



Australian Government


Department of Communications and the Arts

# Bureau of Communications Research

**The communications sector:**  
recent trends and developments  
October 2016

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## The sector as an enabler

The communications sector is a critical enabler of economic and social activity. Communications technology touches and transforms everyone's lives. While communications has always been necessary to 'doing business', the rapid diffusion of communications technologies is changing business models and driving business innovation throughout the economy and opening business opportunities in new areas.

The communications sector broadly comprises the following activities (and their industries):

- telecommunications services (both fixed and wireless), along with the underlying infrastructure required to deliver these services
- terrestrial broadcasting, including free to air television and radio, along with pay TV
- Australian content production and distribution, including film, television and print media
- internet publishing, broadcasting and web search, including over-the-top (OTT) services, and
- postal and courier services.<sup>1</sup>

Although its direct contribution to the economy and employment is relatively small,<sup>2</sup> the communications sector exerts a substantial influence on other sectors as an enabler of economic and social activity and progress.

Many industries rely so heavily on the sector that their ongoing operation would be compromised without it. Examples include the commonplace use of electronic purchasing, and virtually instant online and voice contact and interactions. Most of its impact is through the information, media and telecommunications industries.

In particular it is a crucial input to essential and highly-valued parts of the economy—the professional, scientific and technical services, finance and insurance and retail industries are the largest users of its inputs.<sup>3</sup> This not only highlights the sector's importance in supporting high-skilled and productive activities but also in facilitating commercial activity.

In diffusing knowledge along and transforming the value chain, the sector has a dynamic effect by increasing firm productivity. In turn, this underpins economic growth and improvements in living standards.

The sector's value can also be shown by the returns to its 'factors of production'. As at May 2016, wages in the sector were around a third higher than the all-industries average.<sup>4</sup> In 2014–15, each hour worked by employees increased output by an average of \$120.<sup>5</sup> This was the fourth highest across the market industry sectors after mining, utilities, and the finance and insurance industries. Employees in the communications sector are highly skilled, with a higher proportion of the workforce with postgraduate and bachelor level degrees, graduate diplomas and certificates, and advanced diplomas and diplomas compared with other industries.<sup>6</sup>

The sector has also outperformed the wider economy in terms of labour productivity growth.<sup>7</sup> This then flows through to improvements in other parts of the economy.

The communications sector also provides enabling services to support opportunities and outcomes in service sectors, such as health and education, and promotes inclusiveness and participation. Information and communications technologies also enable the full benefits of new technologies to be realised, such as those providing yield or cost savings in agriculture.<sup>8</sup>



However, the use of services varies by demographic, particularly between population centres. Australians living in non-urban areas continue to have lower rates of home broadband connections and smartphone ownership (although they have higher rates of mobile broadband compared with the national average of 26 per cent).<sup>9</sup> Those demographic groups which are less likely to use the internet—older Australians, low-income households and those not employed—are more concentrated in non-urban areas.<sup>10</sup>

Overall, the confluence of important enabling architecture and rapid technological growth and development means that communications infrastructure has heightened its role as a general purpose technology that provides opportunities across a range of industries and activities. This means that the scale of disruption within the communications sector is not only having a pervasive and far-reaching influence on other sectors, but potentially blurring the boundaries between it and these other sectors (box 1).

### Box 1. Boundary issues

*Ongoing developments in the communications sector will continue to flow through to other sectors that are intense users of communications services and infrastructure. Services provided by over-the-top (OTT) service providers in particular can be difficult to distinguish from those provided by the sector itself. This can underplay the influence and increasing importance of the sector, for example, in the development of innovative business models.*

*Businesses that primarily provide information and communications services are considered to be within the sector (table 1). These are activities or industries where the core business model is completely reliant on the communications sector and they are significantly impacted by changes within it. Other sectors have a less intrinsic reliance on the communications sector but they may have an online presence or conduct transactions over the internet. This is a dynamic process and in the less reliant sectors there is often a significant dispersion in business models with leading edge or innovative firms being heavy adopters of communications based systems to substantially lower costs or improve productivity.*

**Table 1. Classifying communications sector boundaries**

In the sector	Complete reliance	Some reliance
Organisations primarily engaged in providing information and communications services.	Organisations whose viability is based on the availability of communications infrastructure or services, but are generally not considered as part of the sector.	Organisations whose core operations are not concerned with the provision of information or dependent on communications services.
Examples include telecommunications, all internet content publishers, broadcasting (TV and radio), including content production, interactive gaming and postal services.	Examples include Uber, eBay, TripAdvisor, interactive gaming Apple or LinkedIn.	Examples include bricks and mortar retail, dairy farming and coal mining.



## Key developments in the sector

Three fundamental changes are having far-reaching impacts on the consumption of communications services, and on firms in the sector:

- merging of media content and communications technology
- increasing ubiquity of online platforms, and
- emergence of over-the-top (OTT) services.

These changes are affecting the way communications services are produced and consumed with far-reaching implications for markets. For example, the increased accessibility of information, on the one hand, reduces the potential sources of market failure by reducing barriers to entry and increasing transparency in transactions and consumer choice. It also provides new opportunities for firms to diversify. On the other hand, these changes are leading to structural changes within the sector, which in some cases challenges existing business models.

Furthermore, these changes are driving divergent trends within the sector with uneven impacts between parts of the sector, particularly in production.

### The merging of media content and communications technology

While the merging of media content and communications technologies is not a new phenomenon,<sup>11</sup> the greater availability of high-speed broadband, emergence of OTT providers and changing business models within the communications sector has resulted in broadcasters and carriers alike looking to cross-platform delivery as a business necessity.

Content, often regarded the domain of broadcasters, is now facilitated by a range of outlets. Telecommunication companies are also looking to purchase or produce original and exclusive content as a value-added service for their customers and differentiate themselves in the market. One example is Optus's streaming of the English Premier League rights.

### Increasing ubiquity of online platforms

A further key development within the sector has been the rise of internet platforms and intermediaries. Internet intermediaries are firms that provide or facilitate transactions between third parties over the internet,<sup>12</sup> thereby creating value through connecting users on a shared platform and capturing value through charging for access. Internet intermediaries include:

- data processing and web hosting providers
- internet search engines and portals
- e-commerce intermediaries
- internet payment systems, and
- participative networking platforms.

Unlike physical enabling telecommunications infrastructure, which is largely constrained by national borders, internet platform services operate in a global marketplace, and are traditionally run by large, multinational firms. A number of the world's most valuable companies, including Apple, Google,



Amazon and Facebook provide internet platforms which enable and encourage third parties to create and share value. Facebook, in particular, has experimented with several ways to monetise its social media network through platforms and plans to expand its messenger service to allow businesses to create 'chatbots' to help facilitate greater online transactions (table 2).

## Emergence of over-the-top services

Over-the-top, or OTT, refers to applications and services which are accessible over the internet, without any direct influence or control from network operators or internet service providers.<sup>13</sup>

Typically OTT includes:

- communications services such as voice and messaging (e.g. Skype, WhatsApp)
- Advertising services such as searches and social media ads (e.g. Google and Facebook)
- content, e.g. television and music (e.g. Netflix, Stan), and
- cloud-based storage or computer processing (e.g. Dropbox).

In recent years, OTT services have begun to alter the shape of the sector by providing richer communications services that combine text and voice with video and images. Their use includes:

- content distribution
- one-to-one communication
- facilitating mobility
- advertising platforms, and
- aggregator and suggester of news content.

The effects have been most acute in voice, messaging and televised services.

Seen as a free alternative to—or even a replacement for—traditional text and call services provided directly by network operators, OTT services have contributed towards the erosion of the traditional revenue base of telecommunications firms.<sup>14</sup> This is most pronounced in the smartphone messaging market, where the number of messages sent via Facebook's stand-alone messaging apps (Messenger and WhatsApp) now alone outnumber global SMS volumes on a three-to-one basis.<sup>15</sup> This has resulted in mobile carriers having to restructure their mobile pricing models and shift to data-centric plans, usually bundled with unlimited messages.<sup>16</sup>

The subscription video on demand (SVOD) industry alone is worth US\$13.3 billion globally, and this is expected to grow at an annual rate of around 14.6 per cent from 2016 to 2020.<sup>17</sup> Market leader Netflix is now available in more than 190 countries, and it anticipates spending around US\$6 billion on new content in 2016.<sup>18</sup> In the seven months following its official Australian launch, Netflix subscribership grew at a rate of around 100,000 new subscribers per month, to reach more than one million by the end of 2015.<sup>19</sup> By May 2016, this had risen to more than 1.8 million subscriptions.<sup>20</sup>

While free-to-air television remains the dominant form of home entertainment in Australia, hours viewed fell steadily between 2010–11 and 2014–15 (by around 4 per cent overall), with 34 per cent of adult Australians watching online television or online professionally-produced video content.<sup>21</sup>

Streamed radio is less popular, with only 16 per cent of surveyed Australians regular consumers compared to 30 per cent for video streaming, and Australians still spending an average of more than an hour a day listening to traditional radio.<sup>22</sup>



Video-on-demand services such as Netflix have increased the importance of quality broadband services to customers due to the corresponding increase in internet traffic. Specifically, the average monthly download usage on the National Broadband Network (NBN) grew by more than 50 per cent in six months, representing an increase from 73 gigabytes (gb) in March 2015 to 110gb in September 2015.<sup>23</sup> Known as the 'Netflix effect', a handful of well-known ISPs suffered from traffic congestion and internet speed slowdowns during peak hours in the months following the launch of the service.<sup>24</sup> This spike in usage led some to call for OTT video providers to be charged for the network congestion.<sup>25</sup>

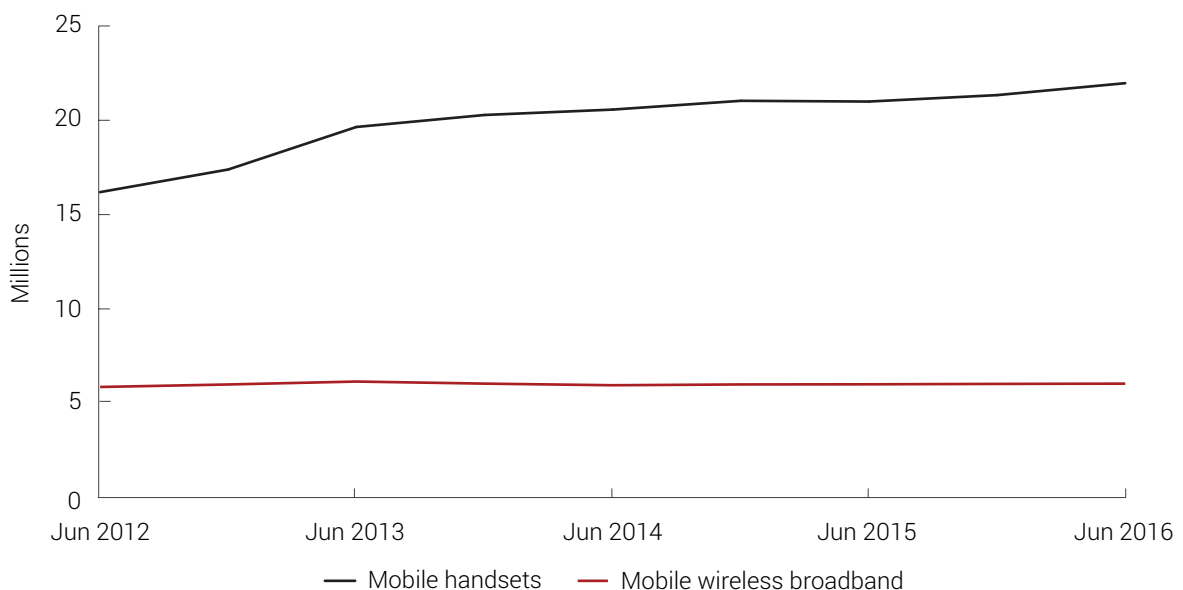
## Changing consumer tastes and behaviours

### Expectations of mobility, connectivity and service delivery

Over the past five years, Australians have demonstrated an increasing appetite for internet services. The average Australian now spends 24.2 hours per week online, lives in a household that has between eight and nine internet connected devices, and uses the internet to access email, search, weather, news, banking and social media services on a weekly basis.<sup>26</sup> This level of constant interconnection is resulting in growing consumer expectations that they can access the services they want, when they want, on the devices they already own, with ease and speed.

Mobile technology is a key driver of this trend. Over the past five years, Australia has witnessed a significant growth in the number of mobile services, including phones and other wireless internet devices. Mobile phone (or mobile handset) subscriptions, in particular, have risen by around 38 per cent, from 16 million in June 2012 to 22 million in June 2016 (figure 1). Coupled with internet dongles and other wireless broadband subscribers,<sup>27</sup> the Australian Bureau of Statistics (ABS) reported that there were 28 million mobile subscribers in Australia as at June 2016, or 1.16 services for every person. In 2015, Australia was ranked by Deloitte as the eighth most concentrated market in the world in terms of smartphone penetration.<sup>28</sup>

**Figure 1. Mobile subscribers, wireless broadband and handset**



Source: Australian Bureau of Statistics (2016), Internet Activity, June 2016, cat. no. 8153.0, October.

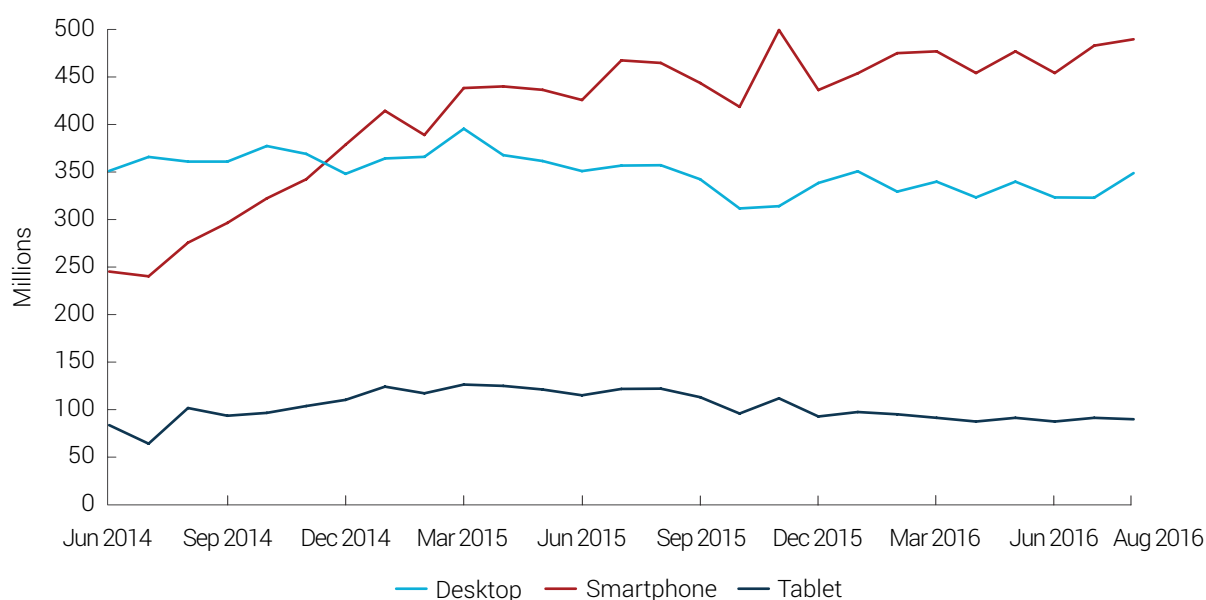




This growth has recently begun to plateau, indicating that the number of mobile services in Australia may be reaching saturation point. This corresponds with a broader consumer shift in usage. Mobile has become the dominant form of telecommunications technology globally. At the end of 2014, there were 7.1 billion active mobile connections, across 3.6 billion unique subscribers worldwide, collectively generating 3.8 per cent of global gross domestic product.<sup>29</sup>

In Australia, despite making up only a small portion of the total volume of data downloaded, downloads by mobile handsets grew by more than 70 per cent over the 12 months to June 2016.<sup>30</sup> Smartphone usage has also overtaken the desktop in terms of total number of online sessions (figure 2). Illustrative of this trend, Google announced in 2015 that, for the first time, more searches in the US were made on mobile devices than on a personal computer.<sup>31</sup>

**Figure 2. Total online sessions by device, per month**



Source: Nielsen (2016), Traffic data provided by Nielsen's Market Intelligence around device-type comparison: trend analysis, Nielsen Online Ratings—Market Intelligence, August.

Expectations for mobility are changing the way consumers interact with technology and what role it plays in their everyday lives. A recent survey found 52 per cent of smartphone owners in Australia check their phones within 15 minutes of waking up, and 28 per cent check their smartphones in the five minutes before going to sleep every night.<sup>32</sup> Workplace policies and practices are also impacted by this trend, as staff increasingly demand mobile solutions which provide greater flexibility over how, when and where they work. This has resulted in greater adoption of teleworking or telecommuting arrangements, which present an opportunity to deliver significant benefits to the economy over the next decade.<sup>33</sup>

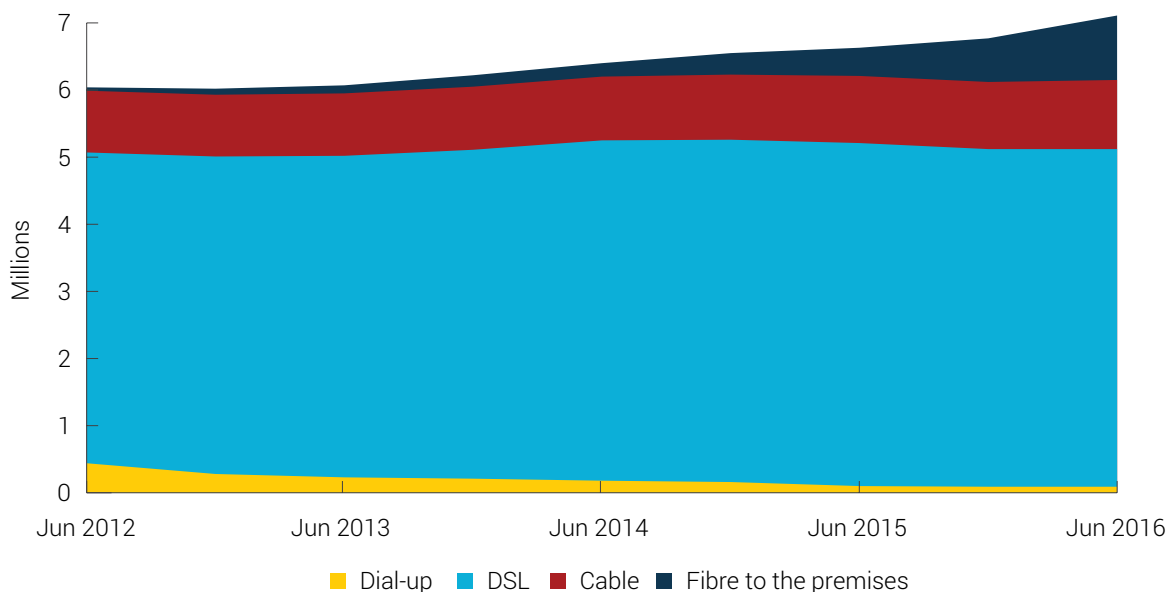
## Demand for faster internet services

Reliable, high-speed broadband networks (both fixed and mobile) are widely available in Australia. As at June 2015 approximately 86 per cent of the population, or 15.8 million Australians, had a home broadband internet connection.<sup>34</sup>



As at 30 June 2016, just under three quarters of all fixed-line internet subscriptions in Australia were delivered via exchange-based digital subscriber line services, using technologies such as ADSL2+ (figure 3).<sup>35</sup> Despite being the primary means by which Australians access the internet, this number is in decline, which can largely be attributed to the rollout of the NBN and the take-up of fibre-based networks.

**Figure 3. Internet subscribers by type of access connection, for ISPs with more than 1000 subscribers**



Source: Australian Bureau of Statistics (2016), Internet Activity, June 2016, cat. no. 8153.0, October.

Note: Fibre to the basement is currently captured by the ABS under the fibre to the premises category. Satellite, fixed wireless, mobile and other internet connection types are excluded.

According to the Corporate Plan, up to 38 per cent of Australian households are anticipated to connect to the NBN using fibre to the node or fibre to the basement technology by 2020.<sup>36</sup> A further 34 per cent of households will be able to access fixed-line internet services through NBN hybrid-fibre coaxial (HFC) cable, and 20 per cent will be serviced through a direct fibre connection to their premises.<sup>37</sup>

Mobile carriers are increasingly offering competitive high-speed mobile broadband plans, with better coverage and much more generous data allowances. While fixed-line services have traditionally offered much better quality and value compared to mobile broadband, the advancements in 4G mobile network infrastructure have significantly reduced this gap.

A consequence of the contraction of mobile prices, in addition to the greater availability of OTT services offering 'free' calls and the rising cost of line rental, has been the growing number of people without a fixed-line home service. As at June 2015, the number of adult Australians without a home telephone service was more than five million, up from two million in June 2010.<sup>38</sup> Similarly, the number of mobile-only internet users grew from 19 per cent in December 2013 to 21 per cent in December 2014, with 3.9 million adult Australians relying exclusively on a mobile device for their home internet connection.<sup>39</sup>



Most of the population who use mobile broadband appear to use it as a complement to, rather than as a substitute for fixed-line services.<sup>40</sup> While on the one hand, increasingly affordable mobile broadband plans could encourage more households to give up fixed-line services, there could also be an incentive to retain or even to return to fixed-line services for their download capacity.

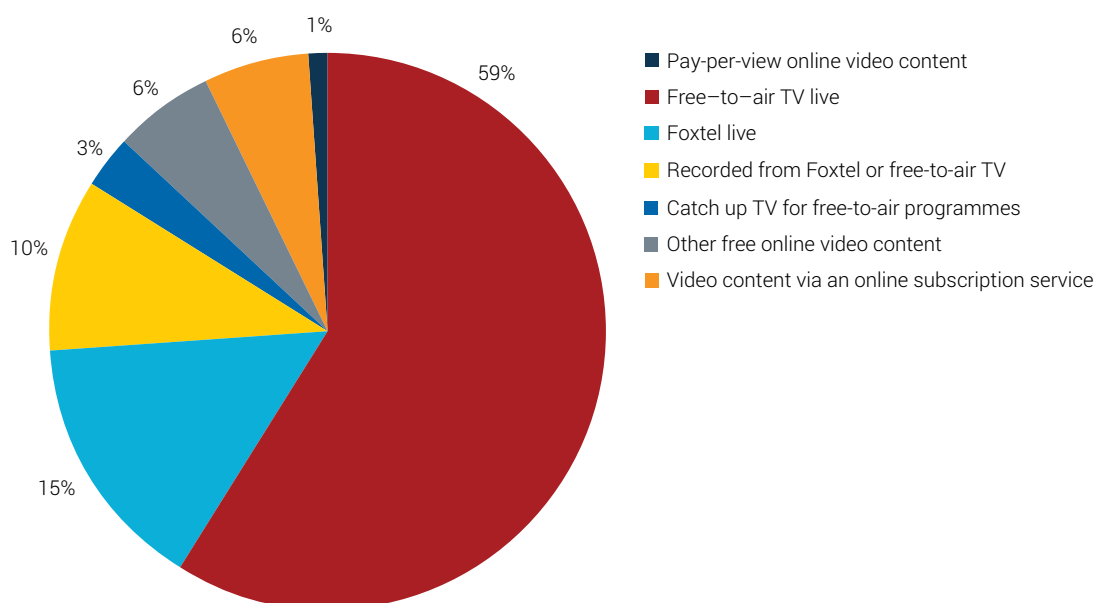
## More diverse viewing patterns

The greater demand for mobility and growth in the range of content is impacting on Australian viewing patterns. Consumers are increasingly able to shape their own viewing experiences, choosing what, when and where they consume media. By 2019, around 80 per cent of global internet traffic is forecast to be consumer video.<sup>41</sup>

This increase in choice has resulted in media fragmentation, where viewership has shifted to a more niche and tailored environment, often driven by exclusive content.

While traditional television still holds a large percentage of viewers, figure 4 shows that around 3 per cent of adult Australians have watched online free-to-air television programs as part of their average weekly viewing over the year.<sup>42</sup>

**Figure 4. Share of time spent watching television (live or recorded) or professional online video content, in the past seven days (per cent)**

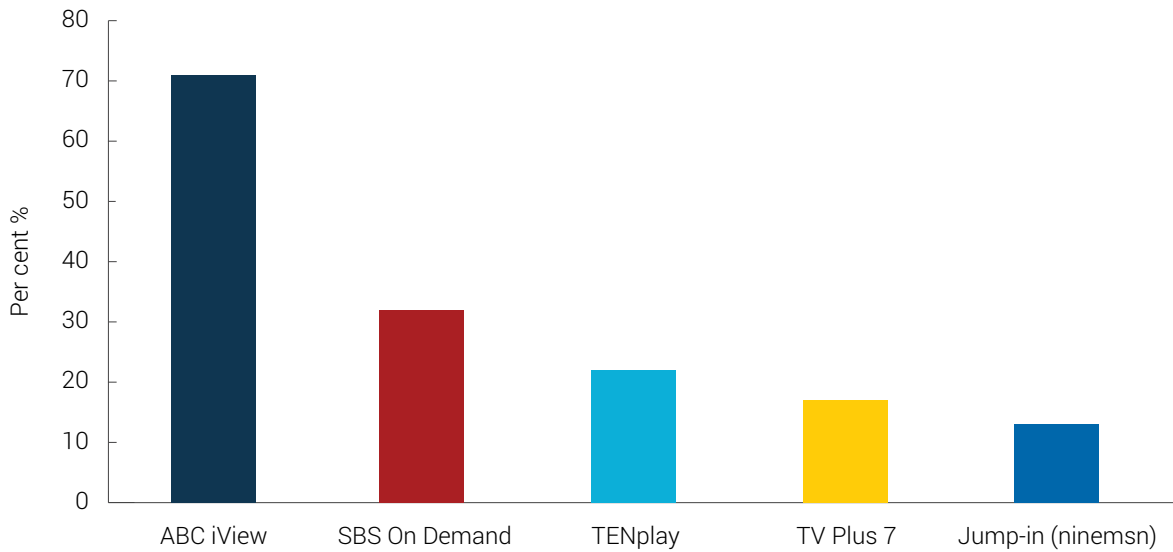


Source: ACMA Communications report 2014–15, December 2015. Based on Figure 3.3.

The first catch-up service 'iView' was launched in 2008 by the national broadcaster ABC and since then all the commercial broadcasters have launched catch-up services. However, ABC iView has been by far and away the most popular of these services (figure 5).



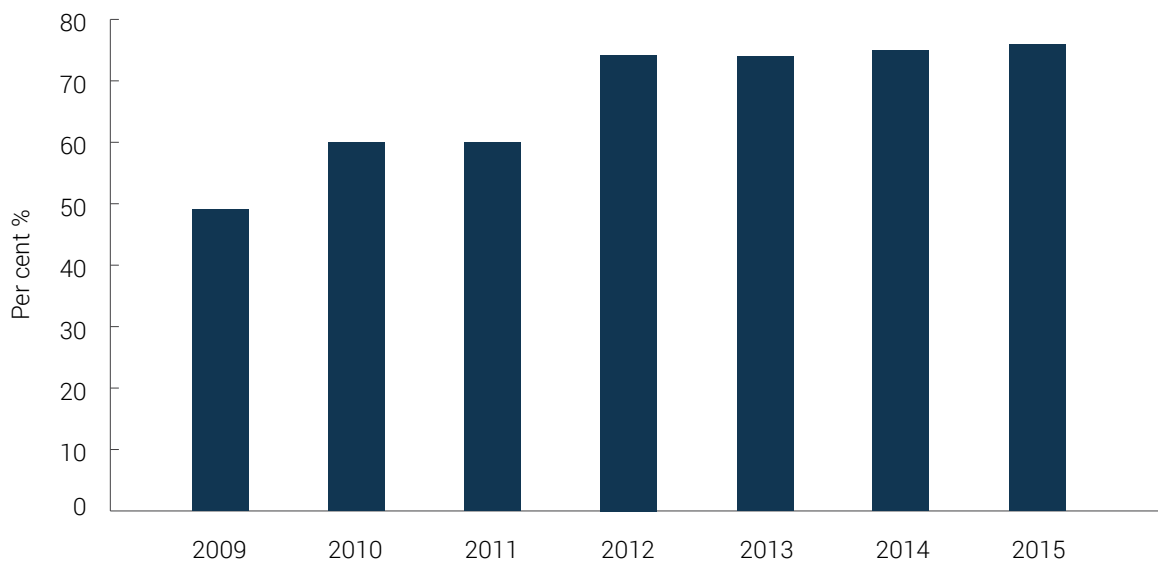
**Figure 5. Popularity of catch-up services among users**



Source: ACMA (2015), Supply & demand: Catch-up TV leads Australians' online video use, Research snapshots, February.

Over the past five years, Australians have increased the proportion of time they spend with their TV sets for uses other than watching live and playback terrestrial broadcasting.<sup>43</sup> This 'other screen use', which has risen from 2.9 per cent of total potential audience in 2011 to 3.9 per cent in 2015,<sup>44</sup> reflects the increasing take-up of internet capable televisions, time shifted and video-on-demand (VOD) viewing. Furthermore, multi-screening of TV, or the use of the internet while watching TV, has risen dramatically since 2009. As at 2015, 76 per cent of online Australians had adopted the practice into their regular evening prime time viewing (figure 6).

**Figure 6. Online Australian multi-screening during prime-time viewing**



Source: Nielsen (2016), Australian Connected Consumer Report 2016, March, pg. 191.



## The impacts on the sector

As new technologies and online platforms emerge, new business models are created, which challenges traditional communication providers and circumvents longstanding arrangements. The greater availability of high-speed broadband, emergence of OTT providers and changing consumer tastes has resulted in broadcasters and carriers alike looking to cross-platform delivery as a business necessity.

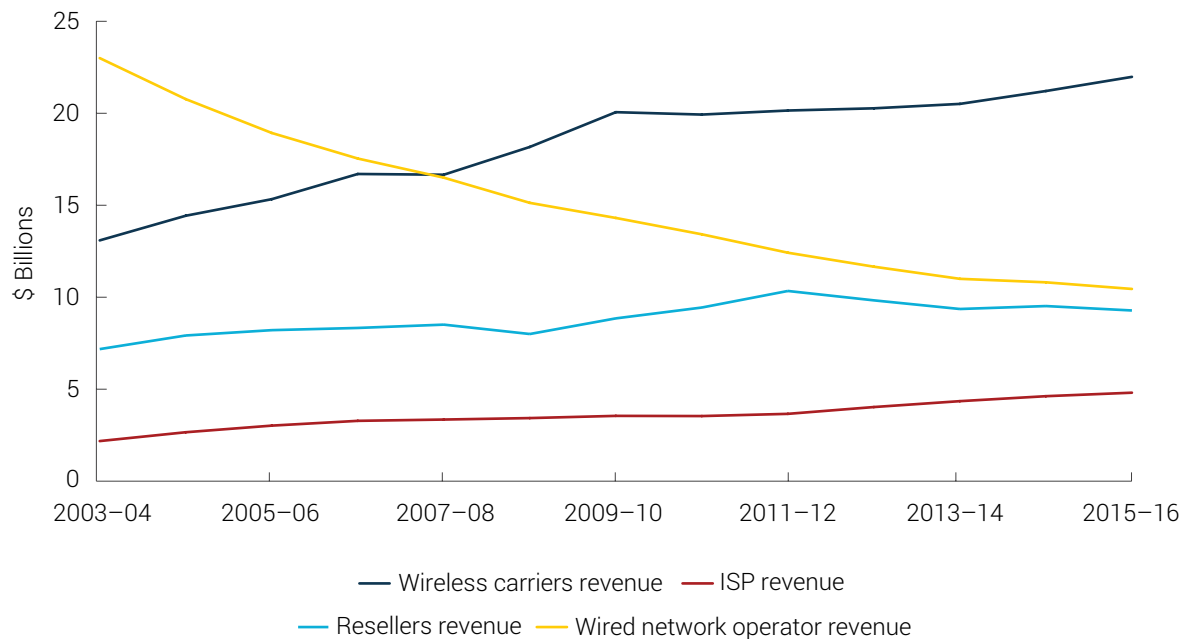
These impacts have differed within and between subsectors. While telecommunications continues to comprise around half of the sector, within that subsector the mix of services provided is changing with consumer demand. Broadcasting also faces increasing challenges in the shift to new technologies as OTT players displace traditional media.

### Telecommunications remains dominant

With the emergence of new technologies and online platforms, telecommunications remains the strongest enabler of these new components of the sector. Australia's telecommunications services industry is the largest revenue generator in the communications sector, accounting for approximately half of the sector's output.<sup>45</sup> The telecommunications industry currently consists of fixed-line network operators, fixed-line retail or internet service providers, and mobile operators and resellers. A number of firms provide services across these technologies.

### Mobile services are increasingly prevalent

As a result of the increasing demand for mobile services among consumers, as discussed above, the mobile service industry has experienced rapid growth over the past 30 years. Since the introduction of Australia's first analogue mobile network in 1981, mobile technology has expanded to allow for the delivery of a broad range of services, including voice, messaging and internet access. While fixed-line revenues have been in decline over the last decade, the provision of mobile or wireless services has been a growth industry, generating an estimated \$22 billion in revenue in 2015–16 (figure 7).

**Figure 7. Telecommunications services revenue by industry, 2003–04 to 2015–16**

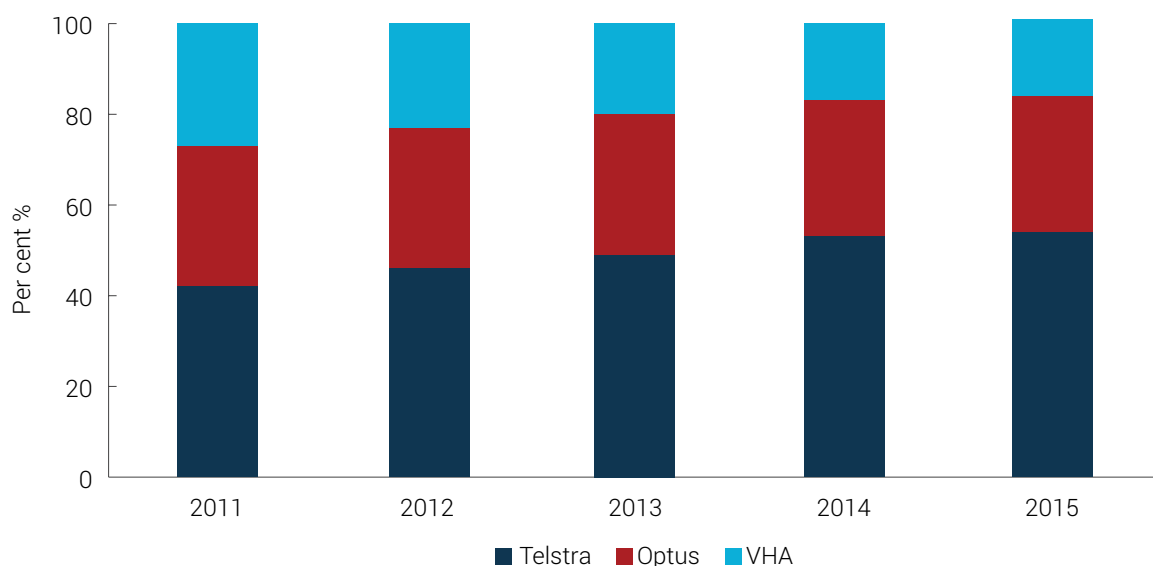
Source: IBISWorld (2016), 'J5911 Internet service providers in Australia industry report', February; 'J5803 Telecommunications resellers in Australia industry report', February; 'J5802 Wireless telecommunications carriers in Australia industry report', March; 'J5801 Wired telecommunications network operation in Australia industry report', April.

The rise of mobile services has, in turn, generated broader positive economic impacts. Deloitte Access Economics estimates the Australian economy is 2 per cent, or \$34 billion, larger than it would otherwise have been had it not been for the long-term productivity benefits generated by mobile technology take-up.<sup>46</sup>

There are three mobile network operators in Australia; Telstra, Optus and VHA. Collectively, they own the majority of available mobile spectrum,<sup>47</sup> and account for more than 90 per cent of mobile industry revenue.<sup>48</sup> As with the provision of fixed-line services, Telstra is the mobile market leader, capturing around 54 per cent market share of all mobile services in Australia as at June 2015, up from 42 per cent in June 2011 (figure 8). This growth has primarily come at the expense of the third-largest carrier, VHA, which fell from 27 per cent to 17 per cent of the market during the same period.



**Figure 8. Mobile carrier share by services in operation, for year ending 30 June**



Source: ACMA, Communications Report, 2010–11 to 2014–15.

The sector is investing heavily in improving transmission speed and coverage.<sup>49</sup> This includes the introduction of long-term evolution advanced (LTE-A) carrier aggregation technology in 2014, which has allowed carriers to combine spectrum in disparate bands to increase bandwidth and data rates.<sup>50</sup> The industry-wide improvements in network performance, and increasingly comparable national coverage maps,<sup>51</sup> have meant increased efforts by carriers to grow their market share. This has placed downward pressure on pricing and, with increased data availability, supporting increased value to mobile consumers.

Despite high levels of capital expenditure, the average mobile subscriber cost per megabyte is falling,<sup>52</sup> having already halved between 2005 and 2013 while there has been a 1000-fold increase in the amount of data available on Telstra data plans over the past 13 years.<sup>53</sup> For example, there is some anecdotal evidence that Telstra lowered its premium price point in 2015 and started offering cheaper mobile plans with much larger data offerings.<sup>54</sup>

While consumers have benefited from lower prices and more generous data allowances, competition has partially eroded company margins, resulting in greater diversification through value-added services, such as Optus's recent English Premier League purchase. Diversification and bundling appear likely to continue as carriers look for new ways to increase profitability and raise their average revenue per user.

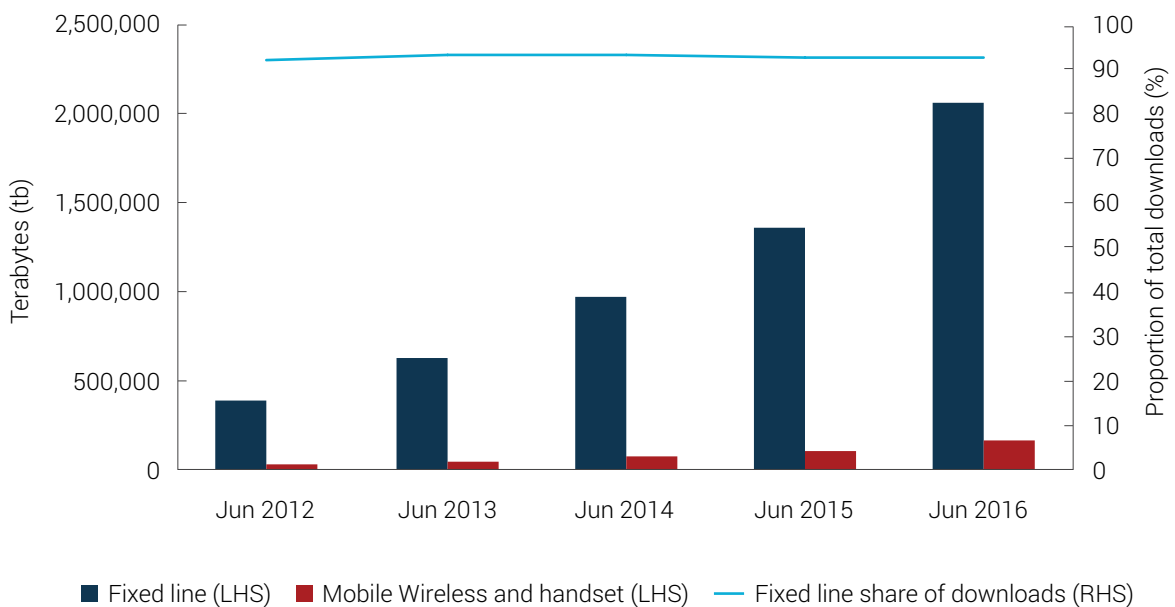
This renewed competition between carriers is also impacting mobile virtual network operators (MVNOs), which often compete on price and are therefore susceptible to these market developments. For example, the MVNO market saw an estimated 16 per cent growth in take-up from 2010–13, although take-up growth is estimated to have halved from 2013–15.<sup>55</sup>



## There remains heavy reliance on fixed-line services for data

Fixed-line telecommunication networks are the heavy lifters in the provision of large data volumes. As at June 2016, around 93 per cent of all data downloaded in Australia was via fixed-line networks, compared to only 7 per cent downloaded over wireless or mobile networks.<sup>56</sup> Since 2011, downloads across all technologies have grown at a very fast rate, which has resulted in fixed-line carrying a constant proportion of total downloads (figure 9). However, despite its importance in providing internet services, the revenue generated by Australia's fixed network industry has more than halved in recent years, from \$23 billion in 2003–04 to \$10.3 billion in 2015–16 (figure 7). This drop can be attributed to a number of factors, including the introduction and widespread adoption of mobile and OTT communication services, which in turn have reduced the need for households to utilise landline telephony for everyday communications.

**Figure 9. Volume of downloads by technology type**



Source: Australian Bureau of Statistics (2016), Internet Activity, June 2016, cat. no. 8153.0, October.

Note: Data reported for a three month period.

The fixed-line market in Australia is currently dominated by one operator (Telstra), with a market share by revenue of around 65 per cent.<sup>57</sup>

By the completion of its rollout in 2020, the overwhelming majority of Australians are expected to access fixed-line internet services over the NBN.<sup>58</sup> While some levels of infrastructure-based competition will continue to exist, this competition will predominately be limited to new housing developments and in some profitable metropolitan areas, where firms are able to utilise existing fibre assets.<sup>59</sup>



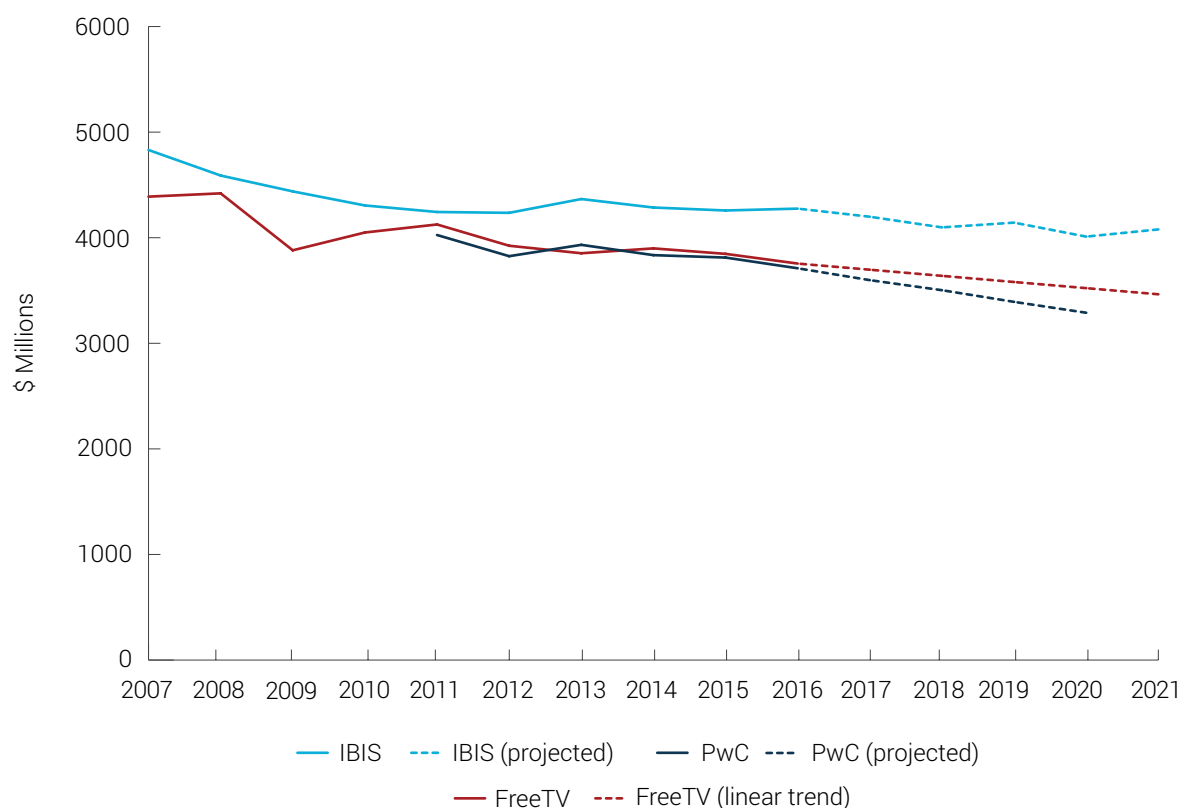


## OTT services and local content costs are challenging traditional broadcasters

Over-the-top (OTT) services are also disrupting the business models of traditional television broadcasters, through the provision of television and other on-demand video services.<sup>60</sup> The subscription video-on-demand (SVOD) industry alone is worth an estimated US\$13.3 billion globally, and expected to grow at an annual rate of around 14.6 per cent from 2016 to 2020.<sup>61</sup>

Although broadcasters have increased their offering of OTT services to include catch-up television services and exclusive programming, the need to satisfy audience demand for anywhere, anytime content exposes traditional free-to-air (FTA) television broadcasters to shrinking advertising revenues (figure 10).

**Figure 10. Free-to-air television advertising revenue projections**



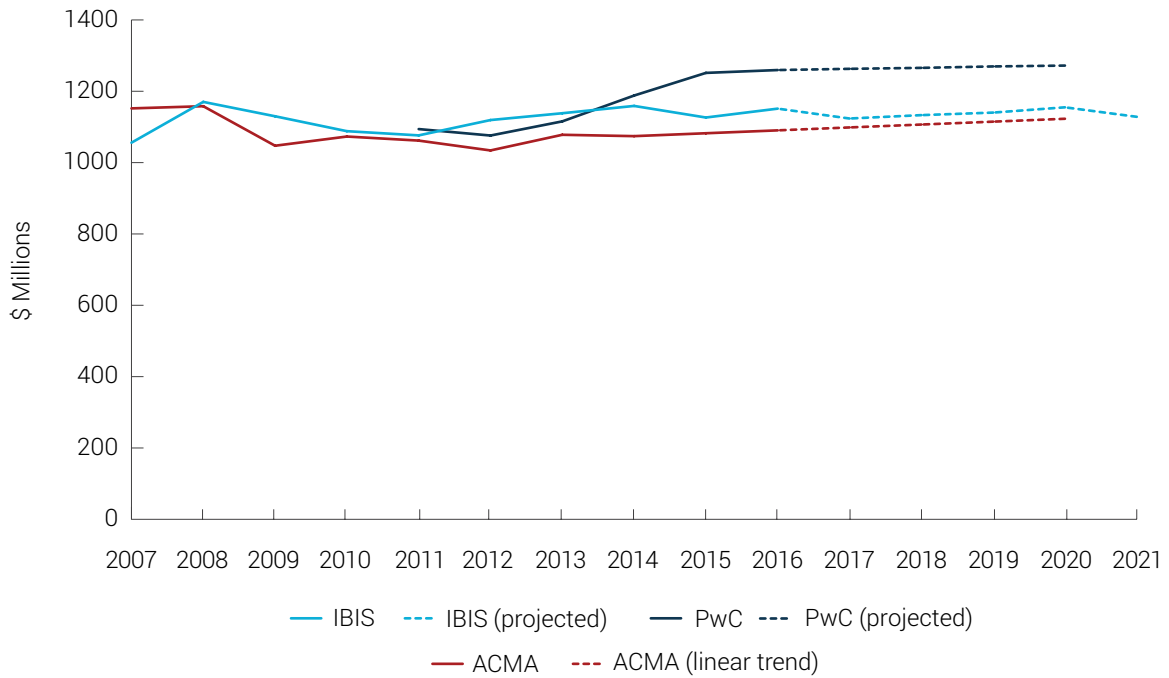
Source: IBISWorld industry report, PwC media outlook 2016–2020, ACMA Broadcast Financial Report 2013–2014 data<sup>62</sup>

Since 2005, revenues in the broadcast industry have declined in real terms, suggesting industry performance is below that of the broader economy.<sup>63</sup> Advertising remains the primary revenue driver, although it is fragmented by the rise of internet advertising and crossmedia campaigns. In Australia PricewaterhouseCoopers (PwC) estimates that the value of internet advertising in Australia is larger than free-to-air and subscription television advertising.<sup>64</sup>

Radio broadcasters do not appear to have experienced the same drop in real advertising revenues as FTA television and Australians remain loyal to traditional radio with consumption stable over recent years.<sup>65</sup> Forecasts are predicting revenue to remain flat in real terms over the next five years (figure 11).



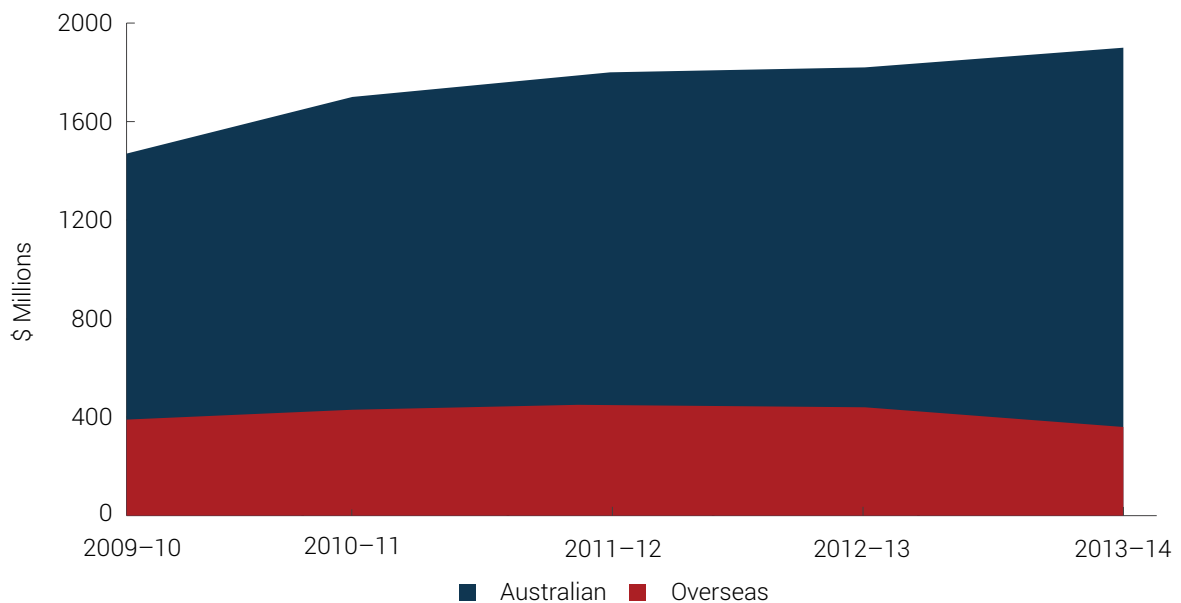
**Figure 11. Free-to-air radio advertising revenue projections**



Source: IBISWorld industry report, PwC media outlook 2016–2020, ACMA Broadcast Financial Report 2013–2014 data<sup>66</sup>

Meanwhile programming costs continue to represent the single largest expenditure item for the industry, driven largely by the rising costs to produce and acquire Australian content (including news, sport and entertainment).<sup>67</sup> Broadcasters’ investment in Australian content, as a percentage of their total content, increased from 73.5 per cent in financial year (FY) 2010 to 79.0 per cent in FY2014 (figure 12).

**Figure 12. FreeTV broadcasters—content investment (FY2010–14)**

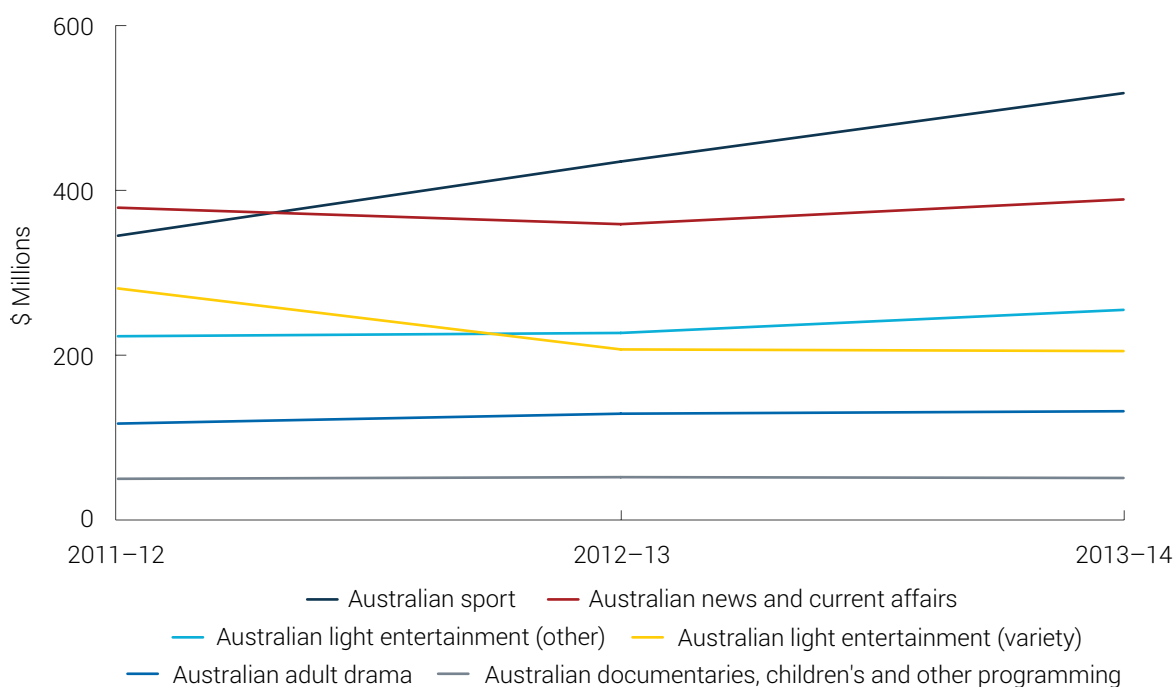


Source: FreeTV Australia (2014) Record \$1.54 billion commitment to free Aussie content demonstrates unrivalled investment in local production and people [Media release], 27 October.



When breaking this expenditure on Australian content down by genre, some noticeable trends start to emerge. As at 30 June 2014, sport was the single-largest expenditure item for Australian commercial television content, having overtaken Australian news and current affairs in 2013 (figure 13).

**Figure 13. FreeTV broadcasters—content investment by genre (program expenditure)**



Source: ACMA (2016) Broadcasting financial results 2013-14 commercial radio and television aggregated licence data.

Live sport highlights the enduring popularity of television as a broadcasting medium, with sport among the most watched, and most profitable, content shown by commercial broadcasters in Australia. In 2015, sport made up 13 of the 20 most watched programs, with the Australian Football League (AFL) grand final being the highest rated program with 2.64 million viewers.<sup>68</sup> In 2015, Channel Seven and the Nine Network both secured exclusive rights to broadcast AFL and National Rugby League (NRL) games respectively, each paying a record amount to secure these rights.<sup>69</sup>

## Australian content is growing with new entrants

As broadcasters are impacted by digitisation so too are film and production industries in Australia. For example, Screen Producers Australia, the peak body for the industry and representing more than 400 production companies, has recently partnered with YouTube in 2016's *Ones to Watch* mentor program, which endeavours to support and nurture emerging producers.<sup>70</sup> This example highlights the increasing role of online media, and its acceptance as part of the broader industry. The appetite for digital content is further evident when considering the growing popularity of YouTube in Australia, including, for example, the rise of 16 local YouTube channels with more than one million subscribers each.<sup>71</sup>

The impact of OTTs is reaching beyond audiences into production, with new buyers such as Netflix and Stan entering the market for Australian content. The appetite for online Australian content remains, with around half of internet-enabled Australians watching movies and television online, of which 96 per cent watch some form of Australian content.<sup>72</sup>



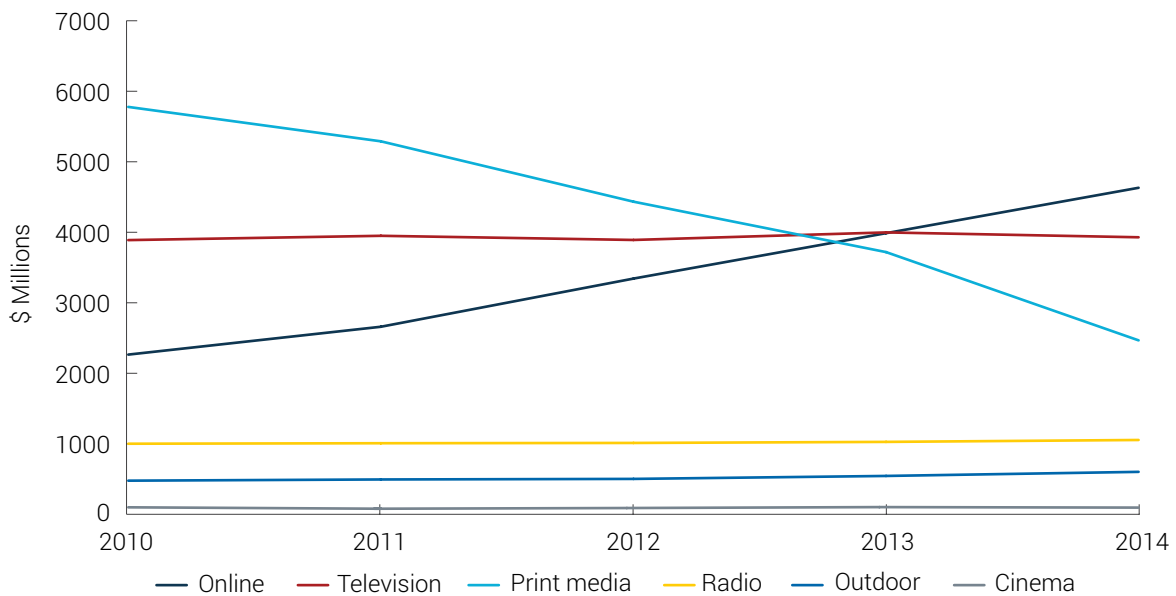
Expenditure on Australian content production is relatively stable and expected to reach around \$3 billion over the next five years.<sup>73</sup>

## Advertising goes online

One of the main revenue drivers for a number of internet platforms is advertising (particularly search engines and social networking platforms). For instance, the proportion of Facebook, Twitter and Google's revenue derived from advertising in 2014 was 92 per cent, 90 per cent and 89 per cent respectively.<sup>74</sup> Advertising revenue is generated through displaying products and services on these platforms and any mobile applications or third-party affiliated websites. Advertising spend is determined by activity-based factors, such as the number of clicks made by people, the number of actions taken by people and the number of impressions delivered.

The emerging trend in advertising expenditure from 2010 onwards has been the sharp rise in online advertising. Compared to other media categories (including the sharply declining print media), online advertising expenditure has risen to be the most predominant advertising media category (figure 14).

**Figure 14. Advertising expenditure by main media category**



Source: ACMA Communications report 2014–15, December 2015.

Online advertising differs to traditional advertising in a number of aspects and its role in platform business models has evolved over time. For example, Google's business model leverages its strength in search algorithm design to generate online advertising revenue. Such algorithms are able to precisely connect searched data with an advertiser's data, for a more targeted advertising solution. Similarly, Google's Gmail service automatically processes message content to tailor advertisements to the user. Google's paid listing service also incorporates 'expected click-through-rate' into advertisement rankings, which increases revenue through better conversion rates.

Platforms, such as Google and Facebook, have identified changing trends in consumer behaviour that have subsequently impacted advertising models. For instance, in its 2014 annual report, Google identified that users are increasingly using multiple devices to access their products and services, and likewise, advertising revenues are increasingly coming from mobile phones and other new formats.



Similarly, Facebook noted that 69 per cent of its overall advertising revenue in the fourth quarter of 2014 was attributed to mobile advertising.<sup>75</sup>

A growing industry and potential disruptor of online advertising business models is 'ad blocking' technology. Ad blockers essentially prevent advertising servers from connecting to the website a person is visiting, thereby 'blocking' the advertisements that would otherwise display on the page. Adobe estimates that \$21.8 billion in global advertising revenue was blocked in 2015 as a result of ad blocking technology.<sup>76</sup> It is predicted that as the proliferation of this technology increases, advertising will again have to evolve to influence the users of these platforms. If users have to opt in, marketers will be forced to deliver a more customised advertising experience. This will subsequently impact the way in which users interact with platform services that rely heavily on advertising revenue.

## What's over the horizon?

Technology will continue the transformation and enabling effect of the sector. Some of these changes are already underway, others will have shorter timelines and more incremental effects while others will be over a longer time horizon and have a greater impact on the sector.

Ongoing developments in information processing and transmission, which started in the 1970s and 1980s, continue to reconfigure how information is delivered. This in turn drives new (and often disruptive) business models and blurs the boundaries between broadcasting and communications.

Within the computer manufacturing industries, the improvement of processing power has ensured that end user devices continue to become faster with decreasing manufacturing costs. This is consistent with Moore's law, which states that the processing capacity per square inch of a device will double every 18 months. Additional improvements to technology include:

- **Storage capacity**—the size and speed of storage devices also increased by the equivalent of Moore's Law. Advances in software and hardware technology allows for greater storage capacity both physically and through cloud-based platforms online.
- **Transmission speeds**—the increasing prevalence of high-speed broadband networks and the ongoing rollout of fibre based services (including fibre to the node and fibre to the premises) and the increasing availability of 4G mobile networks is creating a widespread, reliable platform for the delivery of new applications and services.
- **Compression software**—thanks to advances in compression, increasingly higher definition video can now be delivered in real time (i.e. streamed) to the home and personal device. This also includes MPEG4 which is a compression standard recently adopted by terrestrial broadcast. This allows broadcasters to send the same data but using less spectrum. Currently broadcasters are mainly using this compression for the new high definition (HD) offerings such as 9HD.
- **Standardisation**—the increasing acceptance of software platforms, such as iOS and Microsoft Windows, and internet communications and programming protocols, such as www, HTML, IPv4 and IPv6, have enabled mass production of a range of technologies and devices. Standardisation has also been a major enabler for improved usage of bandwidth. Global acceptance of standards is seeing increased levels of interoperability, however, this is blurring the traditional market boundaries between supplier, producer and regulators while driving innovation.<sup>77</sup>



There is growing concern among technology industry experts that the application of Moore's law is in decline. That is, technological advances are slowing such that the time taken to double processing speed is likely to grow beyond two years.<sup>78</sup> Predominantly this appears to reflect that the limits of existing technology are being reached (i.e. there is a limit to how small a given semiconductor can be).

A further technological driver in the communications sector is the increasing use of software to deliver services that were traditionally delivered using hardware. In 2011, venture capitalist and co-founder of Netscape, Marc Andreessen, commented that 'software is eating the world', referring to the trend that an increasing number of major businesses and industries are being run on software and delivered as online services.<sup>79</sup> Software-defined networks ('network virtualisation') are also a growing phenomenon.

As it currently stands, software-driven providers, such as Amazon Web Services, provide instantly available scalable infrastructure, reducing enterprise requirements for physical hardware. Software driven solutions have unlocked latent supply, creating disruptive business models that continue to reshape industries.<sup>80</sup>

A number of future technological developments are likely to have a significant impact on the sector in the near future (table 2).

**Table 2. Impacts of new technologies**

Technology	Definition	Maturity	Impact
Internet of things	Ecosystem of devices embedded in everyday objects, which monitor, transmit and share data over the internet. <sup>81</sup>	Emerging—mainstream acceptance or adoption may be several years away.	Gartner predicted 6.4 billion devices would be connected to the internet in 2016, growing to 20.8 billion in 2020. <sup>82</sup>
5G	Fifth generation of mobile technology, to supersede 4G.	Telstra announcing plans for its network launch in 2020. <sup>83</sup>	5G networks are expected to support far greater levels of data growth compared to current mobile networks, creating a greater reliance on small cell technology.
Virtual/augmented reality	VR—use of computer technology to create a simulated environment that is affected by the actions of the person using it.  AR—the integration or overlay of digital information with the user's environment in real time to enhance perception of reality. <sup>84</sup>	Commercial development ongoing, currently primarily used for entertainment purposes.	Both AR and VR could be a significant new source of digital disruption. By 2020, some analysts expect the market to generate over hundred billion dollars by 2020. <sup>85</sup>
Bots	Chatbots, or bots, are simple software programs, designed to be able to understand what a user types or says, and respond by answering questions or executing tasks.	In use for customer service and text exchanges.	Chatbots are an essential component of Facebook's 10-year roadmap.

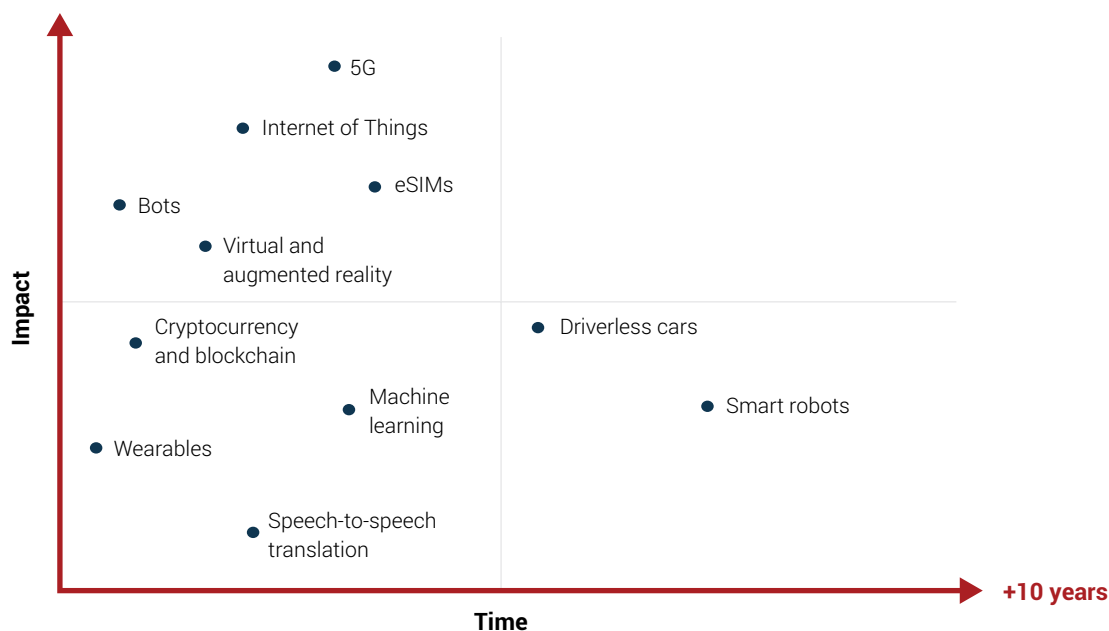


Table 2 (cont.)

Technology	Definition	Maturity	Impact
Blockchain	A type of database that allows individuals to share information and coordinate activities, without relying on a central authority or trusted third party.	It underpins the operation of the cryptocurrency bitcoin and is used in smart contracts. <sup>86</sup> Development for other applications ongoing.	There is enormous potential for the application of blockchain technology in broader financial markets and fields such as education and health. <sup>87</sup>
eSIMS	Subscriber identity module (SIM) cards which are embedded within the device in the form of a soldered chip, instead of a physical and removable card. Information on the eSIM can be changed remotely.	Global standards for eSIMS will be finalised in 2016, facilitating its uptake. The first device with an eSIM (smartwatch) was launched in early 2016.	eSIMS could enable consumers to roam across both domestic and international networks more seamlessly and transparently.

Figure 15 maps these and other longer-term technological trends against the emergence of their impact on the sector and the timeframe at which they are expected to start to have an impact.

Figure 15. Impacts of new technologies: timeframe



Source: BCR analysis 2016.

Note: Impact based on when technologies are estimated to begin to have an impact on the sector. Time horizon is over a ten-year period.



## (Endnotes)

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