of the next most popular Australian streaming service, ABC's iview based on the data from Experian Hitwise:

> Data showing daily traffic to 'catch up' and SVoD sites reveals Netflix leapt to market dominance on the day of its launch, March 24, with more than

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> 475,000 site visits. On the same day ABC's iview recorded about 330,000 site visits and the next was Nine's jump-in.com service with slightly more than 200,000 visits, ahead of Seven's Yahoo TV site. Netflix's major commercial competitors in the subscription space, Presto and Stan, both averaged less than 50, 000 site visits per day, although Presto bumped up after Netflix's first week. Stan has questioned the figures. (Bodey, 2015)

So whither Netflix? Surely the successful launch of Netflix here cannot be passed off as just another example of Australians being, yet again, just great "early adopters" of new technology: when they become available here the take up is often greater at a rate than in most other locations. Most notable examples for television have been the successful take up of colour television in 1974, and again with the introduction of video cassette recorders in 1976. Some futurists see Netflix as already a runaway success that will become a draconian agent of industry disruption. And the utopians have surely ignored the ambitious projections of just how many Australians might eventually enjoy the fast roll out of high capacity broadband. But they generally fail to take account of those who may eventually find that while the broadband network passes down their street, they simply cannot afford the cost of connection to the NBN, plus the monthly fee to the on-line provider.

One of the most extreme disruptors, Terry McCrann, billed by the *Herald Sun* as "Australia's leading business commentator" argues that the present television industry "faces a series of fundamental *existential* decisions." Yet there are real questions to be addressed here about the long-term business viability of the Netflix model. By charging $8.99 a month for its basic service, Netflix is facing two other new commercial on-line competitors in a small Australian market while still bent on expansion into 200 countries, many of which will expect expensive local content. And pitting itself here against commercial TV networks that have a current collective revenue pool in excess of $4 billion annually from advertising revenue, only shared among three major urban players in a regulated commercial oligopoly. And in a market place where they will probably remain quarantined from the programming goldmine of live broadcasts of customers' favourite major sporting events because of commendable equity-based anti-siphoning regulation. Mark Twain's comment comes to mind of how death can be so easily exaggerated!

The big variable that might override predictions of marginality for the online players is that they might just be offering what may become widely perceived as "a new customer experience." Unlimited optimism abounds in this camp. Marketing guru Reed Hastings of Netflix has offered bold predictions for the future of Internet television suggesting that "broadcast television will be dead by 2030" in an interview for the *Empire TV* magazine in the autumn 2015 edition :

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> Think about how incredibly fast the Internet is going to get over the next 16 years and how on-demand TV will be on every screen that you own. It's about an eight year life cycle for a TV, so that's two generations of TVs. The TV you buy in 2020 is going to be amazing *and broadcast channels will just be on the internet* (author emphasis). They will adapt. Internet TV is not just about You Tube quality video; it's about getting the best quality TV on the planet.

In Reed's world of 2030 apparently everyone will be able to afford the cost of broadband connection and payment for the programmes of their choice on their multiple screens across multiple platforms. It's his brand of technological utopia. And all screening 'quality TV'!

But it may be that we end up not with a knock-out blow for the old, but with a set of complementary systems with a plethora of players in a new media order.

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Affordability and 21st century telecommunications services

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Abstract: One of the central goals of ACCAN's 2013 Affordability Roundtable was to kick-start a broader discussion around the affordability of telecommunications products and services, encouraging new and innovative social programs and industry-wide models which can be employed to alleviate the affordability divide. Research indicates that low-income consumers pay a significantly higher proportion of their income for telecommunications access than the majority of Australians, and that this affordability divide between low and higher income Australians is creating barriers to connectivity for many low-income consumers This paper is intended as a continuation of that broader discussion and builds upon the ideas first developed in the article *Improving Affordability of Communications: Research and Policy Directions* published in the AJTDE in 2013. This article encourages the conversation through an interrogation of the current affordability initiatives, both domestic and international, and proposes new initiatives and safety net programs that can assist low-income Australians to be digitally connected.

Introduction

One of the central goals of ACCAN's 2013 Affordability Roundtable was to kick-start a broader discussion around the affordability of telecommunications products and services, encouraging new and innovative social programs and industry-wide models which can be employed to alleviate the affordability divide. Research indicates that low-income consumers pay a significantly higher proportion of their income for telecommunications access than the majority of Australians, and that this affordability divide between low and higher income Australians is creating barriers to connectivity for many low-income consumers (SACOSS 2014: 4). This paper is intended as a continuation of that broader discussion and builds upon the ideas first developed in the article *Improving Affordability of Communications: Research and Policy Directions* published in the AJTDE in 2013. This article encourages the conversation through an interrogation of the current affordability initiatives, both domestic

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and international, and proposes new initiatives and safety net programs that can assist low-income Australians to be digitally connected.

Access to affordable telecommunications for all consumers is one of ACCAN's three key objectives – Availability, Accessibility and Affordability. It is broadly accepted that access to ongoing telecommunications services is essential for full economic, social and cultural participation (Milne 2006). In other words, access to telecommunications is necessary for a full and meaningful citizenship. The main method of communicating with many government agencies is increasingly through online channels and this method of communication will only become more widespread with the Coalition Government's Digital First Strategy. This Strategy will require all government services and public interactions to be available digitally by 2017 (Liberal Party of Australia 2013: 19).

Providing government services and communication online will increase consumers' choice and convenience in interacting with government. However, not all consumers will benefit from this digital first e-government. There is growing evidence that a significant number of Australians are struggling to stay connected to our increasingly digital society because of affordability barriers. In ACCAN's 2013 ATJDE article, there was considerable discussion of the important findings from the Anglicare Victoria – ACCAN funded telecommunications hardship survey of people accessing emergency relief services. More recent research supported by ACCAN indicates affordability barriers continue to add to the exclusion of low-income Australians, specifically those experiencing homelessness and financial hardship (Humphry 2014).

How are we defining affordability?

Price and affordability are difficult concepts to measure and define since what one person considers to be affordable might not be affordable for others. The UK telecommunications regulator, Ofcom, recently explained that, "a good or service is considered to be affordable for a consumer if the consumer is able to purchase it without suffering undue hardship" (Ofcom 2014: 12). Another common measure of affordability is examining the average proportion of disposable income spent on telecommunications services and analysing whether the proportion is the same across all income levels. If this proportion is substantially higher for lower-income households, telecommunications costs are considered to be less affordable for lower income earners (Humphry 2014:37-38).

In 2010 Vodafone commissioned a study on the affordability of telecommunications in certain countries in the European Union. The study defined a telecommunications package as affordable if it:

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- Allows a household in the lowest income decile to make socially necessary use through sustainable expenditure. In other words, individuals should be able to use telecommunications services in line with what might generally be considered a 'social norm' without sacrificing spending on other essential items.
- Helps a household readily control its expenditure of telecommunications.

Affordability, therefore, is not just about monthly price but is a multi-dimensional issue. For the purposes of this article, we define affordability as a consumer's ability to pay for and use telecommunications without sacrificing expenditure on other essential services and items (Lewin & Milne 2010: 4-5).

How is Australia ranking?

The World Economic Forum publishes an annual Network Readiness Index which produces a score for each country based on the environment for ICTs, the readiness of a society to use ICTs, the actual usage of all main stakeholders and the impacts that ICT generates in the economy and society (Bibao-Osorio et al 2014). In the 2014 Index, Australia ranked 18th overall, but the measurement where Australia scored lowest was affordability. Here we were ranked 49th. In fairness, this was an improvement on previous years' figures, which ranked Australia 97th in 2013 and 100th in 2012. In calculating affordability, this measurement considers mobile cellular tariffs, fixed broadband internet tariffs and competition in the internet and telephony sectors. By rank, mobile tariffs and competition are improving, but the relative cost of fixed broadband monthly tariffs is not. It is important to note though that this Index does not include fixed-line services and only focuses on mobile voice and fixed broadband services.

These findings have been corroborated domestically in the ACCC *Telecommunications Report* which showed that in the 2013-14 financial year, overall prices for telecommunications services fell, in real terms, by 2.7 per cent. This is part of a wider decline in the price of telecommunications services which has decreased in real terms by 23 per cent since 2006-07. Against the trend, the price of NBN internet services increased by 4.6 per cent, an increase that was offset by an increase in data allowances in some of the plans (ACCC 2015: 77). This demonstrates the difficulty of comparing products as they develop, and while increased data translates into value for money for many consumers, it is important to remember that some consumers may not want or use extra inclusions. As such, a multifaceted understanding of affordability should take into account value-for-money, as well as the availability of cheaper plans that suit the needs of lower-usage consumers.

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What are the numbers?

The Australian Council of Social Services (ACOSS) 2014 *Poverty in Australia* report indicates that significant numbers of Australians are living in poverty. In 2012, 2.55 million people (13.9%), and 603,000 (17.7% of all children) children lived in households below the 50% of median income poverty line (Saunders et al 2014: 8). We know from the 2013 Anglicare Victoria Hardship Survey and the 2014 *Homeless and Connected* research report that many people living in poverty struggle to maintain telecommunications connectivity. For example, the 2013 Anglicare Victoria survey found that 66% of low-income survey participants experienced difficulty paying for their mobile service in the previous 12 months (Wise 2013: 2). We know from 2012-13 Australian Bureau of Statistics (ABS) figures that 98% of households with a household income of $120,000 or more had internet access, compared to 57% of households with household income of less than $40,000 (ABS 2014) and the Anglicare Victoria survey found that 50 per cent of those on low incomes cannot afford internet access (Wise 2013).

While reasons for non-adoption of telecommunications are multi-faceted, affordability is often cited as one of the major contributing factors influencing consumer telecommunications take-up (Turnbull 2014; Morsillo 2012; Goggin 2014). It is estimated that 6% of the population, over one million Australians, do not use a mobile phone. It is also estimated that 19% of homes do not have any internet connection (ABS 2014). Within certain cohorts of society these numbers are even greater. For example, 54% of sixty-five year olds and over do not use the internet and half of those with a disability and over the age of sixty-five do not have an internet connection (ABS 2014). While many consumers may choose not to have an internet connection – due to affordability or other reasons – the 2013 Department of Communications' *Broadband Availability and Quality Report* highlights that about 6 per cent of premises are unable to access fixed broadband (Department of Communications 2013). As such, the reasons for not having an internet access are multifaceted and include affordability and availability of services.

Current safety net

Currently in Australia, there are a number of initiatives which have assisted low-income consumers to access what has, until recently, been the primary telecommunications service – the fixed line voice service, known as the standard telephone service (STS). The overarching public policy mechanism to address fixed line connectivity for all Australians is the Universal Service Obligation (USO), however this does not specifically address affordability. Telstra is the nominated universal service provider; however, other carriers contribute to the costs of providing this service (ACMA 2015). The USO mandates that all Australians should have

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reasonable access to a fixed line service wherever they live. However, the USO is a 20th century legislative instrument operating in a very different 21st century digital environment – an environment in which access to a fixed line home phone cannot provide the connectivity necessary for full economic, social and community participation.

Access to an affordable fixed-line telephone service no longer provides a level of connectivity considered essential. It urban areas, it is outgrowing its essential nature as the primary means of connecting to our networked society. This is corroborated by an increasing number of consumers who are opting to forego fixed-line telephony, preferring mobile telephony as their sole telecommunications service. Since around 2002, mobile phones have become the dominant technology in voice communication as the number of mobile subscribers has overtaken the number of landline subscribers globally (Eardley et al 2009: iii). Additionally, in order to fully participate in today's digital economy, broadband connectivity is an essential service, because without it people are excluded from normal social and economic activities. Increasingly, it is broadband connectivity which can provide access to employment opportunities, government services and information and online educational possibilities. All of these are key enablers to help lift people out of poverty.

Local provisions

Currently there are limited solutions available to assist low-income consumers with affordability of telecommunications access. The Federal Government provides the Telephone Allowance to certain eligible pensioners and, depending on the beneficiary's circumstance; this payment is either $27.20 or $40 per quarter.

Telstra also offers a number of services targeting low-income earners, which is a requirement of its licence condition (Carrier Licence Conditions (Telstra Corporation Limited), cl. 22). This condition, which is manifested as the *Access for Everyone* package, was introduced in 2002, following the Australian Competition and Consumer Commission's (ACCC) 2001 report on Telstra's pricing arrangements, which found that cost increases stemming from the rebalancing of line rental and other charges, placed undue financial pressure on low-income households.

The *Access for Everyone* low-income package provides a number of critical services to assist significant numbers of low-income Australians accessing telecommunications services. These include, for example, discounts on telephone connection charges and monthly account charges for eligible pensioners, and 'Sponsored Access' services, free of monthly account charges, for crisis and emergency accommodation centres, so that residents can be reached by telephone (Telstra 2015).

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In the 2013-14 Financial Year the total value of the low-income package was $145 million. The majority of this assistance is provided through the pensioner discount, providing fixed line home phone discounts to the value of $117 million in FY 2014 (Telstra 2014). In the 2013 report to the Minister for Communications, the Low Income Measures Assessment Committee (LIMAC), which oversees the *Access for Everyone* program, noted that there had been a drop in the assistance provided via the pensioner discount over the previous five years to the value of $40 million (Telstra 2013: 3). This was attributed to pensioners opting for bundled services offering better value, but it is unclear from the report if the drop in the use of the pensioner discount was influenced by the growing preference for mobile telephony over traditional fixed line home phone services.

International provisions

In the US there are two types of subsidies available to low-income or disadvantaged consumers. These are Linkup, which subsidises initial connection for telephone services, and Lifeline, which subsidises the monthly price. The Federal Communications Commission (FCC) is responsible for administering the *Lifeline* and *Link-Up* programs. A not-for-profit company, the Universal Service Administrative Company (USAC), oversees these programs and the source of funds is based on a 10 per cent charge on long-distance calls (Eardley et al 2009: 22). As a general rule, eligibility is based on household income levels (household income must be at or below 135 per cent of the national poverty guidelines), or on participation in other means-tested government programs (such as Medicaid, food stamps, Supplemental Security Income, federal public housing assistance, the low-income home energy assistance program, Temporary Assistance to Needy Families, or the national free school lunch program) (FCC 2015).

A policy review in 2013 found that the Linkup subsidies increased take-up of telecommunications more than the Lifeline subsidies. It found that young people and renters in particular benefit from this subsidy and that it is cost effective as it is targeted at low-income households that do not have telephone services. These households also have extremely large discount rates, and assistance with immediate upfront costs is valued higher than assistance with ongoing costs. This highlights that the ongoing cost is not the only factor for affordability but in fact set-up costs also play a large role in the affordability of a product or service (Ackerberg et al 2013).

More recently, the Lifeline program expanded and a new program, Safelink Wireless, was created. This program enables low-income households to access mobile phone products and services as a direct substitute for a home phone (TracFone Wireless Inc 2015). This is an innovative initiative as it takes into account the changing telecommunications landscape

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where fixed lines are no longer considered the most essential telecommunications service. Furthermore, in May this year the FCC proposed extending the Lifeline subsidy to broadband services – highlighting the program's responsiveness to the evolving definition of 'essential service' (Gross 2015).

In the United Kingdom, the major telecommunications provider, British Telecom (BT), offers a number of packages and subsidies targeted at low-income consumers. The BT Basics package is available to consumers that receive one of the following government benefits – income support, job seekers allowance or guaranteed pensioners credit. The package provides line rental for a fee of £13.50 (around $30) per quarter, which includes £4.50 worth of free calls. Every domestic call made after this is charged at a discounted rate. This package not only provides low income households with access to telephone services but broadband internet is also available through this scheme (BT 2015). However, it is only available to BT customers so to benefit customers must switch carriers if they already have a rental line with another operator (Eardley et al 2009: 22).

Proposals for further discussion

The US and UK examples highlight how telecommunications providers are adapting to the changing telecommunications landscape as they provide discounts on mobile and broadband services, rather than solely on fixed line services. Further discussion in Australia needs to focus on the affordability of mobile and broadband services, and not be confined to the fixed line service.

The array of products which make up Telstra's current low-income package undoubtedly provides vital assistance for many consumers and people facing financial hardship. However, there is no industry-wide obligation to provide low income measures. It is possible that there are other mechanisms which could provide broader connectivity benefits and certainty for low-income consumers. These include, for example:

- Social tariffs directed to mobile broadband assistance, which cover set up costs as well as ongoing costs
- More low cost packages specifically targeted for low- income consumers
- Introduction of an industry-wide low-income package
- A redefined USO to provide universal access to mobile and broadband services
- Government allocation of a minimum broadband connection with the pension
- Telecommunications vouchers as a form of subsidy.

As discussed above, the most recent ACCC's *Telecommunications Report* found that overall prices for telecommunications services in Australia had decreased; however, prices for NBN

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plans had increased in line with increased inclusions, such as higher upload and download speeds. While this might increase the value-for-money of NBN plans, it is important to remember that not every consumer necessarily wants or needs more plan inclusions. 'No frills' plans, that continue to offer a basic or minimum service at a low cost, are necessary to ensure that users with varying needs are able to access suitable telecommunications services and plans. As such, affordability needs to take into consideration the extent to which products and services provide value-for-money and choice for consumers, which suit consumers' varying requirements and circumstances.

Conclusion

By drawing on international examples of plans and services targeted at low-income consumers, and by highlighting how the use of telecommunications has changed to no longer be predominately focused on the fixed line service, this article has demonstrated that there is a need to reconceptualise what we mean by 'affordability'. Affordability can no longer simply be equated with decreased costs for products and services, or with an increase in value-for-money. This is because for products not to place an undue economic burden on consumers, there must also be variety and choice – tailored to consumer needs at both the high-usage or low-usage end of the market.

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Globalisation – Does it lead to international competitiveness?

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Abstract: Globalisation may not lead to international competitiveness without consideration of the key reason for participation in the global economy and adoption of an approach that provides consistency. How can consumers determine the suitability of what is offered to them and be certain they're getting what they paid for? And how can suppliers be sure their offering is appropriate for their potential offshore markets? From BICSI's perspective, the answer is "standards".

Introduction

Global, Local, International, 'Glocal' – these terms are collectively finding their way into the vocabulary of businesses around the world more and more frequently today, from the largest of public companies, right down to 'mum and dad' eBay shopfronts, and everything else in between. Gone are the days of only the iconic large companies doing business internationally and the small to medium enterprises (SMEs) being relegated to local markets. Thanks to the Internet and digital technologies, everyone can be an international business and compete in offshore markets. Information technology (IT), it would seem, has removed conventional business stratification forever.

While IT has been an amazing business enabler – dare I say, even a great 'equaliser' – it has recently 'muddied the water' for the procurement of goods and services that are 'fit for purpose'.

Let me explain what I mean by 'muddied the water'. With the plethora of businesses of all different scales and capabilities conducting business in the global landscape, the benchmarks for quality and suitability of applications in the purchaser's country are often quite different from the corresponding benchmarks in the supplier's country. How do consumers – particularly in business-to-business transactions – determine the suitability of what is offered to them? How can they be certain they are getting what they paid for and at a fair price? And from a supplier's perspective, how can they be sure their offering is appropriate for their potential offshore markets?

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While globalisation has led to greater opportunity for suppliers and greater competition for consumers to draw from, it brings with it some serious concerns.

This is an issue the reaches to the core of the existence of BICSI (Building Industry Consulting Service International) – a global information and communications technology (ICT) industry association that actively promotes best practice through standards, credentialling and education that can be deployed anywhere in the world.

International competitiveness is an essential ingredient for any sustainable market, including the ICT infrastructure market that BICSI represents – so long as it's conducted from a long-term, ethical perspective, not a purely opportunistic approach.

The good, bad and ugly of globalisation

The greatest impact of globalisation is arguably access to information. Never before in human history has information been so abundantly and swiftly available to anyone, anywhere.

The fact that news of the recent earthquake in Nepal reached millions of people around the world on social media, well before news agencies could compile details of the disaster for broadcast highlights the pervasiveness of this global connectivity.

However, not all online news is dependably accurate. Case in point were the recent erroneous tweets from a BBC reporter, Ahmen Khawaja, firstly posting on Twitter that Britain's Queen Elizabeth II had been transported to hospital, followed shortly thereafter by a second tweet announcing: "Queen Elizabzth [*sic*] has died." The BBC promptly later apologised, stating: "the tweets were swiftly deleted and we apologize for any offence." (Diebel, 2015). As contrite as the BBC's apology was, the damage was done – the incorrect information spread around the world like wildfire, tarnishing the BBC's reputation for factual editorial.

Side-stepping these extreme situations, we do however find an abundance of conventional and reliable online information and, subsequently, transactions that cross national borders, languages, currencies and cultures.

A 2014 McKinsey Global Institute (MGI) study reported that global flows of goods, services, finance, people, data and communication contributed between 15 and 25% of world GDP, adding: "The country most connected to these flows—and inflows matter as well as outflows in the form of exports— will reap 40% more benefit than the least connected country. In short, connectedness is a virtuous circle—the richer the networks of connectivity and the more diverse the nature of flows and bilateral relationships, the more a country benefits." (Manyika, et al 2014).

It is quite evident that, in spite of the long-held view that people buy from people they know, the Internet Generation is showing itself quite comfortable in doing business with complete

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strangers using nothing more than emails and websites – this, in spite of the widely feared Internet hoaxers, spammers and identity thieves.

Corporate entrepreneurs who recognise this trend have seized the windows of opportunity afforded them. Michael Dell for example, successfully pioneered the online procurement concept two decades ago, selling PCs from an online portal, rapidly becoming the world's No. 1 PC supplier. Now Tesla Motors threatens to disrupt the entire US automobile industry with a similar online direct sales model. According to CNN: "Tesla Motors is the only automaker that sells cars directly to consumers, with all other automakers using independently owned dealerships." (O'Toole, 2013)

Locally, a 2014 Australian Bureau of Statistics (ABS) report confirmed a similar appetite for online procurement, noting: "76% of Australia's 15.4 million Internet users made a purchase or order over the internet [in 2013]" (ABS, 2014).

And in the Australian business-to-business arena, the Australian Government created the online AusTender portal to provide centralised publication of Australian Government business opportunities, annual procurement plans, multi-use lists and contracts awarded. Any company can register its area of business interest in an AusTender profile, to receive free automatic notifications via email of the latest business opportunities advertised by Australian Government agencies as they are published (AusTenders, 2015).

This highly efficient procurement protocol produces bilateral competitive benefits for both purchaser and seller. Firstly, it brings a wider variety of suppliers and service providers to the attention of the purchaser, creating a more competitive tender. It also brings with it the valuable potential to expose the purchaser to alternative solutions that may be the norm in other countries, but are not known to the Australian purchaser. Conversely, it opens doors to qualified offshore companies to do business internationally, without the need for establishing a costly local presence – a valuable exercise that can defer the investment of Capex before doing business in a foreign market.

However, its effectiveness is largely dependent on the accuracy of the tender documentation and its interpretation by the tenderer. All too often, projects incur serious problems because of 'translation' issues – not necessarily from erroneous language translation, but more specifically because of incompatible local vernacular. A simple, yet telling example of this disparity was a recent conversation I had with a Bank employee from London who was on vacation in Australia. The banking term 'eftpos', while ubiquitous in Australia, was completely foreign to her, even though she had been in banking for 10 years. In Britain, her professional banking terminology for a direct payment is a 'standing order', but this is a meaningless

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statement in Australia. The bank transfer function is exactly the same, but the terminology is completely different and misinterpretation could lead to contractual problems.

The point being stressed here is the need for internationalisation – not just in the obvious areas of technologies, protocols and regulations – but in the less apparent areas of terminologies, deployment methodologies, application and performance characteristics to name a few.

From BICSI's perspective as a global industry association, for its members to be internationally competitive and successful in the long term, the entire ICT infrastructure sector needs to advocate the development and adoption of international standards and harmonised benchmarks for best practice.

Caution about the global marketplace

Every country has its own set of laws, regulations and standards to ensure safe and reliable functionality of a wide range of products and services within its communities. However, these benchmarks can be very different to those of other countries, and indeed within its own borders. Take mains supply voltage for example. Australia has a nominal 240VAC supply voltage, but its tolerances vary between states. The National Electricity Rules state that voltage at the 'connection point' should remain within ±10% of the 'normal voltage', however electricity distribution network service providers (DNSPs) can elect to make their own declaration of voltage, which is what commonly occurs (AEMC, 2015). While all similar, they can be – and often are – different, resulting in the potential deterioration of electrical loads connected to the supply. Exacerbating the problem is our similarity to, but slight difference from, the European nominal 230VAC supply voltage. Most electrical appliances used in Australia are now imported from overseas; and most of these being designed for European configuration. It could be argued that, so long as they comply with Australian electrical safety and energy consumption regulations, these products are perfectly acceptable for use in Australia and connection to our electrical supply grid. Not necessarily so.

Voicing his concerns of the consequences of misalignment of our supply voltages and tolerances to imported electrical product specifications, Professor Alex Baitch, Principal, BES (Aust) and Visiting Professorial Fellow at University of Wollongong, stated:

> "The problem faced in Australia is that, while electricity DNSPs run their networks with a nominal system-voltage of 240/415 V, increasingly the equipment connected to it is designed for 230/400 V operation. Although this may not seem a major difference, it is in reality a 'silent killer', causing the premature failure of much electrical equipment and costing the community dearly." (Baitch, 2009).

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That same argument translates into other environmental disparities – temperature ranges, humidity, applications, duty-cycle, to name a few. Looking more broadly at the penetration of imported goods in Australia, we may well find similar negative consequences occur in every market where goods and services are transacted across foreign borders, and global or international standards are not promoted and adhered to.

The Global ICT industry

The telecommunications and IT industries were amongst the first to think and act globally. These industries were also early adopters of standardisation, largely driven by very vocal technology end-users who campaigned against proprietary technologies and the entrepreneurs who recognised this distaste, subsequently investing in open-source development. Robust and sophisticated protocols like Ethernet and TCP-IP were made available licence-free to technology developers; and vendor-neutral industry bodies like the Institute of Electrical and Electronics Engineers (IEEE) invested collaboratively amongst its members to develop universal application models.

Today, Ethernet is ubiquitous as a global communications protocol, universally adopted by technology consumers, designers and developers. And its ubiquity is largely due to its deliberate focus on interoperability.

Far-sighted developers who invested in interoperability rather than proprietary systems became internationally competitive at the expense of those who clung to proprietary systems. Where are Wang, Digital Equipment Corp (DEC), Token Ring and AppleTalk today? Very little if anything is invested in these proprietary protocols, and even less is spent on them by users. Whereas millions of dollars are invested in Ethernet development to satisfy the billions of dollars of market demand.

The message is simple – companies that adopt far-sighted standards and invest in the adoption of standardisation become more competitive on the international business arena than those who cling to proprietary technologies.

Promoting sustainable international competiveness

BICSI has some 23,000 members in over 100 countries around the world. In the ICT communities where BICSI members are present, the association endeavours to drive sustainable and ethical competiveness, not only amongst its members, but for the business and domestic communities that the industry supports, both locally and where appropriate, internationally. This stance is demonstrated in BICSI's Antitrust Statement, which states in part:

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> "Association meetings or workshops by their very nature bring competitors together. Accordingly, it is necessary to avoid discussions of sensitive topics. Agreements to fix prices, to allocate markets, to engage in product boycotts and to refuse to deal with third parties are automatically illegal under the antitrust laws. It does not matter what the reason for the agreement might be.
>
> "Accordingly, at any association meeting, discussions of prices (including elements of prices such as allowances and credit terms), quality ratings of suppliers, and discussions that may cause a competitor to cease purchasing from a particular supplier, or selling to a particular customer, should be avoided. Also, there should be no discussion that might be interpreted as a dividing up of territories.
>
> "An antitrust violation does not require proof of a formal agreement. A discussion of a sensitive topic, such as price, followed by action by those involved or present at the discussion is enough to show a price-fixing conspiracy. As a result, those attending an association-sponsored meeting should remember the importance of avoiding not only unlawful activities, but even the appearance of unlawful activity." (BICSI, nd)

By its very name, internationalisation is paramount to BICSI's activities. BICSI is an acronym for Building Industry Consulting Service International. The association actively promotes interoperability and interconnectivity through open system architecture and standards that have no borders. The activities of its members in each of these countries has a singular focus – advancing the ICT infrastructure community professionally and ethically, regardless of location.

The association recognises that local laws, regulations and codes govern or influence the ICT industry in each specific country or region. In many locations, including Australia, BICSI directly participates or has representation in the committees that develop related regulations and standards, with the express purposes of contributing best-practice guidance for inclusion in the standards and regulations, as well as better understanding the legislative criteria that drives the regulations.

In some cases, the standards and best-practice manuals that BICSI has developed internally are utilised in the development of nationwide standards and regulations by governments and private enterprise. Recognised as 'best-of-breed' standards, the application of these BICSI publications fosters a homogenous community of ICT industry professionals, with stakeholders in many parts of the world.

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Speaking at the 2014 BICSI Middle East District Conference in Dubai, Dr. Taseer Ahmed Rangrez DBA, PhD. Member of the United Nations Association of USA, UN Foundation; Advisory Member of Gartner Research Circle; and Advisory Council Member of Harvard Business Review, advocated the importance of standards in industries and communities collectively growing, adding:

> "Standards ensure that there are common platforms and interfaces to ensure that Internet growth is not encumbered by incompatibility. It's not just infrastructure: standards have also been instrumental in the growth of video streaming VoIP and ecommerce.
>
> "According to California State University at Chico, 65% of multinational enterprises believe localization is either important or very important for achieving higher company revenues.
>
> "There is no better proof of your commitment to your international prospects and customers than having your products localized for them. Successful globalization stems from ensuring equal quality standards and a thorough understanding of local elements; implementing standards and conformance tools – streamline processes, trim costs, earn and maintain market access, and boost bottom line; conformity assessment activities benefit public health, the local environment, the development and design of new and improved requirements for the safety and quality of the products." (Rangrez, 2014)

Localisation of global standards (sometimes referred to as 'glocalisation') not only harmonises design methodologies, performance metrics, and deployment techniques, but also 'bonds' the stakeholders with a common 'language'. For example, the fixed cabling between a server and PC is unambiguously qualified in global cabling standards as a link and all its components clearly defined for form, function and performance. Regulations often define this because it's the fixed cabling that can't be seen or accessed once the building is functional. On its own however, it can't function. Adding the interconnecting leads at both ends facilitates connection between the PC and server, but the performance characteristics for this are quite different to the fixed 'link'. Industry standards refer to this expanded path as a 'channel', distinguishing it physically, functionally and performance-wise.

Misinterpretation of these two parameters is common for those who haven't fully grasped the 'language' of international cabling standards and has resulted in non-compliant, substandard or unfit-for-purpose' ICT infrastructure. In these cases, someone always loses – either the client doesn't get what they pay for, the provider loses money through rework, or someone's professional reputation is tarnished. Understanding the industry 'language' however, ensures

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that systems engineered by one entity, perhaps somewhere else in the world, can be correctly deployed by local teams and confidently deemed fit for purpose.

A common technology 'language' is also imperative in large scale ICT projects, such as wide area networks where multiple disciplines and trades are involved. For example, in the deployment of Australia's National Broadband Network (NBN), optical fibre designers (often telecommunications engineers or technicians) typically produce specifications and drawings for the NBN rollout that are then used by civil contractors to deploy the pit-and-pipe infrastructure where the optical fibre will be hauled into. It's common for designers to have little civil works experience, nor knowledge of the civil contracting jargon. And it's equally common for excavator and back-hoe operators to have little knowledge of the telecommunications engineering terminology that ends up on fibre reticulation drawings.

The need for homogenous 'language between the disciplines and trades cannot be overstated. The manifestation of disparate 'languages' in projects of the scale of the NBN rollout is billions of dollars in lost productivity and massive delays in the rollout.

For companies who utilise international standards and apply the guidance of globally developed best-practice manuals, their stakeholders all along the supply chain 'speak the same language', resulting in less errors, faster deployment, satisfied clients and more profitability. In short, they are more competitive.

Such positive results have been experienced by organisations that engage BICSI credentialed designers and contractors, knowing not only that they are as highly qualified ICT professionals, but also that they utilise the same standards and design documents – ie. speak the same language. There are several instances in Australia of large US-based engineering firms who are contracted to deliver some of the country's massive mining projects and have sought out and engaged local BICSI credentialed designers and contactors for the very reason stated above – they speak the same language.

This makes BICSI credential holders highly valuable internationally, because the credentials are exactly the same around the world, and highly sought after by companies who understand the benefits of these credentials. It's also quite common for BICSI credential holders to secure lucrative jobs in another country, primarily because their BICSI credential is highly regarded.

BICSI's suite of credentials, standards and best-practice manuals are all internationally developed and recognised. For example, the most recent (13th) edition of BICSI's longest standing best-practice manual – Telecommunications Distribution Methods Manual (TDMM) – was developed by committees of more than 50 subject-matter-experts from a wide array of industries from all over the world, including Australia and New Zealand. This 2100-page document is considered the definitive reference manual for telecommunications and ICT

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infrastructure design by ICT professionals all over the world. First published in 1984 specifically for the North American telecommunications industry, each update edition has seen the manual progressively become truly international, ensuring its suitability for many markets. Input for this manual is drawn from the subject-matter-experts in data networks, telecommunications distribution, copper cabling, optical fibre cabling, testing, earthing, electrical distribution, RF transmission, legal matters, fire protection, building management, AV systems, security systems, healthcare professionals and others, to ensure the guidance provided is comprehensive and relevant to applications all over the world.

BICSI has a high-level Global Development Committee made up of members from several countries that oversees the development of standards and best-practice manuals from its many technical committees in fields that include electronic safety and security, outside plant, data centres and telecommunications project management.

Looking at the broader business landscape, there are many industry-specific associations and groups that have a propensity for collaboration to further the application of best-practice in their spheres of interest. Due to the adoption of digital technologies in so many applications, many associations are reaching out to BICSI to for guidance and education in the infrastructure to support their applications. Such collaboration also facilitates further harmonisation between industries and fosters adoption of existing standards recognised as robust and international.

Some that interface with BICSI on a global scale include IEEE, Ethernet Alliance, TIA and InfoComm. Others, such as ARCIA, ITS Australia, TelSoc and Engineers Australia collaborate with BICSI at a local level to advance best practice amongst its members.

Conclusion

So let's go back to the conundrum with international competiveness, mentioned in the introduction:

How can consumers determine the suitability of what if offered to them and be certain they're getting what they paid for? And how can suppliers be sure their offering is appropriate for their potential offshore markets?

From BICSI's perspective, the answer is "standards".

Standards that are collaboratively developed by subject-matter-experts drawn from all over the world harmonise the industry and enable us to have the same technical aspirations, to speak the same language, and to have the same metrics of performance and quality. With uniform guidelines and benchmarks that transcend national borders, this enables industry professionals across all layers of the supply chain to work together efficiently and effectively.

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Ultimately that makes individuals and companies far more competitive, anywhere in the world that those who do not advocate or practice 'glocal' standardisation.

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Things to learn and things to abandon:

A comparative study of the communications consumer redress scheme in Australia, Japan and Korea

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Abstract: This article compares the telecommunications consumer dispute resolution scheme in Australia, Japan and Korea based on the telecommunications consumer policy principles developed by the Organisation for Economic Co-operation and Development (OECD) in 2011 and the guidelines and recommendations developed by the International Telecommunications Union (ITU) in 2013. This article concludes that the Australian consumer dispute resolution scheme (the Telecommunications Industry Ombudsman scheme) appears to be the best practice among these three jurisdictions studied, followed by the consumer scheme in Korea. Both the current Japanese scheme and the proposed new scheme in Japan appear to be less appropriate due to the foreseeable inadequate accessibility and insufficient consumer redress authority created under the scheme. Nonetheless, much experience and exceptional practices can all be shared and learned by the regulatory decision-makers in all three countries.

Background and Introduction

Over the last decade, the communications sector has been subject to transformation with the development of competition and the diffusion of a range of new technologies and services. Competition has brought significant benefits to consumers with falling prices, better quality of services, a wider choice of service providers, and easier access to new services. Technological and service developments have resulted in electronic communications becoming a central feature in many countries around the globe, and this will become even more so as next-generation communication infrastructures and services are put into place.

The significant benefits to consumers in the development of new services and technologies has also had some costs, as consumers have been faced with more complex choices, a range of offers (sometimes with unclear pricing structures) and contracts which at times limited the flexibility of consumers (OECD, 2008).

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The emphasis on creating competition in communication markets has been mainly through supply-side measures but, in recent years, there has been more recognition that informed and empowered consumers can, through demand-side choices, stimulate firms to innovate, improve quality and compete in pricing. By making well-informed choices between suppliers, consumers not only benefit from competition, but they drive and sustain it. At the same time, as the use of communication services has increased, more emphasis is being placed on reviewing consumer policy relating to communication services by supplementing the range of consumer measures to provide better protection, more flexibility in the market for consumers, and better access to information (OECD, 2008).

It is in this context that the Organisation for Economic Co-operation and Development (OECD) has developed a set of policy principles for ensuring that consumer interests in communication services are adequately protected. The principles recognise that it is necessary to ensure transparent and effective consumer protection while maintaining an environment that provides incentives for investing in developing new communication services (OECD, 2011).

In 2007, the OECD published a Recommendation on Consumer Dispute Resolution and Redress (OECD, 2007) in which member countries are recommended to review their existing dispute resolution and redress frameworks to ensure that they provide consumers with access to fair, easy to use, timely and effective dispute resolution and redress without unnecessary cost or burden. It also required member countries to ensure their domestic frameworks provide for a combination of different mechanisms for dispute resolution and redress in order to respond to the varying nature and characteristics of consumers (OECD, 2007: pp. 9 – 10).

Against this background, this article examines the communications consumer dispute resolution and redress in Australia by comparing it with consumer schemes in two other OECD member countries in Asia: Japan and Korea.

Japan and Korea are chosen as comparators for two reasons. Firstly, both Japan and Korea have achieved fast development of their communications industry in recent years. Although the population in Australia is smaller than those of Japan and Korea, the Internet penetration rates in these countries are indeed comparable, and similarly with fixed-line phone and mobile phone penetration. In particular, the fixed-line telephone penetration in Australia was 44% in 2013, while it was 47% in Japan and 50% in Korea in the same year (International Telecommunications Union, ITU, 2013a). In 2013, the Internet penetration by individuals in Australia was 83%; it was 86% in Japan and 85% in Korea (ITU, 2013c). In addition, all three countries have a high level of mobile phone take up. It was 130% in

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Australia (ITU, 2013b). These figures (the high penetration rates) present a comparable level of development in the telecommunications sector between Australia, Japan and Korea.

A higher level of penetration suggests a larger communications consumer population in the market. The figures above are significant. They indicate that the communications consumer populations in these three countries have grown much larger than the entire populations of the respective countries. The topic of communications consumer protection is therefore becoming an area of regulation attracting attention from every aspect of people's lives.

The following part of this paper, Part 2, aims to provide an analysis of the current communications consumer dispute resolution and redress schemes in these three countries. Part 3 analyses and evaluates these schemes against the OECD Policy Guidance for Protecting and Empowering Consumers in Communications Services. Part 4 concludes that all three countries have in place certain schemes responding to OECD principles to various levels; however the schemes are significantly different in all these countries regarding scheme set-up, authority, operation process and procedure. Australia's scheme appears to be the best practice among these three countries, followed by the scheme in Korea. Both the current Japanese scheme and the proposed new scheme appear to be less appropriate due to the foreseeable inadequate accessibility and insufficient consumer redress authority created under the scheme. Nonetheless, much experience and excellent practices can all be shared and learned by the regulatory decision-makers in these countries.

Investigating Communications Consumer Schemes in Australian, Japan and Korea

This investigation consists of two main activities. The first activity is a desk research investigating the current schemes. The second activity is a series of one-on-one depth interviews to verify and supplement the findings from the desk research (mainly due to the lack of public information in English in Japan and Korea). In order to compensate for the limited sample size in using depth interviews, interview participants were carefully selected from regulators, the communications industry (major companies), consumer law attorneys, and academia in both Japan and Korea.

A total of seven interviews were carried out during September and October 2014. Interviews in Japan were conducted with the Japanese communications industry regulator, the Ministry of Internal Affairs and Communications (MIC) (Kamiya, 2014), the two largest Japanese telecommunications companies (NTT East and DoCoMo) (Oonawa et al, 2014), one Professor specialising in communication policy from the Institute for Media and Communications Research, Keio University (Sugaya & Higashihira 2014), one major Internet Service Provider (Biglobe) (Yoshiyuki et al, 2014), and two legal professionals

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specialising in communications consumer protection (Takahashi & Arimoto, 2014). Interviews in Korea were conducted with SKT, the biggest telecommunications company in Korea, (Choi & Tae Kim, 2014); two Professors specialising in communication policy: one from Inha University (D. (Kim, 2014) and the other from Hallym University (Ahn, 2014); and one specialised communication attorney (Choi, 2014).

The three countries exhibit three very different systems with various different stakeholders in each system playing different roles and functions. In order to present a clear picture in an easy-to-understand fashion, findings from both the desk research and interviews are combined and compared in the following parts of this paper.

Scheme in Australia

Being the world's first industry-specific ombudsman scheme, Australia's Telecommunications Industry Ombudsman (TIO) was established in 1993 to provide an alternative dispute resolution service between carriage service providers (CSPs) and consumers. The TIO is authorised under Part 6 of the *Telecommunications (Consumer Protection and Service Standards) Act 1999* to provide a free and independent dispute resolution service for small businesses and residential consumers in Australia who have complaints about their services. The industry regulator, the Australian Communications and Media Authority (ACMA), is only involved in consumer disputes when non-compliance issues occur.

To use the TIO scheme, the complainant, being either a residential consumer or a small business (TIO, 2015j) should have a complaint relating to a landline telephone, mobile or internet service, or damage to property or telecommunications equipment. The complainant needs to contact the service provider to attempt to solve the complaint with them before taking the matter to the TIO. The complaint matter has to be less than two years old (TIO, 2015a). Once the TIO accepts the complaint, a case officer will be allocated and will be responsible for handling the compliant until a final decision is made. The TIO has the authority to decide the resolution of a complaint up to AUD$50,000, and to make recommendations on complaints up to AUD$100,000. Australian telecommunications companies are legally obliged to join the TIO scheme (TIO, 2015g). Figure 1 below illustrates the position of the TIO in consumer dispute resolution in Australia and the complaint-handling process.

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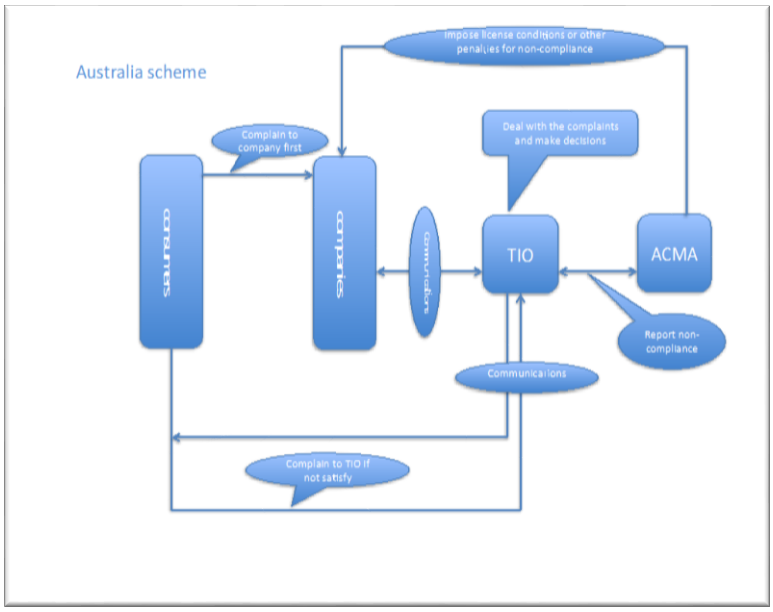

Figure 1: Australian Scheme

Several things are relevant to the TIO's complaint process:

- When forming any view, assessing any evidence, or making any decision, the TIO must have regard to what is 'fair and reasonable' (TIO, 2014d).
- To use this scheme, small business as defined by the TIO includes any business that usually has up to 20 full-time employees and $3,000,000 annual turnover (TIO, 2015h).
- The complainant is required to complain to the provider and to give the provider a chance to consider the complaint matter before the TIO can accept the complaint. However, the period that the complainant needs to deal with the service provider before taking the matter to the TIO is not specified in the TIO's Constitution and Terms of Reference (TIO, 2014c).
- The TIO's resolution becomes a binding decision to the provider if the decision is accepted by the consumer within 21 days from the date when the decision is made. The acceptance of the TIO's resolution prohibits consumers from taking any further action against the provider about the same complaint matter (TIO, 2014a).
- During the TIO's complaint-handling process, providers are normally prohibited from taking legal action in a court, tribunal or alternative dispute resolution forum about the complaint matter (TIO, 2014b); there is a timeframe of 15 business days to follow the course of action outlined in the TIO's decision by the provider after the consumer accepts the decision (TIO, 2014c). Non-compliance matters are normally referred to the industry regulator, the ACMA, and (might) be published in various

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forums such as the TIO Annual Report, the TIO website, or a Member News bulletin (TIO, 2015c).

The entire process is free of charge for consumers. The TIO sources its funding solely from its member companies who are charged fees for using complaint resolution services provided by the TIO. The funding system acts as an incentive for service providers to keep complaints made to TIO to a minimum, as service providers are only charged if the TIO receives a complaint from one of their customers (TIO, 2015d).

Scheme in Japan

In Japan, dispute resolution for communications consumers operates in a very different structure, as there is no TIO-like middle person who can make binding decisions on consumer matters. Instead, disputes between consumers and service providers are mainly negotiated and agreed between the parties themselves.

In negotiating a dispute with a service provider, an individual consumer can seek help from the National Consumer Affairs Centre of Japan (NCAC) or even make direct calls to the Japanese communication industry regulator, the Ministry of Internal Affairs and Communications (MIC).

The NCAC is established as an independent administrative agency. It works as a core consumer advocate in Japan (NCAC, 2003a). The main activities of NCAC include consumer information collection (analysis and release) as well as consumer consultation. It is a general consumer body dealing with consumer issues across all sectors involving communications-related issues. It also trains consumer counsellors nationwide (NCAC, 2003b). A main function of NCAC is to help consumers to deal with issues with their service providers, but it does not have any legal authority to make a decision on the matter.

In addition, the MIC also set up a consumer centre to receive phone calls or written complaints from individual consumers and/or consumer counsellors. This centre is called the MIC Consumer Inquiries Centre. It works as the complaint and consultation reception desk of the Telecommunications Consumer Policy Division in the MIC to respond to complaints and consultations, inquiries from institutions such as the NCAC, and fact checks with the telecommunications carriers and departments concerned, and requests for appropriate measures to be made by them. However, this consumer inquiries centre does not deal with private issues from individuals in general; although it can issue administrative orders to telecommunication companies, but this measure is rarely used. More often, the Consumer Inquiries Centre sends direct requests to companies ordering them to improve the level of their consumer services when a large number of complaints are made against them (Kamiya, 2014). Figure 2 below illustrates the current Japanese system.

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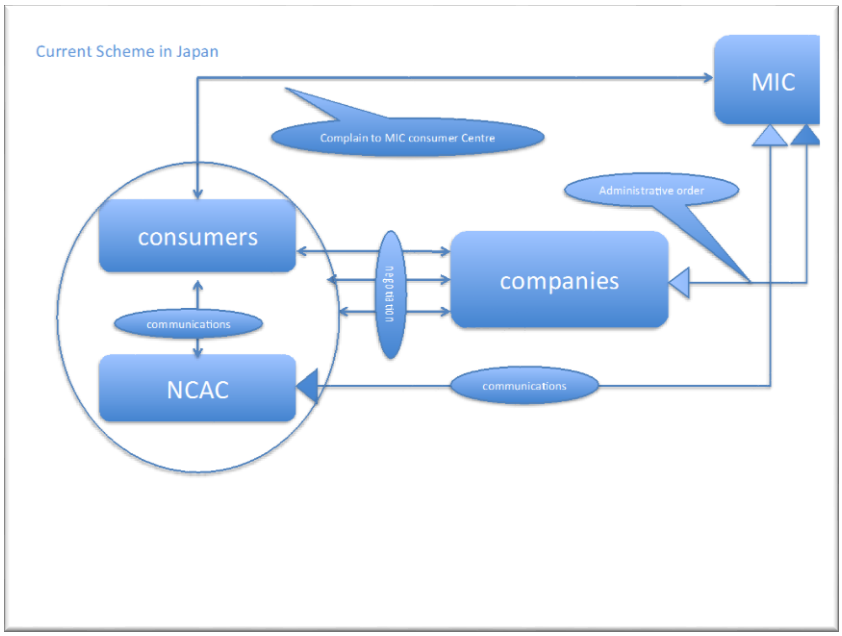

Figure 2: Current Scheme in Japan

There are three points to add here

- This process is mainly a straightforward private negotiation process between consumers (sometimes with the assistance of NCAC counsellors) and service providers (companies). NCAC's role is purely to assist consumer negotiation in this process.
- The MIC's role is also very limited with regard to its direct involvement in individual consumer matters.
- In contrast, companies are given ultimate power in making decisions of their business-related consumer disputes. This situation is also confirmed by Dr. Koseki Yoshiyuki, the CEO of Biglobe, who has stated that "Biglobe always tries our best to satisfy our customers. However, there are situations where it is impossible to satisfy all of our customers. In such cases, we normally choose to continue our negotiation. This situation, however, might only happen once per year." (Yoshiyuki et al, 2014)

The Japanese system is nonetheless starting to change due to the fact that "the number of complaints in telecommunications business is increasing in Japan in recent years" and "the consumer commission requested the MIC to consider a law amendment to target this issue" (Kamiya, 2014).

Statistically, the total number of telecommunications related complaints and queries received by the MIC Consumer Inquiries Centre decreased continuously over the past decade

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from a total of 16,101 in 2004 to a total of 6,811 in 2012 (Kamiya, 2014). This trend is however characterised by an increasing number of cases based on terms and conditions agreed with the service providers, an increasing number of cases on the quality of communications service, and cases on sales activities, including telemarketing. In particular, consumer complaints relating to terms and conditions agreed with service providers have been ranked the number-one complaint matter in the past few years, and complaints relating to quality of service have jumped from being outside the top 10 in 2010 to ranking in 9th place in 2011 and in 6th place in 2012.

In contrast, the statistics from the NCAC present a very different trend, indicating a clear increase of communications-related consumer complaints in the past few years with a total number of 35,189 complaints in 2011 and 46,409 complaints in 2013. The top ranked complaint matter is however the same – agreed terms and conditions (NCAC, 2014).

In this context, the MIC initiated a discussion in February 2014 aiming to introduce a new customer consultation scheme in the Japanese communications industry. A study group was subsequently set up by the MIC to investigate the possibility of establishing a third party to deal with consumer complaints in the industry. The draft report was made available to MIC on 25 September 2014. The conclusion was not to establish such a 3rd party at this stage. However, in the course of conducting this study and negotiating with the industry, the industry has committed to establish certain "new consumer frameworks" to accept consumer complaints on behalf of the whole industry. The study group suggested that the MIC should follow up the industry commitment on the establishment of the new consumer framework and should review the framework regularly after the establishment. The study group also suggested to the industry that they should consider establishing a third party within the new consumer framework. The MIC's decision is made with a clear expectation that the industry will set up their own "consumer framework" in the coming years (Kamiya, 2014). The detailed structure of this new industry framework is yet to be decided by the industry. There is, however, a proposal being considered at the current stage. Figure 3 below illustrates the proposal of the new industry framework (Kamiya, 2014):

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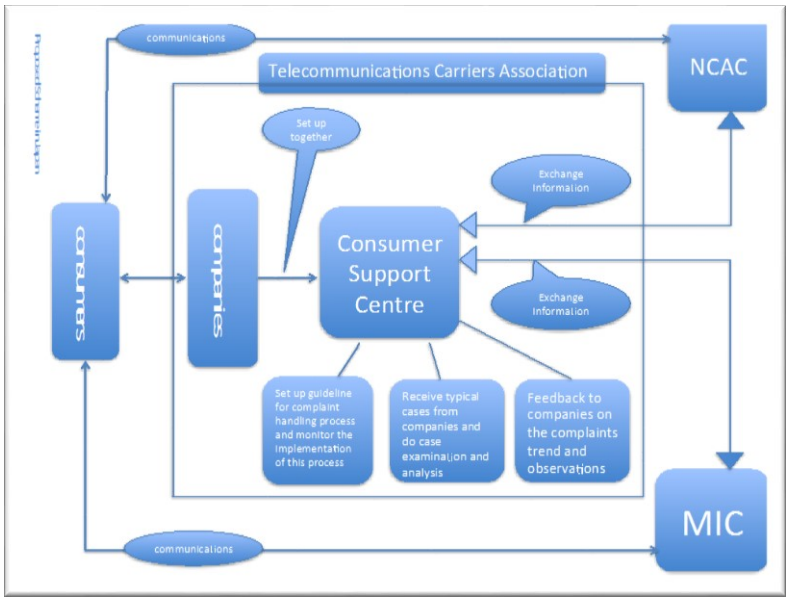

Figure 3: Proposed Scheme in Japan

There are two points to add here:

- The Consumer Support Centre in the middle of the diagram is a new body, to be jointly set up by the communications industry in Japan. Once formed, this body is to carry out specific tasks including exchange of information among companies, collecting and analysing typical complaints, setting up a guideline for the complaint-handling process, and communicating with external agencies such as the NCAC and the MIC.
- As indicated, the Japanese Telecommunication Carriers Association (TCA) is currently being considered as the vehicle in the new framework. The TCA was established in 1987 with the aim of contributing to the sound growth of the industry and improving convenience for the public by addressing common issues faced by carriers. Membership of the TCA is voluntary for companies. It now has 57 companies including all the leading service providers in Japan such as NTT DOCOMO and Softbank (TCA, 2014).

The Scheme in Korea

Korea's telecommunications consumer scheme is mid-way between the Australian TIO scheme and the Japanese scheme, as there is no particular third party complaint-handling scheme in the industry. However there is the Korean Consumer Agency (KCA), which acts as a middle person to solve disputes in all service fields and which also makes recommendations to the parties involved in the dispute.

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The KCA is a government organisation established in 1987 based on the Korean Consumer Protection Act. The KCA's role is to protect consumer rights and interests and to promote a rational consumption life in all service fields including ICT (KCA, 2013b). Consumer counselling and dispute resolution are two major functions of the KCA together with other functions such as policy research, consumer education and publication and information disclosure (KCA, 2013d).

There are two separate teams directly dealing with consumer issues: the Consumer Counselling Team (CCT) and the Consumer Dispute Settlement Commission (CDSC) within the KCA. The CCT provides counselling services to consumers encountering problems using products or services, helps consumers to negotiate with service providers, and recommends conciliation when needed. The CDSC has a quasi-judicial power. If the parties in a dispute fail to accept the recommendation made by the CCT, the CDSC can conduct mediation and also make a decision on the dispute matter. If both parties accept the decision by the CDSC, the decision will have the same judicial effect as a court of law. If one or both parties do not accept the decision, civil suits can be filed. In cases where the companies fail to comply, the KCA assists consumers in commencing civil litigation, and 30 attorneys have been appointed currently to provide legal assistance. If the case is won in court, the consumers partially pay for the attorney fee. If the case is lost, the consumers don't have to bear the cost (KCA, 2013a). The KCA has been the principal dispute resolution method for Korean nationals for years with its scale of operation and good reputation.

The new Korean government began its role in 2013 with 17 Ministries, 3 Departments and 18 Agencies compared to the former government's 15 Ministries, 2 Departments and 17 Agencies. The Ministry of Science, ICT & Future Planning (MSIP) and the Korea Communications Commission (KCC) are the two main government bodies that govern ICT-related businesses (Koo, 2013). Therefore, communications consumers can also report their matters to the KCC and the MSIP in addition to the KCA scheme, although the MSIP oversights the industry development as a whole but does not make decisions on individual consumer matters (Ministry of Science, ICT and Future Planning, n.d.). Figure 4 below illustrates the Korean scheme.

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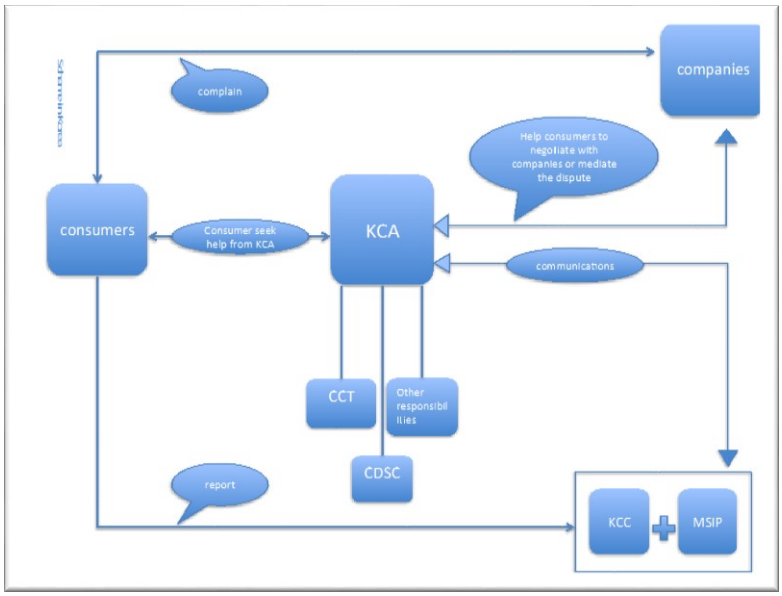

Figure 4: Scheme in Korea

Analysis and Evaluations

The OECD Consumer Dispute Resolution and Redress Recommendation was published in 2007 and made a series of recommendations to its member countries for them to take into account the need to improve awareness of and access to dispute resolution and redress mechanisms and to enhance the effectiveness of consumer remedies in cross-border disputes (OECD, 2007).

The OECD Policy Guidance for Protecting and Empowering Consumers in Communications Services was published one year after the 2008 OECD Ministerial Meeting on the Future of the Internet Economy. This policy guidance highlights the fact that communications consumers may be reluctant to take legal action when they have serious disputes with their service provider, either because of the time and expense involved and/or because they find the judicial process intimidating. In addition, this policy reinforces the importance for communications consumers to have access to fair, easy-to-use, timely, effective and inexpensive dispute resolution and redress mechanisms, including, where possible, alternative dispute resolution services. Once again, the 2007 OECD Consumer Dispute Resolution and Redress Recommendation is cited as good practice for communications consumer protection (OECD, 2008).

Three important principles in consumer protection are identified in the OECD guidance. They are:

- creating an accessible consumer scheme (accessible scheme);
- establishing a consumer authority with sufficient power (competent authority); and

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- ensuring the consumer scheme has a wider role and functions (wider roles/functions).

The following part of this paper analyses and evaluates the three schemes against these OECD recommendations.

Accessible Scheme

The OECD Guidance suggests to set either up an alternative dispute resolution scheme (ADR) or a simplified court procedure for small claims. The scheme should be easy to use with sufficient information disclosure, and should not impose any cost for consumers. It should also consider the special needs of disadvantaged or vulnerable populations.

The Australian TIO scheme is good practice in this regard. The scheme is free to use for consumers. The service benchmark used in the TIO is the Benchmarks for Industry-based Customer Dispute Resolution Schemes, in which accessibility is the number one principle (Ellison, 1997). In addition, the TIO has been working effectively to improve awareness of and accessibility to its office. Consumers can access the TIO's service by various different methods including telephone, post, and website. Translation and interpreting services are made available to consumers free of charge. The TIO introduced a new, more user-friendly website in 2012 and has seen an increasing number of consumers report their complaints to the TIO using the online portal (Cohen, 2013). The TIO's website is designed to make content accessible to a wider range of people with disabilities, including blindness and low vision, deafness and hearing loss, learning disabilities, cognitive limitations, limited movement, speech disabilities, photosensitivity and combinations of these. Moreover, the TIO provides a national relay service and a teletypewriter (TIO, 2015f).

The current scheme in Japan relies heavily upon private negotiation between the consumer and service provider. The NCAC's role and function is limited to a mere "helper" and the MIC's role does not focus on solving individual consumer complaints. It is therefore hard to say that there is a current "scheme" in solving consumer disputes with service providers. The proposed scheme is currently being considered by the industry, in which an industry-specific consumer support centre is to be created to handle consumer complaints. In the author's opinion, even with the eventuation of the industry consumer support centre, the "easy to use" and the "accessibility" benefits are still doubtful due to the following two reasons. Firstly, the current proposal is a highly complicated framework with many parties playing different (but sometimes overlapping) roles. This is highly likely to create confusion to consumers as to the process of complaint handling. Secondly, in the proposed scheme there are three different contact points where consumers can start their complaint journey: the Consumer Support Centre jointly established by the industry, the NCAC, and the MIC

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complaint hotline. More starting points can provide more choices for consumers but it can also create uncertainties as to "which one should I go for?" So, without a clear guidance for consumers in the first place, merely providing different channels to consumers may work negatively in practice.

Compared with the scheme in Japan, Korea's scheme appears to be simpler, easier and more user friendly. In Korea's scheme, the KCA plays an important role: it serves as a key contact for consumer disputes, it provides consumer counseling as well as redress, and it also provides assistance for consumers to file civil litigation against non-compliant companies. In this regard, it can be considered as a 'one-stop shop' in handling consumer complaints.

As a multi-cultural country, Australia's population has a great diversity. It is therefore vital to increase the accessibility of the consumer scheme by providing language services. The TIO has done well in this regard. This is, however, not a particular concern in the case of Japan and Korea.

The other goal that the TIO has achieved is its accessibility for disadvantaged and vulnerable populations. This is done through the design of the TIO's new website, and the TIO's relay service and teletypewriter service. In comparison, neither the NCAC in Japan nor the KCA in Korea provide comparable services.

In relation to the time limit for accepting complaints, the TIO accepts complaints for up to two years after the date that the consumer discovered the problem they are complaining about. In certain situations, the TIO also accepts complaints for up to five years (Telecommunications Industry Ombudsman, TIO, 2014a). In the view of the author, this two- to five-year time period certainly constitutes an extremely wide time limit, especially for communications complaints, which might, in turn, unnecessarily limit the operation of the providers (Li, 2014: pp. 151 – 168). Nonetheless, this wide time limit doubtlessly contributes to a higher level of accessibility of the scheme. In comparison, the time limits set by the NCAC and the KCA are not clearly specified anywhere.

One strong opinion from the author's interviews in both Japan and Korea indicates that the mainstream industry (big companies) is highly satisfied with the level of customer service that they are providing. As the result, major companies are arguing that consumer complaints have been, and can still be, well handled by companies themselves.

In Japan's case, "responsible and legitimate companies" are very capable of handling their own consumer issues. The increasing number of consumer complaints in the recent years is a result of misconduct by "doggy companies" (Kamiya, 2014). It therefore does not reflect the level of consumer services that companies are providing. For instance, Dr. Yoshiyuki, CED of Biglobe stated: "the accessibility has not been and is never to be a problem for our

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customers. Our company has spent so much money in providing the best customer care. In fact, making our customers happy is the only way that we can grow our business … yes, we are a big company, but we don't bully and we have never done that … our customers are all happy customers". He also pointed out:

> "Japanese society is a special society where nobody likes to make complaints. Yes, people get unhappy about something. But people prefer to talk through it themselves a lot more than finding another place to complain … this is the culture of the Japanese and this is the culture of many Japanese companies…" (Yoshiyuki et al, 2014).

Mr. Eiji Matsuoka, Manager of Corporate Strategy/Planning department in DoCoMo stated: "…we are a big company with 63 million active subscribers. Our customer service is key to driving our performance because we know for sure that if they are not happy they will move to our competitors immediately. However, I never thought communications consumer disputes is a big issue in Japan from my experience … I genuinely do not think we need any other consumer scheme to deal with consumer issues in communications. We always make sure our consumer care is accessible so I do not see the problem… "

Mr. Hatakenaka, Manager in customer care, NTT East, stated:

> "… we have about 10 million subscribers for main business in NTT. NTT East receives about 700 inquiries every day including general inquiries and sometimes complaints. We have a team of 18 people dealing with consumer issues specifically but we always solve the problem quite quickly, either on the phone straight away or within one day. It is very rare to face the situation that we have tried to solve the problem but our client is still unhappy. This situation probably happens once a year or once every few years…" (Oonawa et al, 2014).

Interestingly, all of these statements were verified and confirmed by a number of non-company interview participants including communications attorneys and academics (Sugaya & Higashihira, 2014; Takahashi & Arimoto, 2014).

SKT in Korea argued a similar case. Mr. Choi and Mr. Kim from SKT's Consumer Experience department stated that:

> "… as being the largest operator in Korea, we have 28 million subscribers and do not normally have unhappy customers. We pretty much solve all the consumer issues within 24 hours … we do not give reasons to our consumers to be unhappy about us … competition is robust and we can only survive if we provide the highest level of consumer service …" and "customers can access our customer care around the clock … KCC can get vigorously involved if there is any issue …

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we don't really see the need to change anything currently…" (Choi & Tae Kim, 2014).

Again, these statements were further confirmed by other interview participants including Prof. Ahn and Prof. Kim (Ahn, 2014).

So, the very argument that the industry in Japan and Korea is putting forward during the interviews is that, simply, accessing dispute resolution with companies by consumers has never been and will not be an issue. Nonetheless, Mr. Kamiya from the MIC still believes that there are issues in consumer dispute resolution in Japan apart from those "naughty doggy companies" and that these issues need immediate attention from the entire industry and the regulator (Kamiya, 2014).

Competent Authority

The OECD Guidance suggests that a consumer protection enforcement authority should be set up to have the ability to take action and obtain or facilitate redress for consumers, including monetary redress.

The TIO has significant authority in making decisions by using monetary redress. It has the authority to decide the resolution of a complaint (which companies are legally obliged to implement) up to $50,000, and make recommendations on complaints up to $100,000 (TIO, 2015k). To the knowledge of the author, the amount of the TIO's monetary redress is far bigger than many other similar authorities in the world (Li, 2014: pp. 151 – 168).

The current Japanese scheme heavily relies upon private negotiation between consumers and service providers. The NCAC's role and function are limited to being a mere "counsellor" to consumers in the negotiation process due to a lack of authority in decision-making. By the same token, the KCA's decision-making power is comparatively clearer than the NCAC's, which is demonstrated by the KCA's dispute resolution team, CDSC. The KCA has been known as the number-one choice for consumer disputes in Korea for years, and, as specified previously, the CDSC normally starts mediation 30 days after the conciliation fails and makes a mediation decision on the dispute. Mediation decisions made by the CDSC have the same judicial effect as a court of law, and if the business does not comply with the mediation decision, the court can order the Execution of Judgment. The CDSC also has a panel of 30 attorneys to provide legal assistance to consumers in case of non-compliance by companies (KCA, 2013a). Although the amount of monetary redress is not specified on the CDSC's website, it is still rational to assume that the CDSC's mediation decision can be regarded as a decision with reasonable weight, due to the follow-up legal assistance to the consumers and so on.

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Wider Roles/Functions

The OECD Guidance suggests a variety of roles and functions for its member countries, in which "collecting consumer complaints and analysing marketplace trends" as well as "enhancing education and awareness" are two main roles that the consumer scheme should play.

In regard to "collecting consumer complaints and analysing marketplace trends", not only should the member countries have systems in place to collect consumer complaints and, where necessary, analyse marketplace trends; member countries should also consider opportunities for the collection and exchange of information from foreign consumers in developing their systems, and should consider the feasibility of using existing databases for such collection and exchange. In regard to "education and awareness", the OECD suggests to its member countries to co-operate with businesses, industry groups, and consumer groups in furthering consumer and business understanding of how to avoid disputes, of dispute resolution and redress mechanisms available to consumers, and of where consumers can file complaints. Moreover, special consideration should be given to the needs of disadvantaged or vulnerable consumers in designing education and awareness initiatives (OECD 2007).

All three schemes have done well in this regard.

The TIO publishes consumer complaints data and marketplace trends mainly through its annual report (TIO, 2015c). It also publishes quarterly statistics together with the relevant analysis (TIO, 2015j). The TIO does outreach activities on a regular basis, such as attending community events. For instance, a total of 12 outreach activities are planned during March to October 2015 (TIO 2015). In addition, the TIO also sponsors a small number of events or activities staged by intermediary organisations, mainly to improve its accessibility to disadvantaged and vulnerable consumers (TIO, 2015f). Moreover, the TIO communicates with the industry through its industry engagement activities. The TIO has an industry engagement team where a group of TIO staff are made available to provide information on the TIO's processes, to offer training and information about consumer complaints, and to arrange guided visits to the TIO for companies to familiarise themselves with the TIO's work (TIO, 2015e).

The NCAC, as a cross-border consumer body funded by the Japanese government, clearly specifies "public relations, publications and surveys" and "education & training" as two of its seven main activities (NCAC, 2003a). The NCAC collects consumer complaints, analyses marketplace trends, and releases relevant consumer information through various methods such as publications, its website, and leaflets. The NCAC's publications include the journal specialising in consumer affairs 'Gekkan Kokumin Seikatsu' (People's Life monthly

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magazine) and 'Kurashi no Mamechishiki' (Useful Day-to-Day Tips) containing easy-to-understand tips and information useful for everyday life, as well as 'Shohi-Seikatsu Nenpo' (The Annual Report on Consumer Affairs) (NCAC, 2003b). In fact, statistics collated by the NCAC regarding telecommunications consumer complaints form a vital part of the overall collection and analysis of the market trends by the Japanese industry regulator, MIC (Kamiya, 2014). In regard to education and awareness, the NCAC runs a variety of training courses nationwide, targeting administrative officers of local authorities handling consumer affairs, consumer counsellors, people aspiring to become consumer counsellors, private corporation employees engaging in consumer affairs, and teachers. These training courses are designed to provide knowledge concerning consumer affairs, skills to handle consumer consultations and to provide useful information to consumers. In addition, the NCAC also certifies consumer counsellors through a qualifying examination. The examination is given nationwide annually to improve the capacity and quality of counsellors and to obtain new counsellors (NCAC, 2003c).

The KCA does equally well on this point. The KCA specifies seven main roles and functions of the organisation, three of which relate to information analysis and education. They are "publication and information provision", "collation and assessment of safety information", and "consumer education and training" (KCA, 2013b). The KCA communicates to consumers and companies via both online and offline methods. There are two interactive web portals set up for communication purposes: one is the main website of the KCA (KCA 2013) and the other one is a website dedicated for consumer safety (KCA 2015). The KCA also has a physical library where regular periodicals, independent articles, research institute publications, statistics, dissertations, research reports, CD-ROMs, and all other publications are held (KCA, 2013c).

One thing that the KCA does particularly well is its "education and awareness" activities. The KCA develops customised education programs for consumers by providing education and training for schools, consumers, enterprises and the government. Pilot school and college education programs help students develop rational consumption behavior. Education and training also encourages consumer-oriented management from businesses and helps the central and local governments to promote consumer-oriented policies. In doing so, the KCA also develops and provides educational materials and online contents. In 2006, the KCA developed the 'Appropriate Consumption Life' which is used as an elementary school textbook. Moreover, the KCA operates Consumer TV to better inform consumers. An online broadcasting program called 'Consumer TV' was launched by the KCA in 2005. A year later, in 2006, the KCA has begun to provide services through major portal sites. Consumer programs are broadcasted in KTV and cable channels. Nowadays, CDs produced by the KCA

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are widely used in elementary, middle and high schools, universities, civic consumer organizations and local governments in Korea (KCA, 2013b; Kim 2014; Choi 2014). With this level of education and various awareness activities, it is most likely that the KCA is known to the majority of the Korean population, and so has become the first choice in consumer dispute resolution in the country.

Conclusions

In March 2013, the International Telecommunications Union (ITU) conducted a study titled "Regulation and consumer protection in a converging environment". The finding of this study is based on a survey regarding consumer protection policies amongst ITU's 193 member states (ITU, 2013). A set of "golden rules" is developed in this study to assist the regulatory decision-making by the member states. The golden rules cover four broad areas:

- updating existing legislation;
- consumer education;
- building consumer trust; and
- enforcement.

There are also more in-depth explanations of each area (ITU, 2013d: pp. 19 - 21). The same study also provides "guidelines and recommendations" for successful methods, and practices for meeting the challenges of consumer dispute resolution in the converged age, in which more practical suggestions are made specifically on how to improve and maintain the effectiveness of the regulation. Those suggestions include:

- ensuring the regulatory framework promotes sufficient competition and choice for consumers;
- ensuring consumers have access to timely and accurate information; and
- ensuring that consumers are informed about potential security and privacy challenges (ITU, 2013d: pp. 19 – 21).

Both "golden rules" and "guidelines and recommendations" developed by the ITU resemble the OECD Communications Consumer Dispute Resolution Guideline. Bringing all these requirements together demonstrates a model of good practice in communications consumer dispute resolution, which is "*putting the consumer at the heart of the regulator's decision-making [and] maintains the focus on competition for delivering consumer benefit and helps to address areas where the market does not fully deliver.*" (ITU, 2013d)

To conclude, the author chooses a star-rating approach and the table below is designed with star-ratings together with a brief explanation as to what can be done by each of these three schemes to develop and/or maintain a consumer protection framework that is fit for purpose. This paper is only a snapshot of comparable schemes so it cannot reach

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comprehensive conclusions, but hopefully provides a useful starting point for future discussion.

	Australia	Japan		Korea
		Current scheme	Proposed scheme	
Accessible scheme	5 stars	3 stars	2.5 stars	4 stars
Competent authority	5 stars	3 stars	3 stars	4 stars
Wider roles/functions	4.5 stars	4 stars	4 stars	5 stars
Overall star rating	4.8 stars	3.3 stars	3.2 stars	4.3 stars
What can be done	Widen outreach activities to younger generations, such as organising information sessions suitable for school kids.	Create a more specific and accessible method between the consumer authority and consumers, especially for consumers with disability and special needs.		Consider setting up a sub-division or specialised team in the KCA to deal with communications consumer disputes given the already large and growing population of communications consumers.
	Create multi-platform consumer communications by-products in non-traditional forms such as interactive CDs and Apps.	Consider creating a unified consumer ADR authority with clearer roles/functions, ideally with the power of monetary redress. This can be a governmental agency (such as a sub-division in the NCAC) or an independent body established by the industry (such as the proposed industry consumer support centre in the new industry framework) so the complicated consumer scheme can be made clearer, easier and simpler.		The current one-stop-shop of the KCA and its CDSC is a good approach. The power of the KCA can, however, be strengthened by more regulatory support by relevant industry authorities such as the KCC and the MSIP. For instance, instead of pursuing the judicial system, industry regulators can impose certain license conditions or issue regulatory orders in non-compliance cases when needed. This approach might need certain law reform but it will likely reduce the burden of the judicial system and the overall long-term cost of communications consumer dispute resolution.
	Consider to either refine or justify its wider scope of operation against the international standards in the communications industry	Improve education and awareness of the scheme to both the consumers and the industry.		The KCA demonstrates a best practice in consumer education and awareness, which can be well modelled by countries lacking experience in doing this. Maintaining the level of activities is the only suggestion to KCA in this regard.

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Interviews

Ahn, J. J. (2014, 22 September). Personal communication. This is a 120 minute interview with Prof. Jamin Jungmihn Ahn, from Division of Law, Hallym University. This interview was jointly conducted with the interview with SKT at 10am on 22nd September 2014 in SKT Tower, Seoul.

Choi, J; Tae Kim, H. (2014, 22 September). Personal communication. This is a 120 minute interview with Mr. Jeff Choi, senior manager in SKT's corporate relations division and Mr. Hyun Tae Kim, manager of the Consumer Experience Management Office in SKT. This interview was conducted at 10am on 22nd September 2014 at SK-T Tower, Seoul. Prof. Ahn also attended this interview.

Choi, J. (2014, 23 September). Personal communication. This is a 120 minute interview with Mr. Jaeweon Choi from Tek & Law, a legal attorney specialising in IT and IP. This interview was conducted at 1pm on 23rd September 2014 in Tek & Law, Seoul, Korea.

Kamiya, M. (2014, 26 September). Personal communication. This is a 90 minute interview with Mr. Masahiko Kamiya, Deputy Director, Telecommunications Consumer Policy Division, Telecommunications Bureau, MIC, Japan. It was conducted at 10am on 26th September 2014 in the premises of theMinistry of Internal Affairs and Communications (MIC).

Kim, D. (2014, 22 September). Personal communication. This is a 60 minute interview with Prof. Kim who is a professor of media and IT at Inha University in Korea. Before joining the university, he worked as a senior research fellow for the Korean Broadcasting Commission, a regulator of broadcasting industry, from 1994-1996, and from 1996-1999 as a director of broadcasting policy and convergence policy with KISDI (Korean Information Strategy Development Institute), a government sponsored think tank on IT and media. Professor Kim served as a Korean

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government delegate for the OECD and the ITU. He also served as a research director for the Korean Society for Journalism and Communications Studies and Korean Association for Broadcasting and Telecommunications Studies, respectively. Prof. Kim is currently a member of National Economic Advisory Council as an advisor to the President of Korea for Creative Economy. This interview was conducted at 4pm on 22nd September 2014 at Seoul Conventional Centre.

Oonawa, K; Hatakenaka, M; Matsuoka, E; Ootsuki, M. (2014, 26 September). Personal communication. This is a 100 minute interview with Mr. Kousuke Oonawa, Associate Manager, Corporate Strategy/planning department, NTT East; Mr. Hatakenaka, Manager, customer care, NTT East; Mr. Eiji Matsuoka, Manager, Corporate Strategy/planning department, DoCoMo; and Ms. Memiko Ootsuki, Assistant Manager of Carrier and Regulatory Affairs Office, DoCoMo. This interview was conducted at 3pm on 26th September 2014 at Mita Campus, Keio University, Tokyo, Japan. (This interview was jointed conducted with the interview with Prof. Sugaya from Mediacom Keio University).

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Takahashi, I; Arimoto, M. (2014, 25 September). Personal communication. This is a 60 minute interview with Mr. IKuo Takahashi, an attorney and the founder of Komazawa Legal Chambers who has been practising as a telecom lawyer for years; and Ms. Mayo Arimoto, attorney at Ogawa & Associates Law Office. Both Mr. IKuo Takahashi and Ms. Arimoto were heavily involved in a comparative study on telecom consumer dispute resolution commissioned by MIC in 2013. This interview was conducted at 1 pm on 25th September 2014 at Komazawa Legal Chambers, Tokyo, Japan.

Yoshiyuki, K; Yoshiyuki, I; Kouno, H; Takahashi, I. (2014, 25 September). Personal communication. This is a 100 minute interview with Dr. Koseki Yoshiyuki, CEO of Biglobe; Mr. Ishimae Yoshiyuki, Senior Manager in Corporate Management, Biglobe; and Mr. Huuji Kouno, Consumer Department, Biglobe. Mr. IKuo Takahashi, Telecom Attorney, Komazawa Legal Chambers also attended this interview. This interview was conducted at 4 pm on 25th September 2014 at Biglobe Premises. An interpreter, Miss Yanxian Guo, was used to carry out the entire communication during the interview.

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Financing risky science does not make the State an entrepreneur

Review of '*The Entrepreneurial State: Debunking public vs. private sector myths*' by Mariana Mazzucato

Jason Potts
RMIT University

Summary: This article reviews 'The Entrepreneurial State: Debunking public vs. private sector myths' by Mariana Mazzucato

Mariana Mazzucato, a Professor of Innovation at the University of Sussex, has written a book that is an extended version of a 2011 NESTA report of the same name, in which she lays out a full-throated defence of bold, activist big-government centred innovation policy. The book presents itself as a contrarian truth-telling debunking of the idea of the State as a risk-adverse loser-picking enterprise, which Mazzucato repeatedly attributes to ideological mythmaking. She is worried about the direction of public sector funding of basic science and mission oriented R&D, documenting a steady decline through time that is even more worrying for the retreat in corporate R&D (she largely focuses on the US, but her concern is equally with Europe: she is more impressed with Asia). And she proposes a number of suggestions by which to put things back on the right track, which she associates with the 1940s-60s compact between the military-industrial-academic complex that US President Eisenhower once warned about. One suggestion is to re-balance the risk-reward calculus of public investment by seeking income-contingent equity positions in the technologies that the state is involved in financing. Apparently we need this because the usual way the state recoups its R&D investments (through the tax system) doesn't really work because of widespread corporate tax avoidance. Mazzucato doesn't present any evidence, so your own priors will have to be your guide here. Maybe it's a good idea; maybe it's not.

The Entrepreneurial State has been widely lauded by many economic commentators and has made it onto numerous best business books lists for 2013/14 (Martin Wolfe in the *Financial Times* and Teresa Tritch in the *New York Times* wrote glowing reviews; although *The Economist* offers a somewhat sceptical view, noting that she is 'too hard on business'). It is certainly a provocative and engaging thesis, which Mazzucato sharply illustrates with extended discussions of the public sponsorship of most of the key technologies of the iPhone, and of the wily ways of the pharmaceutical industry and the challenges of green-energy technology. And she *is* hard on business, repeatedly chiding the propensity of large public

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corporations to engage in share buy-backs in preference to long run-R&D investment, when they're not avoiding taxes and off-shoring jobs, or hypocritically lobbying for bailouts.

The book is unashamedly a Keynesian treatise (of a Schumpeterian subject) that seeks to promote the role of government, and to burnish its image, against the ideological corruption that the neoclassical economists and the neoliberal politicians have foisted over the past few decades. Lines such as "it is essential to understand innovation as a collective process" and emphatic claims that "[T]here is nothing in the DNA of the public sector that makes it less innovative than the private sector" are thematic refrains that ring through this book.

Readers of this journal might naturally be expected to be sympathetic with Mazzucato's claims, which amount to the idea that we owe the vast revolutions in digital telecommunications (the internet, and its tributaries) to bold, far-sighted government investment in creating new technologies, and not just in correcting for market failure. This speaks to the wisdom and virtue of large scale public funding of not just basic research but also mission-oriented endeavours to tackle big problems, effectively taking on risk to blaze the way for what Mazzucato portrays as the naturally more timid and risk-averse private sector to follow.

So is Mazzucato right about this? There are two basic problems with her argument. The first is the most obvious, and in fairness Mazzucato does try to address it, which is that of causality: *viz*. because government investment in experimental new technologies preceded the iPhone, does that mean that government investment caused the iPhone? The second is the critique of Keynesian (and socialist) economics itself by the Austrian and Public Choice schools of economics (e.g. Dourado & Tabarrok, 2015), concerned respectively with the discovery nature of the market process and rent-seeking behaviour. Mazzucato makes no attempt to defend against this, yet it is perhaps the most damaging for her thesis.

But let me start with the causality issue – *post hoc ergo propter hoc*. It is certainly true that many of the good bits in the iPhone, and a great many highly valuable new drugs, among other innovations, have an ancestry that began in a government laboratory or at the pleasure of a government research grant (Google's search algorithm, funded by the NSF is an oft-mentioned example). This is not in dispute, even when the same government actively strangled that same research (as with the work on touch screens that did eventually find their way into the iPhone, see Orlowski, 2013). But lots of things preceded the success of Google and Apple that might be imaginatively traced as origins. What about their teachers in high-school? The roads they drove on to get to their Cupertino garages? The laws they used to charter their incorporated companies, and to register their intellectual property. We paid for those too, and pretty soon we're on the fringes of partisan zealotry shouting 'you didn't build that!' The point is that this is an argument about perceptions of equity, not about logic.

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Let me put this the other way around. Would those investments have still been made in a different universe in which the iPhone never appeared? Certainly they would, and we know that because they were made for reasons that had their own logic at the time. Part of this can be squarely sheeted home to the demands of military research and national defence. They needed robust computer networks that would withstand nuclear attack and then they needed small, lighter more powerful microprocessors to put into satellites. So the Department of Defense (through DARPA and the RAND Corporation, among others) funded the research that delivered these technologies. But once they're created, and once they're in the public domain, everything else is an externality (if this fundamental point of economic logic still seems opaque, see Davidson & Spong, 2010). Mazzucato seems to have a curious conception of the meaning of public good and externality – a criticism that has been made elsewhere (by Tim Worstall, in a *Forbes* review), so I shall not rehearse that further here. It's no different from someone giving charity to a person who subsequently acquired a great fortune. Does the person who made that generous charitable donation have a legitimate claim on the fortune? Morally this is perhaps ambiguous, but contractually the answer is clearly no. Now if it was a different contract – along the lines of an income-contingent loan or a share of income (making it equity) then we would be in a different position. In effect, this is the argument Mazzucato is making. Now if we do have that sort of contract, then we can't build our assessments of how that will work based on prior evidence from a very different set of institutions where no such contracts existed. Now perhaps we should do this experiment: but if we do, we've just created a socialised venture capital fund. It's not entirely clear why we would expect that to work better than a privately held one, but there are some fairly sound reasons to expect worse performance.

Which is my second point of critique, which is that while Mazzucato seems to have very strong priors about the innate villainy of private sector actors, she finds nothing troubling about public sector incentives. Plainly, there are benefits associated with public sector support of basic science and bold missions – that is not in dispute, and Mazzucato presents these as her case. The claim then further extends to the distributive justice associated with these benefits, which is where she seems to think the argument lies. But what about the costs of this public spending and decision-making? The real debate is not about the level of B, it is about whether B > C, or not. That basic attention to cost-benefit considerations is missing from Mazzucato's whole argument.

And what are these costs? On the face of it, from a Keynesian reading, there aren't any costs at all, because the money spent (raised from taxes, which disincentivise investment and spending, a point never mentioned) will multiply through the economy anyway. Mazzucato deflects this issue by repeatedly pointing to the widespread and apparently scandalous use of

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retained earnings to engage in share-price-boosting buy-backs rather than investment in R&D. Perhaps so, but beside the point. The real issue is that there are also costs associated with this government spending (Davidson and Potts, 2015). These costs are due to misallocation of resources caused by distorted incentives, the most egregious form of which is rent-seeking (Tullock, 1967). Goolsbee (1998) for instance shows how the main beneficiaries of increased public spending on research scientists are, unsurprisingly, research scientists, who facing an inelastic supply curve see an increase in demand translate cleanly through to increased real wages. Kealey (1996) and Greenberg (2001) elaborately document the extent of this, and Diamond (2006) puts the lie to the claim that public sector science is more innovative than private sector science in the context of research institutes (a widely reported study unmentioned in Mazzucato's book).

An example of what I mean here is to compare the focus in the book on green technologies, particularly early stage investment in wind and solar, and the role of the government in developing these emerging industries, and moreover the poor behaviour of venture capital funds in this (Mazzucato accuses them of cutting and running, bankrupting Solyndra, for instance). Or nuclear energy, which was a product of sustained investment in basic science, R&D and industry development. But perhaps the single greatest revolution in global energy supply of recent goes entirely unmentioned, namely the shale gas revolution brought about by private innovation in techniques of horizontal drilling and hydraulic fracturing, or 'fracking'. The fall in the price of hydrocarbon energy in the past 10 years, and the enormous increase in the size of energy reserves (including the US becoming a net energy exporter for the first time since before WWII) is entirely due to this completely private sector innovation which was largely developed by the oil services company Halliburton in the 1950s.

Market incentives operating over research investment gave us commercially successful fracking and tight-gas, not windmills. That's how market incentives are meant to work – namely delivering the least cost solution that satisfies the most people. That this is regarded as a failure in some quarters is testimony to a strong residual notion that technological choice should ultimately be a political or democratic choice in which the bold and mission-oriented correct answers are solar and wind, regardless of cost and consumer demand.

Mazzucato has written a bold and engaging book targeted to a post-GFC weakening of appetite for spending on public science and innovation. *The Entrepreneurial State* offers a clear thesis, namely that government should not be timid about its role in investing in the science that leads to many valuable and important discoveries. Furthermore, she thinks that it deserves some of the spoils from that, more than the indirect tax revenues the wealth creates. Consistent with this claim, she thinks that many private sector companies have been

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parasites in this ecosystem, taking but not giving back. It's a popular, if somewhat populist, thesis.

The book is called *The Entrepreneurial State*, presumably to highlight the book's central claim of the State as a bold risk-taker, innovating at the frontiers of science and technology (see also Mazzucato, 2014). But that misunderstands entrepreneurship, which is not about technological boldness or discovery really at all, but about, literally, the market discovery of an entrepreneurial opportunity. This is the basic flaw in a very flawed book – innovation involves much more than just basic scientific discovery, or even R&D, but also requires market discovery. This latter aspect is derided in the book as just 'design', in the case of Apple, which utterly misunderstands what is involved in turning a technological opportunity into a market opportunity, and which comes close to treating entrepreneurial action as immaterial to innovation. In contradistinction, Hausmann & Rodrik (2003) develop this theme about the importance of cost discovery in reducing the uncertainty associated with entrepreneurial investment. Scholars of entrepreneurial opportunity and judgment emphasise the critical importance of this information gathering to successful innovation (Shane, 2000 for example, or Foss and Klein, 2012). Mazzucato gives no reason to indicate why government might be expected to do this better than the private sector.

Finally, what implications for telecommunications and the digital economy? Mazzucato's thesis calls for bold mission-oriented public investment in the frontiers of new technologies, where the presumption is that the big Telcos are spending their profits buying back shares and, in Australia of recent times, furiously engaged in take-over bids to create new networks. That's not an unreasonable concern. But the problem with that model, however, is that it is products and services that are consumed, not technologies. Entrepreneurs still have a lot to contribute to the innovation process, and there are fundamental limits to what governments can do in this space. While not as snappy, *The Wasteful, Bumbling and Politically Opportunistic Mission-Oriented Basic Science State* might have been a better title for the book.

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Aluminium Distribution Cabinets Resistance to Rifle Fire

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Summary: An unusual historic paper from 1966 where the Post Master General's Headquarters Lines Section collaborated with the Department of the Army to subject aluminium distribution cabinets to ballistics testing ahead of possible rural deployment.

Introduction

The introduction of low-power solid state amplifiers for rural carrier frequency cables in the 1960s brought about underground installation in pits and the elimination of expensive equipment buildings. However, above ground installation has a number of advantages over underground, such as reduced water entry and corrosion resistance.

The existing torpedo shaped aluminium distribution cabinets (or pillars) used throughout the metropolitan area had proven design, ready availability, low cost and sufficient space for amplifiers of up to 60 channels for balanced pair operation.

These cabinets were considered for rural deployment; however as the historical paper written by Mr T N Pimm of the Post Master General's Headquarters Lines Section (TJA, 1966) cautions, "for those familiar with the installation of equipment in the country, the problems of vandalism by rifle fire are well known". Therefore the Lines Section took a more guarded approach before introducing another "probable target" into that rural environment.

The paper describes ballistics testing with the assistance of the Department of the Army of 300- and 900-pair cabinets using 0.22 and 0.303 inch calibre bullets. The tests were conducted at such distances from the cabinet where it was assumed the vandal "had sufficient common sense or hard earned experience of the dangers of ricochet."

Various calculations are provided for strike velocity and the results have been tabulated from extensive field testing. Both cabinets were no match for 0.303 inch calibre bullets which often passed through front and back and were prevalent in Australia following WW2.

This is one of the primary reasons why above ground aluminium distribution cabinets did not find their way into the rural telecommunications landscape.

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Postscript

Cable Pillar Systems

The Melbourne *Age* published an article in April 2013 (Age, 2013) which describes the closing of a business called Cable Pillar Systems in Hallam which manufactured these aluminium distribution cabinets. Cable Pillar Systems supplied Telstra, and its predecessor the Post Master General's Department, with approximately 70,000 cabinets since their design won the contract in 1956. The recent introduction of the NBN meant that the requirements for aluminium cabinets dried up and the company closed its doors in 2013 after more than 50 years of operation.

Australian Firearms

According to the website GunPolicy.Org (GP, 2015) hosted by several local universities, Australians surrendered approximately one million rapid-fire long guns (mainly semi-automatic rifles and self-loading and pump-action shotguns) in the buy-back following the 1996 Port Arthur tragedy. By mid-2012 however, Australians had restocked with single-shot models to pre-Port Arthur levels.

It is estimated that there are approximately three million civilian firearms in Australia currently.

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The historical paper

ALUMINIUM DISTRIBUTION CABINETS — RESISTANCE TO RIFLE FIRE

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INTRODUCTION

Distribution cabinets and pillars are used in Metropolitan areas to provide flexibility in the use of pairs in main subscribers cables and to provide cross connection facilities from main to distribution cables. The units are made of cast aluminium (BS 1490 alloy LM 6) and are available in three sizes, 300 pair, 900 pair, and 1800 pair. (See Fig. 1). The principal dimensions are given in Table 1.

* Mr. Pimm is Engineer Class 2, Lines Section, Headquarters. See Vol. 16, No. 1, Page 87.

TABLE 1: DIMENSIONS OF PILLAR AND CABINETS

	300 pr.	900 pr.	1800 pr.
Overall Height	3 ft. ¼ in.	3 ft. 1½ in.	4 ft. 6 in.
Overall Diameter	6¼ in.	11¼ in.	11¼ in.
Thickness of Cover	5/32 in.	7/32 in.	7/32 in.

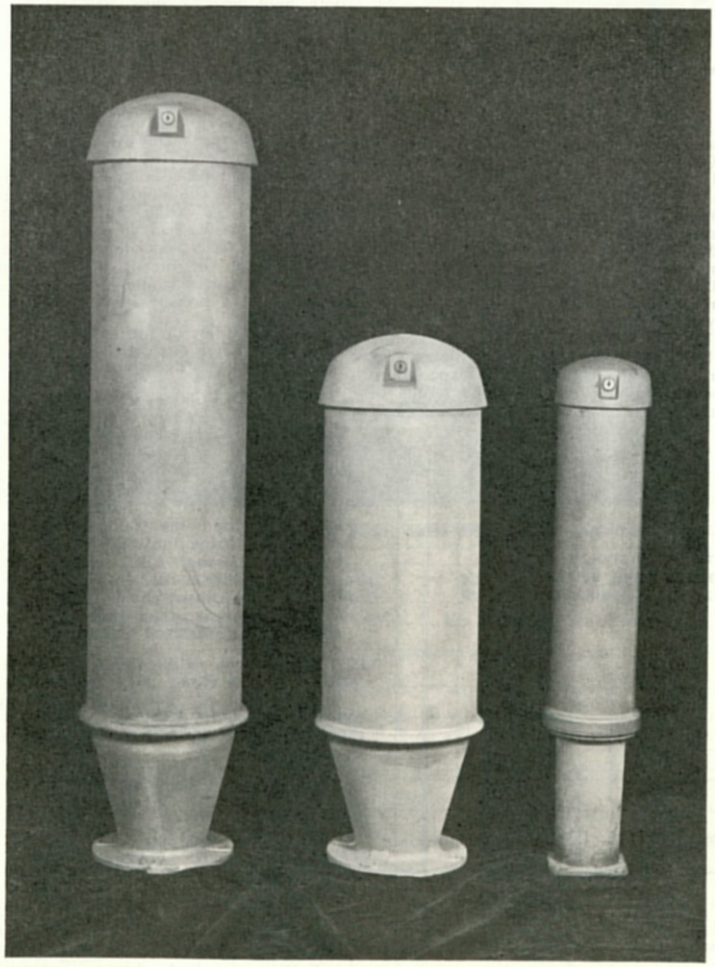

Fig. 1 — Aluminium Distribution Cabinets and Pillar. Left to Right: 1800 pair cabinet, 900 pair cabinet, 300 pair pillar.

Up to the present time they are not in general use in rural areas and the need to investigate their resistance to vandalistic shooting has not arisen. With the advent of solid state amplifiers and their important characteristic of low power consumption, developments are under way for their application to rural carrier frequency balanced pair cables. Due to the small size of the equipment, buildings are no longer necessary and either buried or above ground enclosures are suitable for housing line amplifiers. In the application to rural carrier cables there are many advantages in selecting an above ground housing which is easily accessible for maintenance purposes and largely free from water entry and corrosion problems, which are inescapable when underground installations are adopted. The existing cabinets have the advantage of proven design, ready availability and low cost, and line amplifiers to suit them are now being developed for 12 channel and 60 channel balanced pair operation.

To those familiar with the installation of equipment in the country, the problems of vandalism by rifle fire are well known. Peppered and damaged road signs, buildings, insulators and even vital water tanks are a familiar sight in rural areas. Therefore a cautious approach is being adopted on the introduction into such an environment of another probable target. For this reason, it was decided to carry out tests on the cabinets to obtain information on their susceptibility to damage from 0.22 in. and 0.303 in. bullets at various ranges.

BALLISTIC TESTING

The ranges for the 0.22 in. calibre were chosen on the basis of maximum and minimum probable firing distances. A shooter of the kind considered is unlikely to choose a target at a distance greater than 100 yards owing to the reduced chances of gaining a hit. That is, the vandal is not in the class of the keen and accurate shooter, but is in effect a casual shot who will choose an object because of its proximity and attractiveness. At the short range, the vandal is expected to have either sufficient common sense or hard earned experience to realise the danger of ricochet. A lower limit of 20 yards was therefore considered reasonable and 40 yards was chosen for an intermediate range. The cartridges used for the test were "Civic" high velocity, long rifle type (Fig. 2) with an average muzzle velocity of approximately 1,350 feet per second.

The ranges chosen for 0.303 in. ammunition were based on the sure knowledge of their greater damage potential at much greater distances than 0.22 in. calibre. Distances of 100 yards and 200 yards were chosen, with greater distance being unwarranted as already

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Fig. 2 — Cartridges used in Tests and Examples of Deformer Bullets after Testing.

considered. In order to obtain a high accuracy during the 0.303 in. tests it was decided to use a short range (30 yards) and to vary the charge to simulate longer shots. This then allowed accurate placing of rounds in two or three positions from full face to glancing shots. The calculated velocities were 2,230 feet per second at 100 yards and 2,030 feet per second at 200 yards (Fig. 3).

The tests were carried out at the Army Inspection Staff Proving Ranges at Footscray, Victoria under the guidance of Mr. J. Cook, the Senior Inspector for Small Arms Ammunition.

The velocity of the 0.303 in. cartridges was determined by a Photo-Electric Counter Chronometer (PCC) over a 100 ft. base with an instrumental midpoint at 90 ft from the muzzle. The recording of the velocity of the 0.22 in. cartridges was by PCC equipment over a 50 ft. base with an instrumental midpoint at 30 ft from the muzzle. The 0.22 in. cartridge velocity was not recorded during the testing at 100 yards. Testing was restricted to the 300 pair and 900 pair covers as the 1800 pair, having the same thickness of metal as the 900 pair, was expected to sustain similar damage. The results of the tests are given in Tables 2 and 3.

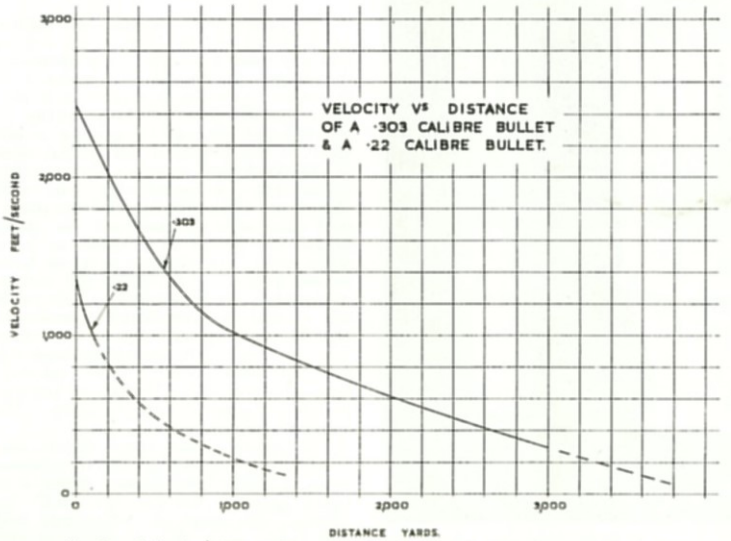

Fig. 3 — Velocity/Distance Curves for 0.303 in. and 0.22 in. Calibre Bullets.

CONCLUSION

From the foregoing results it can be seen that the 300 pair pillar is vulnerable to damage from 0.22 in. calibre high velocity bullets at least up to 40 yards range and probably to 60 yards. However, it is apparent that, having passed through one thickness of aluminium, the remaining energy in the bullet was insufficient to cause any further damage to the inner surface on the opposite side. Furthermore the target width for penetration is only about 2 in. and as accuracy is not expected to be high under these conditions a relatively small amount of damage may be expected on any one unit.

However, considering the large number of shooters using 0.22 in. rifles it would be inadvisable to install the 300 pair unit in large numbers throughout the country areas unless some extra protection was arranged. As this unit will only hold two or three repeaters, its usage in any case would be small and since carrying out these tests it has been decided to concentrate equipment design effort on the 900 pair and 1800 pair sizes.

It will be seen that even at 20 yards range the large casing was not fully penetrated by a 0.22 in. calibre bullet. The maximum penetration was approximately 3/16 in. with some associated deformation of the casing. The inside surface of the casing had, in several cases, star shaped cracks associated with the deformation of the metal (Fig. 6), and these small cracks would allow leakage of air from a pressurised container.

Some examples of the deformed bullets which caused this damage are shown in Fig. 2.

Neither the 300 pair nor the 900 pair casing offered much resistance to 0.303 in. calibre bullets at ranges of 100 and 200 yards (velocities of 2179 and 1998 feet per second). It is of interest however, to consider the range at which a 0.303 in. bullet will just fail to penetrate the 900 pair cabinet. A first approximation may be obtained by assuming that equal energy contained in either a 0.22 in. or 0.303 in. bullet will cause equal penetration. (Strictly this is incorrect owing to differences in both material and shape).

The 0.22 in. calibre long rifle bullet has a weight of 40 grains and a 0.303 in. a weight of 174 grains. Equating the energy of a 0.303 in. calibre bullet to that of the 0.22 in. at 20 yards, we have:

$$E = \tfrac{1}{2} M_1 V_1^2 = \tfrac{1}{2} M_2 V_2^2$$

$$\text{Then } V_2 = \sqrt{\frac{M_1}{M_2}}\, V_1$$

and taking $V_1 = 1250$ feet per second

$V_2 = 600$ feet per second.

A 0.303 in. calibre bullet has this velocity at about 2,000 yards (Fig. 3) indicating the high damage potential of these bullets.

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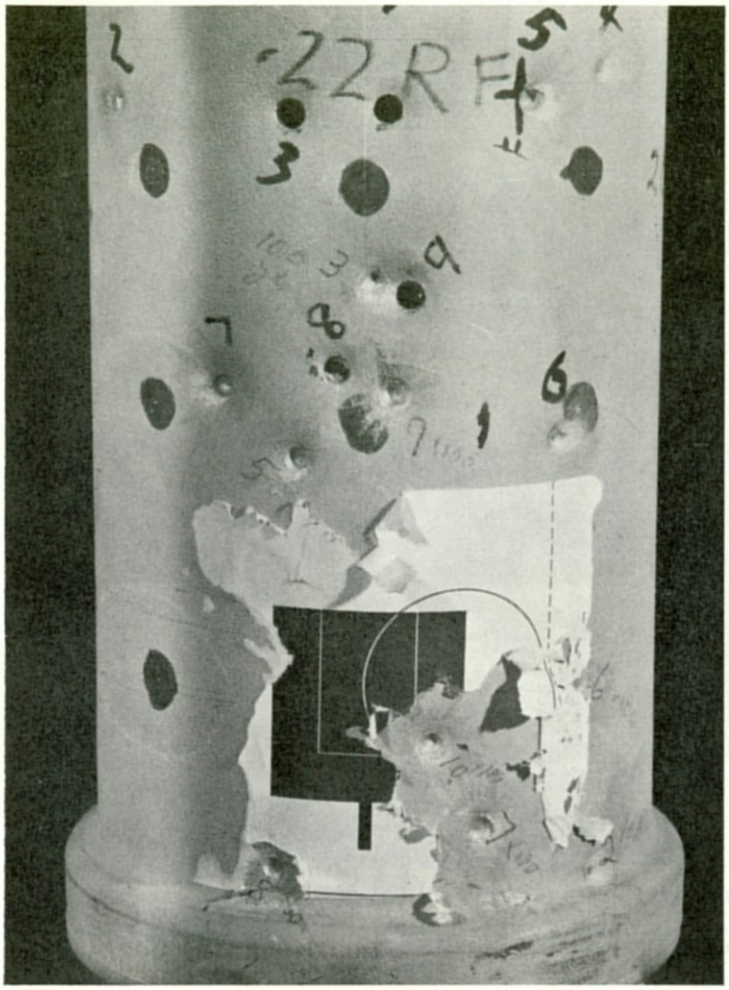

Fig. 4 — Penetration of 0.22 in Calibre Bullets on 300 Pair Cover at 20, 40 and 100 yd. Ranges. (See Table 2).

TABLE 2: TEST RESULTS — 300 PAIR COVER

	Circumferential Distance from centre line (inches)	Velocity at 30 ft. (ft. per sec.)	Striking Velocity (ft. per sec.)	Depth of Penetration (inches)	Remarks
0.22 in. calibre, 20 yards Fig. 4 Top row	¼	1223	1194	Full	Hit centre column
	1	1241	1212	Full	No damage to inside surface on rear of pillar.
	1½	1243	1214	1/8	Star shaped crack inside surface.
	2½	1251	1222	1/32	
	3½	Not Rec'd.	NR	1/32	
0.22 in. calibre, 40 yards Fig. 4 Centre row	1/4	1218	1131	Full	Penetration just complete
	1/2	1284	1197	Full	
	1½	1215	1128	1/8	Fine tear in metal at bottom of hole. Star shaped crack inside.
	2½	1145	1058	Negligible	
0.22 in. calibre, 100 yards Fig. 4 Lower shots					Maximum penetration of 7 shots was 1/16 in. with star shaped cracks at inside surface in 4 cases.
0.33 in. calibre 200 yards	Central		1998	Full, front only	Hit centre column
	3½		1998	Full, front and rear	Large section torn out at rear.

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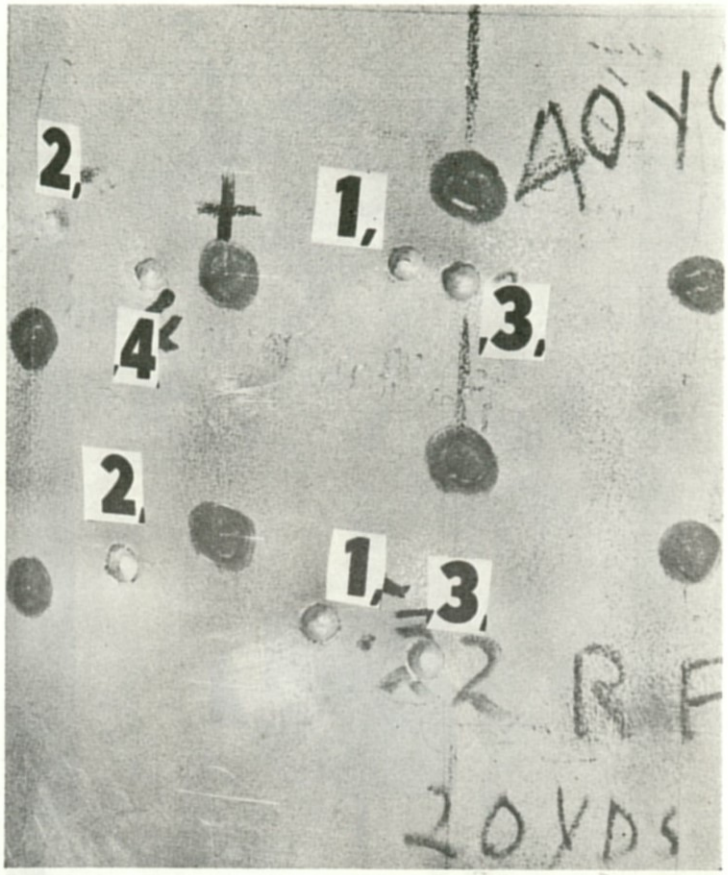

Fig. 5 — Penetration of 0.22 in. Calibre Bullets on 900 Pair Cover at 20 and 40 yd. Ranges. (See Table 3).

TABLE 3: TEST RESULTS — 900 PAIR COVER

	Circumferential Distance from Centre Line	Velocity at 30 ft. (ft. per sec.)	Striking Velocity (ft per sec.)	Depth of Penetration (inches)	Remarks
0.22 in. calibre, 20 yards, Fig. 5 Lower row	1/4	1197	1168	5/32	Local deformation, star shaped crack inside surface.
	1	1232	1203	3/16	Slight local deformation, fine tear in metal at bottom of hole. Star shaped crack inside surface.
	3	1315	1286	3/16	Slight local deformation. Star shaped crack inside surface.
0.22 in. calibre, 40 yards, Fig. 5 Upper row	0	1236	1149	1/8	Local deformation to ¼ in. between these two adjacent holes. Star shaped cracks inside surface.
	1/2	1241	1154	5/32	
	2½	1212	1125	1/16	negligible deformation
	3½	1225	1138	1/32	negligible deformation
0.303 in. calibre, 100 yards	2		2179	Full Front and rear	No denting of surface surrounding bullet entry except for side shots. Severe tearing on rear face of cabinet.
	3¼		2179		
	4½		2179		
0.303 in. calibre, 200 yards.	1¼		1998	Full Front and rear	No denting of surface surrounding bullet entry except for side shots. Severe tearing on rear face of cabinet.
	2		1998		
	4		1998		
	4½		1998	Incomplete Penetration at rear.	

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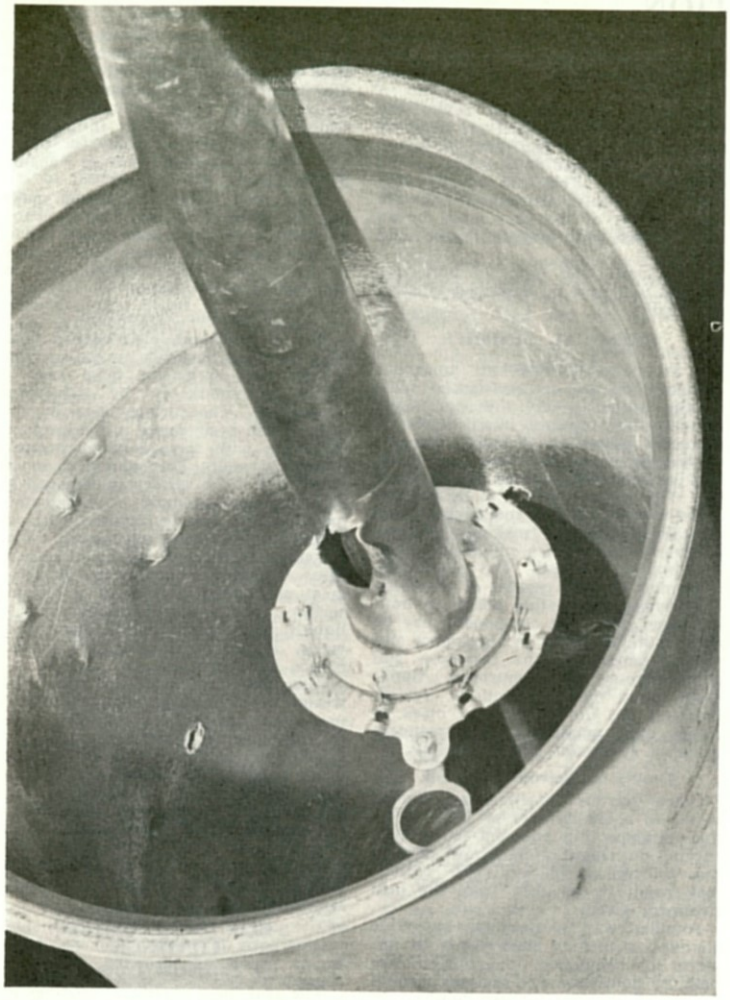

Fig. 6 — Inside Surface of a 900 Pair Cover, showing Star Shaped Cracks from Bullet Penetration.

Consideration may be given to extra protection of the cabinets in order to avoid damage even from 0.303 in. bullets. Such protection however, would need to be of the order of 1½ in. of concrete or ⅜ in. steel. The cost and weight of this protection severely limits its practical use when compared to installation of a container in a manhole. If, however, the local probability of such damage could not be tolerated and manhole installation was inadvisable for other reasons, a possible method of protection is indicated in Fig. 7 where access is relatively easy and construction cost is not excessive.

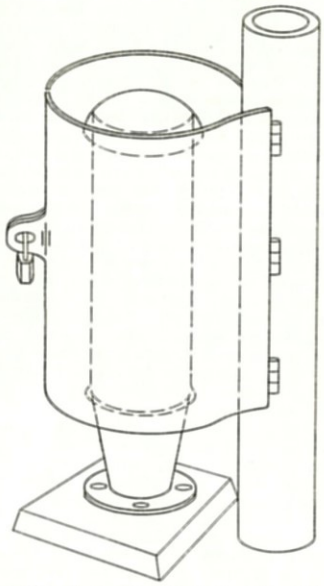

Fig. 7 — A Possible Method of Providing Additional Protection.

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