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# COMPETITION AND COVERAGE: BUILDING AN INCLUSIVE MOBILE SERVICES SECTOR

ANIP Research Report by Sana Ahmad

## Executive Summary

Mobile networks have become the most widely used telecommunications service in Australia and the demand for more data and faster service is growing rapidly (Deloitte Access Economics 2019, p. 11). Competition in the mobile services market is essential for providing the necessary upgrades, innovation and improved network coverage to meet consumer demands (Houpis et al. 2016; Cricelli et al. 2011). For the majority of Australia's population who reside in metropolitan areas, the mobile services sector offers a high level of competition, allowing for a high level of service provision (Australian Competition and Consumer Commission [ACCC] 2018). However, in regional and remote parts of Australia, there is a lack of competition in mobile network services, which results in a significantly lower quality of mobile coverage for consumers in these areas (Infrastructure Australia 2019, p. 569). With nationally consistent pricing being offered by most major mobile service providers in Australia, this raises concerns that regional and remote consumers are paying the same price for a lower quality service.

Currently, mobile networks cover approximately 98.5 per cent of Australia's population but only one-third of its landmass (Infrastructure Australia 2019, p. 569). Australia's vast geographical landscape has always presented a challenge for telecommunications provision. When the telecommunications sector transitioned from a public service into a deregulated sector in the 1990s, safeguards such as the Universal Service Obligation were established to ensure a minimum standard for the provision of fixed-line telephone services across the country. Federal Government initiatives, such as the Networking the Nation program were also implemented to subsidise telecommunications provision in regional and remote areas. However, the majority of initiatives have been focussed on improving fixed-line and broadband services in regional and remote areas, despite the growing uptake of mobile services (McLaren 2018, p. 34). There is also an argument that Telstra had an advantage in regional mobile markets due to its partial incumbency during the rollout of its mobile networks (Goggin 2008, p. 83). These historic factors help explain Telstra's considerable mobile network footprint, particularly in regional areas.

Telstra's mobile network covers approximately 31 per cent of Australia's total land area, whereas Optus and Vodafone-TPG cover between 12 and 13 percent (Infrastructure Australia 2019, p. 569). This disparity in coverage is what fuels the lack of competition in regional and remote areas, where Telstra is often the only available network. The Federal Government's current initiative, the Mobile Black Spot Program (MBSP), has sought to address the lack of mobile coverage and competition in regional and remote areas, with mixed results. The program has been successful in delivering its first objective of increasing mobile network coverage in

regional and remote Australia (Regional Telecommunications Independent Review Committee [RTIRC] 2018). However, it is struggling with delivering on its objective of increasing competition in mobile services provision in regional and remote Australia. This report highlights that out of the 1,229 subsidised mobile base stations which have been co-funded by the program, 894 stations have been delivered by one provider, Telstra. Furthermore, only 28 per cent of base stations provided under the program are being shared between multiple MNOs (Australian Government, 2020b, p. 8). This is a poor result, given that co-location of infrastructure is the main mechanism intended by the program to improve mobile competition.

This report recommends that the MBSP guidelines be amended to better encourage the co-location of infrastructure on new mobile base stations. It recommends updating the MBSP's co-funding system to better incentivise mobile network operators to invest and draws from the funding initiatives utilised in New Zealand's Mobile Black Spot Fund program. The report also suggests that a standardised mobile coverage mapping system should be developed to improve transparency around coverage provision in regional and remote areas.

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## Introduction

Mobile networks are playing an essential role in Australia's transition to a digital economy. The mobile phone is now the most popular and frequently used device to access the internet in Australia and levels of mobile-phone only households have been increasing as fewer people rely on fixed-line telephone services (Australian Media and Communications Authority [ACMA] 2018). As a result of the recent floods and bushfires, as well as the COVID-19 pandemic, pressure and reliance on mobile networks have increased significantly. With more people working, studying and accessing services from home, there is an increased demand on mobile networks all over Australia.

The need for effective mobile service delivery is felt especially in regional areas. Even before the pandemic, Australia had seen a rise in people moving to these areas and it is expected that this trend will only increase further as a result of the pandemic (Bourne et al. 2020). Regional areas typically have less mobile infrastructure than metropolitan areas and this reduces the capacity of networks in these areas to handle high levels of mobile traffic. It also puts these areas at risk of having no mobile service if existing infrastructure is damaged. This risk became a reality during the 2019-2020 bushfire season, when mobile network outages prevented people from contacting family and friends in emergency situations (ACMA 2020).

Despite its importance, in parts of regional and remote Australia, the quality, choice and coverage of mobile networks continues to lag behind that of metropolitan areas (RTIRC 2018). This report seeks to further investigate this issue through an exploratory review and analysis of academic journal articles, books, industry reports, government publications and government data sets. It will examine the role of Federal Government policies in fostering competition in the mobile services market. With a focus on regional and remote areas, it will assess the competitiveness of Australia's mobile services sector by examining the market share and geographic coverage of major mobile network operators. Lastly, it will evaluate the effectiveness of the Federal Government's current Mobile Black Spot Program.

This report argues that policy initiatives to improve regional telecommunications have overwhelmingly focussed on fixed-line services, despite consumer trends indicating the growing importance of mobile coverage. The government's light handed regulation of competition in mobile services has therefore failed to deliver effective mobile coverage and competition outcomes to mobile users in regional Australia. It has also struggled to regulate the substantial market power of the former incumbent provider, Telstra, in these areas. The Mobile Black Spot Program -

despite being the largest public investment in mobile coverage - has not achieved its intended outcome of improving competitive outcomes for mobile users in regional areas.

Section 1 explores the existing literature and provides background on competition in Australian mobile telecommunications. It will consider whether Australia's incumbent telecommunications provider, Telstra, has had a historical advantage in the regional Australian mobile market and will analyse past Federal initiatives aimed at improving regional telecommunications. Section 2 will set out the current infrastructural issues in the Australian mobile services sector, highlighting the lack of competition in mobile networks in regional areas. In Section 3, the report will assess the impact of the Federal government's Mobile Black Spot Program in improving mobile coverage and competition for Australians in regional areas. It will compare Australia's program with New Zealand's Mobile Black Spot Fund to identify the value of different funding and infrastructure-sharing models. The report will conclude with recommendations to improve Australia's Mobile Black Spot Program.

# 1. The History of Competition in Australian Mobile Telecommunications

## Literature Review

Academics have largely heralded competition in Australian mobile telecommunications to be a success, due to the sector's high levels of innovation and growth over the last 30 years (Howell & Potgieter 2020; McLaren 2018; Giesecke 2006; Campbell 2000). The sector has been operating under conditions of open competition since the early days of the mobile technology and has experienced little government intervention, apart from regulation and the sale of access to the required spectrum. The sector is seen as successful largely because it has been able to independently secure investment to upgrade to 2G 3G, 4G and 5G technologies (McLaren 2018) and has three major MNOs which operate in the mobile market with a high level of competition (ACCC 2018).

In both Australian and international contexts, the dominant view is that the mobile telecommunications sector was able to bypass much of the government intervention and competitive restructuring involved during the privatisation of national fixed-line services (Li & Whalley 2002; Hess & Coe 2006; McLaren 2018). For instance, in studies which analyse the privatisation of Telstra, the focus is usually on fixed-line telephone and broadband since these services present more features of a natural monopoly (Howell & Potgieter 2020, Li & Xu 2004). In particular, the regulation of

access to fixed-line infrastructure under the former Telecommunications Access Regime has undergone a great deal of contemporary analysis (Selvadurai 2010; Ergas 2008; Fletcher 2009; Chavan & Raiche 2008), because addressing its competitive shortcomings were crucial to the development and design of the National Broadband Network (NBN) (Madsen & de Percy 2020; Alizadeh & Farid 2017).

Mobile services in Australia have not attracted the same level of research as fixed-line services in the context of privatisation or in the form of historical analysis. Studies of the Australian mobile services market tend to focus on capturing the current level of competition between operators in the Australian mobile services market (Richard & Shailer 2016, ACCC 2018) or comparing the competitiveness of Australia's mobile market to other countries (Zhang 2013; Sung & Kwon 2011). There are few studies which examine Australia's mobile services sector and its competitiveness through a historical lens. This is surprising, given that Australia's largest mobile services provider, Telstra, is the country's former incumbent telecommunications provider (ACCC 2018).

Studies undertaken in other countries have demonstrated that incumbent, fixed-line telecommunication providers have had an inherent advantage when entering the mobile services market (Jakopin & Klein 2012; Whalley & Curwen 2012; Bijwaard et al 2008). Known as the 'first-mover advantage', this advantage arises from a range of factors including the incumbent having strong political backing, large existing customer bases, the ability to cross-subsidise across different market sectors, having a monopoly over analogue mobile services and well-developed infrastructure and resourcing capabilities (Jakopin & Klein 2012). This report seeks to build on this idea of 'first mover advantage' and investigates whether Telstra's status as a former incumbent provider has played a role in its current dominance over mobile services in regional areas.

The idea that Telstra may have a monopoly over mobile services in regional areas was much more prevalent in the literature when Telstra was only partially privatised. Crase et al. argued that mobile networks in regional areas were established as a 'near-monopoly' by Telstra because it had the help of public funding to provide mobile services in unprofitable areas (2001, p. 115). The study suggested that regional areas were not as 'unprofitable' as they seem and warned that without adequate competitive regulation, Telstra may become entrenched as the monopoly mobile services provider in these areas (Crase et al. 2001, p. 116). Eason raised concerns that the Universal Service Obligation would be of limited use to mobile users in regional areas and argued that non-metropolitan mobile markets would become 'thin pickings' with current regulations in place (2000, p. 100). Goggin has examined how Telstra's position as Australia's 'national carrier' placed significant pressure on the company to extend their mobile network to regional areas through



CDMA technology (2008, p. 83). Goggin further noted that public discussions about rural telecommunications issues continually fail to address mobile services (2008, p. 84).

This report agrees that mobile service provision in regional areas requires more attention and seeks to re-open the discussion about whether Telstra is overly dominant in the regional mobile services market. This investigation sits within a broader, contemporary discussion of competition regulation in Australian telecommunications, as the extent of Telstra's market power in Australia is likely to influence the future privatisation of the NBN.

### Shifting from Monopolies to Markets

Striving for competition in the telecommunications sector is a relatively modern ambition. For the majority of the twentieth century, telecommunications were a nationalised service in many countries, including Australia, with national operators enjoying a lawful monopoly over service provision. By the 1980s, in many countries it had become apparent that public monopolies over telecommunications had created systems which were inefficient, and delivered low levels of customer service, economic performance and technological innovation (Geradin and Kerf 2003, p. 7). This prompted countries to undertake privatisation of their national telecommunications networks, with Britain doing so in 1984, Japan in 1985 and New Zealand in 1990. These reforms were based on neo-liberal economic thinking popularised by the Thatcher and Reagan administrations and were part of global trend towards deregulation and privatisation of industries

Under the Hawke-Keating government, Australia also began a series of microeconomic reforms to open up its economy and privatise more utilities. In a review of its telecommunications industry in 1988, it was recognised that there was a need to introduce competition into the sector and eventually privatise its operation (King & Maddock 1996, p. 137).

Mobile network provision was also affected by this decision. Competition in sector officially began when the government allocated mobile carrier licences to Telecom Australia and Optus in 1991 and to Vodafone in 1992. Figure 1 depicts a timeline of major events in Australia's mobile telecommunications sector, showing the introduction of new entrants and new technologies into the mobile services market. Prior to 1991, the only mobile network in Australia was the analogue Advanced Mobile Phone System (AMPS), a nationally owned service operated by Telecom Australia. From 1992 to 1996, mobile services were operated as a 'triopoly' as there were only 3 mobile carriers licenced to operate mobile GSM networks in Australia (Van der Vlies 1996, p 316). This changed after the enactment of the

*Telecommunications Act 1997* (Cth) in 1997, when the telecommunications sector was opened to full competition. For both mobile and fixed line services, the Act removed restrictions around the number of network carriers in Australia.

One of the major concerns with introducing competition into the telecommunications sector was whether it would widen the gap in the standard of telecommunications infrastructure between regional and non-metropolitan areas (Eason 2000, p. 10; Crase et al. 2000, p. 106). Australia's unique geographic circumstances have always presented a challenge to the provision of telecommunications services, because the cost of supplying infrastructure in regional and remote communities can often outstrip the financial returns of servicing those areas. Prior to privatisation and deregulation, Telstra could address this issue by cross-subsidisation, which would absorb its losses from servicing regional areas (McLaren 2018). In an open market, it was feared that there was little commercial incentive for telecommunications providers to service regional and remote areas.

## HISTORY OF MOBILE TELECOMMUNICATIONS IN AUSTRALIA:

<p><b>1981</b> Telecom Australia introduces public automatic mobile telephony.</p>	
	<p><b>1987</b> Telecom Australia launches Australia's first cellular mobile network using analogue, Advanced Mobile Phone System (AMPS) technology.</p>
<p><b>1991</b> The Federal Government allocates mobile carrier licences to Telecom Australia and Optus. This licenses them to use new, digital GSM technology to provide mobile networks</p>	<p><b>1992</b> Government allocates a third mobile carrier licence to Vodafone. Telecom Australia merges with the Overseas Telecommunications Corporation and is later renamed 'Telstra.'</p>
<p><b>1993</b> Telstra, Optus and Vodafone launch their 2G (GSM) mobile networks respectively in April, May and September.</p>	
<p><b>1998</b> Telstra introduces the Code Division Multiple Access (CDMA) mobile network, which is targeted at rural customers.</p>	<p><b>1997</b></p> <ul style="list-style-type: none"> <li>Government sells the first tranche of Telstra shares, commencing its partial privatisation.</li> <li>The <i>Telecommunications Act 1997</i> (Cth) comes into force and removes restrictions around the number of mobile network carriers in Australia, thus beginning an era of 'open competition.' It also introduces the Facilities Access Regime, which imposes obligations on telecommunications carriers to provide other carriers with access to their transmission towers and sites.</li> <li>The Telecommunications Access Regime is introduced under Part XIC of the <i>Trade Practices Act 1974</i>.</li> </ul>
	<p><b>1999</b> The ACCC publishes the <i>Facilities Access Code</i> to assist network rollouts by new and existing mobile network operators.</p>
<p><b>2000</b> Telstra's AMPS analogue mobile network is shut down.</p>	
	<p><b>2003</b> 3G networks are introduced to Australia by Telstra, which begins its rollout by servicing major metropolitan areas.</p>
<p><b>2005</b> Optus and Vodafone commence 3G network rollouts.</p>	
<p><b>2009</b> Australia's third and fourth largest Mobile Network Operators, Vodafone and 3 Mobile (Hutchinson), merge. Future services are delivered under the Vodafone brand</p>	<p><b>2008</b> Telstra's CDMA network is shut down.</p>
	<p><b>2011</b> Telstra introduces 4G networks to Australia.</p>
<p><b>2012</b> Optus launches its 4G network.</p>	
	<p><b>2013</b> Vodafone launches its 4G network. ACCC conducts review of the <i>Facilities Access Code</i>.</p>
<p><b>2019</b> ACCC decides against declaring domestic mobile roaming. It identifies other measures to improve regional mobile coverage. Telstra and Optus launch 5G mobile networks in Australia.</p>	<p><b>2020</b> Federal Court allows the merger of TPG Telecom and Vodafone, overruling the ACCC's 2019 decision.</p>

Figure 1. Timeline of the History of Mobile Telecommunications in Australia

## Measures to Promote Telecommunications Provision and Connectivity in Regional Australia

Since competition was introduced into fixed-line and mobile services sectors in 1991, the Government has had implemented a range of programs to ensure that regional areas were not left without adequate telecommunications services. This section will review several key measures to demonstrate that the many of these initiatives have been related to the provision of fixed-line and broadband services in regional areas, as opposed to mobile services. It will draw from the Australian Communications Consumer Action Network's timeline of federal government initiatives in remote telecommunications, recently published in the *Remote Indigenous Communications Review* (Featherstone 2020).

### **Universal Services Obligation (USO) (1991-Present)**

The Universal Services Obligation (USO) is an industry and government funded contract, awarded to Telstra, to provide a standard level of access to telephone and payphone services across Australia. The objective of the USO is to ensure that Telstra maintains its fixed-line copper network in areas deemed uneconomic, so that all Australians can share in the benefit of further service improvements. Under the renewed USO contract, entered into in 2012, Telstra will receive approximately \$270 million per year until 2032 to ensure access to these telephone services. Crucially, mobile networks, data and pre-paid services are not covered by the USO, despite the evidence that mobile services are increasingly preferred over fixed line (ACMA 2018). The USO has therefore been criticised for being an outdated, costly subsidy scheme which is not meeting the contemporary digital needs of consumers, particularly consumers in regional areas (Cou tts 2015; Featherstone 2020). Feedback on the USO indicates that government intervention in facilitating equitable telecommunications should better reflect the growing role of mobile services (Productivity Commission 2016; Featherstone 2020) with suggestions that some of the USO funding should be diverted to fund the Mobile Black Spot Program. (Cou tts 2015).

### **Networking the Nation (NTN) (1998-2005)**

Networking the Nation was a national funding program to provide telecommunications solutions for remote and regional areas, funded by the first and second partial sales of Telstra in 1997 and 1999. There were a number of projects funded under this initiative, with the largest being the Outback Digital Network, which was aimed at building a broadband network across Northern Australia (Featherstone 2020). A total of \$320 million was invested in the NTN program, funding over 720 projects. Upon evaluation, it was reported that the NTN's resources were insufficient in the face of the substantial infrastructure needs of remote and rural Australia (Department of Communications, IT and the Arts 2005). Several of the

telecommunications solutions that the program provided, such as satellite and UHF radio-network systems, eventually ceased operation because there was a lack of ongoing maintenance and funding (Featherstone 2011, p. 4.6).

### **Mobile Connect (2001-2008)**

The Mobile Connect program was aimed at improving mobile coverage in which the Government spent \$145 million on improving mobile infrastructure between 2001 and 2008 (RTIRC 2008, p. 132). There is limited information available about this program and it is unclear whether it had a specific focus on regional and remote areas. The program resulted in new or improved coverage for 560 towns and districts, and further coverage along 34 regional highways and 16 national highways (RTIRC 2008, p. 132). The program reportedly had issues with stakeholder engagement. For instance, in 2005, \$8 million was made available by the Government under the program to extend mobile service, but no applications were received from mobile carriers (RTIRC 2012, p. 45). The Regional Telecommunications Review Committee attributed this lack of engagement to the program's lack of scale, the remoteness of the priority locations and the associated backhaul costs the sites would attract (RTIRC 2012, p. 45).

### **Broadband Access Programs (2004-2011)**

There were a number of successive broadband access programs implemented by the Government during this period, including the Higher Bandwidth Incentive Scheme (2004-2005), the Broadband Connect Program (2006-2007) and the Australian Broadband Guarantee (2007-2011) (Featherstone 2020). The objective of these programs was to make cheaper and more reliable broadband services widely available in regional Australia. These programs were aimed at helping consumers transition to high-speed broadband services provided by the NBN.

It is clear that there was a tendency for regional telecommunications funding initiatives to target fixed-line and broadband services. The programs reviewed in this section are amongst the largest funding initiatives in regional telecommunications in recent years, yet the Mobile Connect program was the only program focussed on providing improved mobile network infrastructure to areas with poor coverage and service. This eventually changed with the introduction of the Mobile Black Spot Program in 2014, which will be discussed later in this report.

### **Competition in the Mobile Services Market: Did Telstra have 'first-mover advantage'?**

The lack of government investment in mobile services during the early years of mobile technology raises the question of whether service provision was able to

diversify beyond Telstra in regional mobile markets. Multiple studies of overseas markets have shown that it is an incumbent's dominance in fixed-line services gives it an advantage in mobile service provision (Jakopin & Klein 2012; Whalley & Curwen 2012; Bijwaard et al 2008). One of the key elements of this advantage is that incumbent providers often already have a high-share of infrastructure-based services (Jakopin & Klein 2012, p. 362). Furthermore, it has been observed that regional mobile markets are quickly saturated and that it becomes increasingly difficult for later entrants to gain a market share (Whalley & Curwen 2011, p. 225).

Based on these findings, there are historical factors which suggest Telstra had an advantage in regional mobile services. Crucially, in 1998 Telstra was the first mobile operator to launch a CDMA network, which was targeted at regional and rural customers. CDMA technology was a type of 2G network better suited to servicing low-density, rural areas. As Goggin notes, Telstra's 'commercial' decision to launch CDMA presented a private solution for a pressing government problem (2008, p. 84). Goggin's analysis shows that CDMA was introduced without any public discussion and highlights the lack of transparency in the relationship between Telstra and Government during this time (2008, p. 84) It has been reported that a significant amount of government funding was directed to Telstra in the 1998-2002 period to expand the coverage of the CDMA network and that this clearly solidified Telstra's market position in regional Australia (Vodafone 2002). When the CDMA network was eventually closed down in 2008, Telstra migrated its users (approximately 1 million at the time of closure) onto the Telstra NextG Network (ACCC 2017b, p. 6). While the CDMA network was a valuable 2G technology which addressed some of the problems in regional mobile coverage, the relationship between Telstra and the Government during the CDMA network's implementation indicates that Telstra had the advantage of being the 'first' mobile network operator in many regional parts of Australia.

## 2. Measuring Competition and Coverage in the Australian Mobile Sector

### Mobile Network Infrastructure in Australia

In Australia, the mobile networks are owned, operated and maintained by three major commercial operators - Telstra, Optus and Vodafone-TPG. Competition for mobile service is concentrated between these three operators, with the ACCC reporting that these three providers account for 91 per cent of all mobile services in Australia (ACCC 2018, p. 5).

The Australian mobile sector has a range of actors who provide mobile infrastructure and services. This includes:

- **Mobile network operators (MNOs)** - companies which own, operate and maintain the wireless infrastructure which provide voice, SMS and data services.
- **Mobile virtual network operators (MVNOs)** - businesses that provide mobile network access through infrastructure owned by mobile network operators.
- **Hardware and handset wholesalers and retailers** - companies that sell mobile phones and devices, and the infrastructure used to construct the network

(Deloitte Access Economics 2018, p. 2)

## Competition in the Mobile Services Market

Mobile network operators compete on a range of factors, including scope of network coverage, network quality, retail service, plan inclusions and price. The level of competition is high, both in MNO and MVNO markets and there is a high degree of market concentration in both markets (ACCC 2018, p. 5).

Competition in telecommunications is important because it allows for improved quality and diversity in services, as well as reduced costs to customers. With mobile networks in particular, studies have demonstrated that areas which have high levels of competition between different mobile network operators have higher levels of coverage, higher take-up of mobile devices and greater technological innovation than areas which are serviced by a single network operator (Houpis et al. 2016; Cricelli et al. 2011).

The MNO market exhibits one of the highest levels of market concentration in the Australian economy, due to its high barriers to entry, the capital-intensive nature of the sector, and the need for MNOs to spread costs across a large user base to guarantee profitability (Harrison 2021a, p. 26). Out of all MNOs, Telstra has consistently had the largest share of the mobile services market, with a share of 42 per cent in 2020 (Granwal 2021). By comparison, Optus held a market share of 26 per cent and Vodafone, a share of 17 per cent (Granwal 2021). For MNOs, the high levels of competition mean that profit margins have decreased over time, as these companies pass on more savings to consumers (Harrison 2021a, p. 34). Consumers of MNO services have experienced an overall reduction in price paid over the last 5 years (Deloitte Access Economics 2019, p. 14).

For MVNOs, market concentration is slightly lower than that of the MNO market, but the four largest MVNOs - Amaysim, ALDImobile, TPG and Vocus Group - still account for 60 per cent of overall revenue in the sector (Harrison 2021b, p. 25)

There have also been a number of mergers and acquisitions in the MVNO sector such as Amaysim's acquisition of Vaya in 2016 and Optus's acquisition of Amaysim in 2021. The effect of these mergers on competition is still yet to be seen. Compared to MNOS, MVNOs typically have lower barriers to entry and lower start-up costs since they are not required to build network infrastructure or seek spectrum licensing (Harrison 2021b, p. 29). However, the cost structure of MVNOs is heavily influenced by the fees they pay to MNOs in order to use their infrastructure, which on average, consumes 74 per cent of an MVNO's total revenue (Harrison 2021b, p. 27).

Generally, in terms of competition and substitutability, Australian consumers have a range of mobile operators and virtual operators to choose from. This has been confirmed by ACCC reports which have found Australia's mobile market to be competitive (ACCC 2018; ACCC 2017a). However, this level of competition is not geographically uniform across Australia. In regional areas, there is a lack of competition between mobile network operators and an overall poorer quality of mobile network (Infrastructure Australia 2019, p. 569). A national approach to assessing the state of competition can often overlook the challenges faced by consumers in regional areas.

### ACCC's Approach to Assessing State of Competition

The ACCC takes a national approach to assessing the nature of competition in the mobile services market, which is why geographical discrepancies in the availability and quality of mobile networks are obscured.

The ACCC has found that geographic coverage is not the primary driver of competition in the mobile services market and therefore states that it is not essential for MNOs to have equal coverage to compete effectively (2017b, p. 2) The ACCC has stated that dividing the mobile services markets into different regions (such as regional and metropolitan) makes it difficult to assess the complete state of competition (2017b, p. 68). The ACCC considers that an MNO's coverage in regional areas influences the demand in metropolitan areas, and that competition in metropolitan areas influences the price available to consumers in regional areas due to nationally consistent pricing and service inclusions (2017b, p. 16). However, while regional consumers may benefit from paying the same prices as metropolitan consumers, the quality of their mobile coverage is not the same. This highlights how a national approach to assessing the state of competition overlooks the issues faced by consumers in regional areas.

Interestingly, the ACCC has concluded that it is network quality, not geographic coverage, which is the main driver of market share in the mobile services market (2017b, p 42). It therefore attributes Telstra's higher market share to the superior



quality of its network. In doing so, the ACCC undermines its own dismissal of geographic coverage as an indicator of competition. This is because the quality of a mobile network is directly related to mobile site density in a geographical area (Mollahasani et al. 2020; Ahmed 2014). This therefore links the issue of competition back to mobile network infrastructure and the number of mobile sites each mobile network operator uses.

## Competition in Mobile Network Infrastructure

The three mobile networks in Australia - Telstra, Optus and Vodafone-TPG - have different geographic footprints in terms of coverage. As seen in Table 1, Telstra's mobile network covers approximately 31 per cent of Australia's total land area whereas Optus and Vodafone-TPG cover between 12 to 13 per cent. Therefore, there are parts of Australia where all three MNOs have coverage, areas where only Telstra and Optus have coverage and areas where Telstra is the only available network.

Table 1. 3G and 4G Coverage across Australia, 2016

Provider	3G Coverage	4G Coverage	Area Covered by Network	
	% of population	% of population	km <sup>2</sup> (millions)	% of Australia's area
<b>Telstra</b>	99.3%	98%	2.4	31%
<b>Optus</b>	98.5%	95%	1.0	13%
<b>Vodafone</b>	97%	96.9%	0.9	12%

Source: Infrastructure Australia (2019 p. 569)

Telstra has the largest infrastructural reach out of the 3 major mobile networks, both in terms of population and geographic coverage. In 2015, it was reported that Telstra had mobile equipment on 9,600 sites, that Optus had equipment on 7,400 sites and Vodafone on 6,700 sites (RTIRC 2015, p. 2). Telstra was reported to hold a 48 per cent share of the mobile tower market, compared to Optus' 11 per cent and Vodafone's three per cent (RTIRC 2015, p. 2).

### **Coverage Maps**

Coverage maps are often used by consumers which MNO will provide the best service. It is important to note that MNO's coverage maps do not accurately depict the quality or range of mobile coverage in an area or the number of mobile towers present. Mobile coverage can be affected by a range of factors such as topography, vegetation, buildings, as well as the distance between mobile phone towers. Coverage maps often overstate the level of coverage and fail to depict areas of weak service caused by these factors, which can mislead consumers (RTIRC 2012 p. 39; ACCC 2017b, p. 44). The maps also differ in detail and composition depending on the MNO which distributes it. Until criteria are established to standardise coverage

maps, current maps should be viewed with a high level of scepticism by consumers and policymakers.

## Quality of Mobile Coverage

The quality of mobile coverage has consistently been flagged as an issue in regional Australia. In 2012, over two-thirds of people consulted in the Regional Telecommunications Review cited poor mobile coverage as a priority issue during the submission process (RTIRC 2012, p. 41). In 2013, 45 out of 55 Regional Development Australia (RDA) Committees reported that their communities experienced poor mobile network coverage (Australian Bureau of Statistics, 2013 p. 24). A 2017 CSIRO-led study of Australian farmers found that more respondents reported to have 'poor to no coverage' (43 per cent) across their farms than 'good to full coverage' (34 per cent) (Zhang et al. 2017, p. 29). Furthermore, surveys conducted in 2018 found that rural respondents were 20% more likely to rate the quality of their mobile networks as 'poor' and 13% more likely to rate their accessibility to mobile networks as 'difficult' (JWS Research, 2018, p. 70).

Australia is considered a 'world leader' in mobile coverage, quality and speed (GSMA Association 2019, p. 10). However, data from Australia's Digital Inclusion Index (ADII) has demonstrated there is a substantial difference between mobile networking access and affordability in rural and urban areas. In 2020, the digital inclusion score was 7.6 points higher for people in capital cities (65.0) than in rural areas (57.4) (Thomas et al. 2020, p. 6) Even though there has been a significant increase in uptake of mobile data in rural areas, there are concerns that the demand for data has been surpassing the capacity of mobile network infrastructure in regional and rural Australia (Lane et al. 2016, p. 5).

## Remote Indigenous Communities

Indigenous Australians living in remote communities are particularly vulnerable to digital disadvantage due to lack of mobile infrastructure. The *2020 ACCCAN Remote Indigenous Communications Review* identified 3 key issues with mobile coverage in remote Indigenous communities, with the primary issue being a lack of mobile coverage in remote communities (Featherstone 2020, p. 9) According to the review, government programs such as the Mobile Black Spot Program have assisted larger regional Indigenous communities become more connected but there remains a lack of commercial incentive to service smaller, remote Indigenous communities due to remoteness, sparseness of population and cost of backhaul infrastructure and this continues to be a barrier to better mobile coverage (Featherstone 2020, p. 9). Secondly, the review found that mobile towers near remote Indigenous communities

provide mainly 3G networks, which have poor speeds and are prone to congestion (Featherstone 2020, p. 58). Despite mobile plans offering national pricing, residents in remote Indigenous communities are not able to access the full spectrum of network they are paying for. Furthermore, mobile towers near remote Indigenous communities suffer from limited battery life, which is concerning due to the unreliable power supply in regional areas (Featherstone 2020, p. 58). This unreliability affects the accessibility of mobile coverage.

Since the uptake of fixed broadband in remote Indigenous communities is low, levels of mobile-only and pre-paid mobile use are much higher in these communities than in other parts of Australia (Thomas et al. 2020, p. 19). With mobile data being more expensive per gigabyte than fixed broadband (Thomas et al, 2020 p. 19), this means that Indigenous Australians receive less data for each dollar spent on data.

In the 2020 ADII, the score for Indigenous Australians was 55.1, which is 7.1 points below the national average and a notable 9.9 points behind Australians living in capital cities (Thomas et al. 2020, p. 19). However, data collection for the 2020 ADII did not extend to remote Indigenous communities, and this score is only based on Indigenous Australians living in urban and regional areas (Thomas et al. 2020, p. 19). It is likely that the digital inclusivity score for remote Indigenous communities is actually much lower. Somewhat ironically, data collection for the ADII is achieved through Roy Morgan phone surveys, and clearly more needs to be done to include remote Indigenous communities into national surveys of digital inclusivity. This highlights the need for better data collection in relation to digital inclusion for remote Indigenous communities.

### Impact of 2019-2020 Bushfires on Mobile Network Infrastructure

The 2019-2020 bushfire season had a significant impact on mobile network infrastructure across south-east Australia. The Australian Communications and Media Authority reported that over 1,390 telecommunications facilities were impacted during the peak of the bushfire season, with 36 per cent of outages occurring on mobile networks (ACMA 2020, p. 4). The areas affected were primarily regional areas, where residents were unable to use telecommunications and radio networks for updates on the fire conditions or to contact family and friends (ACMA 2020, p. 2). Some residents were reportedly not able to pay for food or fuel due to the outages affecting EFTPOS machines. The fires did not directly cause the network outages, with the majority of cases arising due to power outages in fire-affected areas. ACMA reported that 88 per cent of the network outage incidents were caused by power outages, 11 per cent were caused by other factors and only 1 per cent of outages were caused by direct fire damage (2020, p. 7). The outages raise concerns about the resiliency of mobile networks and signal the need for adequate

emergency telecommunications infrastructure, particularly back-up power, for mobile towers in regional areas.

### 3. Extending coverage but reducing competition? Evaluating the Mobile Black Spot Program

The Mobile Black Spot Program (MBSP) is a Federal Government initiative to address poor mobile service in regional and rural areas of Australia. Introduced in 2014, the program helps co-fund mobile infrastructure in areas where it is commercially unviable for mobile network operators to provide coverage (Department of Communications 2014). The Federal government has committed to investing \$380 million into the program, which has the dual objectives of increasing mobile coverage and enabling greater competition for mobile users in regional and remote Australia (Department of Communications 2014).

While most evaluations of the MBSP focus on the accomplishment of first objective, very few have investigated the latter. This section therefore investigates how effectively the MBSP has improved competition in mobile services in remote and regional Australia. It will begin by examining the literature on the MBSP, which consists mainly of government publications. It will then examine how many co-funded sites have been allocated to each mobile network operator under the program, using the government data sets. It will canvass stakeholder submissions about the MBSP to highlight potential areas for reform and will compare Australia's MBSP to a similar program implemented in New Zealand.

Through an analysis of these data sources, it will be argued that the Mobile Black Spot Program is not effectively reaching its objective of providing increased competition and choice to regional and remote mobile users. There is evidence that the majority of mobile sites funded under the program are being delivered by one operator, Telstra, and that levels of co-location and sharing of new regional infrastructure is low. These findings will be used to inform recommendations to improve the effectiveness of the MBSP.

#### How the Mobile Black Spot Program Works

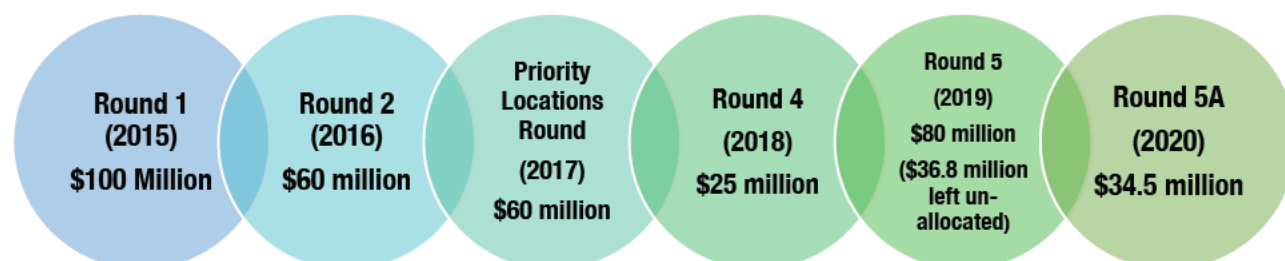
The MBSP requires mobile network operators (such as Telstra, Optus and Vodafone) to partner with co-investors from businesses, communities, state and local governments in order to bid for Federal government funding. Mobile network

operators and their co-investors submit applications for proposed new mobile base stations at specific locations, which the Department of Communications assesses against a scoring criteria. The funding for mobile base stations in specific locations is then awarded to applicants based on the scoring system (Department of Communications 2014).

As of 2021, the program has allowed for the funding of 1,229 new mobile base stations, 923 of which are already operational (Department of Infrastructure, Transport, Regional Development and Telecommunications 2021). Overall, the program has been successful in delivering hundreds of thousands of kilometres of additional mobile coverage in parts of regional and remote Australia. Considering that the MBSP is the largest public investment in mobile coverage in Australia’s history (RTIRC 2018 p. 28), such positive results are to be expected.

As seen in Figure 2, the program has had 5 rounds of funding. The funding set aside for Round 5 of the MBSP was under-utilised due to a lack of MNOs applying for grants. A subsequent funding round, Round 5A, was announced in 2020 in order to utilise the remaining funding. The lack of engagement by MNOs in the later rounds indicates that the commercial incentive for participating the in program has decreased over time.

Figure 2. Funding Rounds of the Mobile Black Spot Program



(Source: Department of Infrastructure, Transport, Regional Development and Telecommunications 2021)

## Literature on the Mobile Black Spot Program

Being a relatively new program and one that services a small portion of the population, the Mobile Black Spot Program has attracted very little analysis outside of periodical government reviews. The *2015 Regional Telecommunications Review* contained limited analysis of the program, given that it had only recently commenced. (RTIRC 2015) However, the review raised an important question of how the MBSP would adapt as the ‘commercial case for extending coverage becomes increasingly marginal as one moves into the less densely populated areas of Australia’ (RTIRC 2015). This is an issue which has arisen in the last few years,

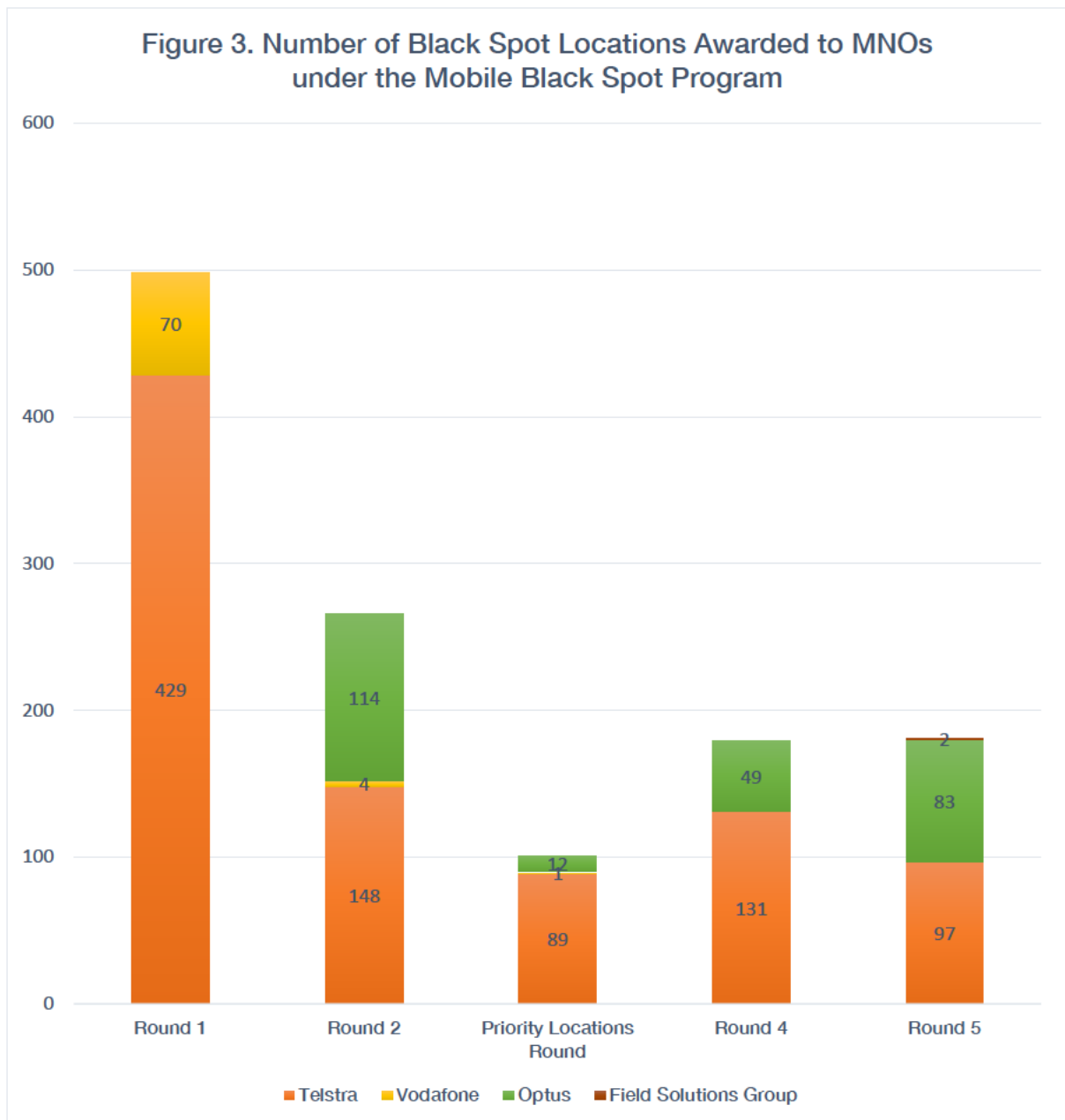
particularly during Round 5 and the Program is currently being restructured in order to combat this. In the *2018 Regional Telecommunications Review*, the MBSP was heralded to have made significant improvements to mobile coverage in regional areas, with the program's co-investment model assessed to be 'working well' and the MBSP overall garnering high levels of public support (RTIRC 2018). However, despite the fact that fostering competition in regional mobile telecommunications is one of the objectives of the MBSP, neither of the two Regional Telecommunications Reviews addressed whether this objective was on track.

The issue of whether competition has been fostered by the MBSP has been raised by the ACCC in several publications. In the *Communications Sector Market Report*, the ACCC assessed that the MBSP had given insufficient consideration to competition when allocating funding (2018, p.162). Furthermore, it raised the lack of co-location under the MBSP as a concern, noting that the government subsidies for individual MNOs to build mobile stations was doing little to promote competition for consumers in regional areas and was simply subsidising individual MNO ventures (ACCC 2018, p. 162). The ACCC made similar comments in their *Measures to Address Regional Mobile Issues* paper (2017a). However, in both publications, the ACCC did not present evidence of how these assessments were made. This section seeks to further prove the claims of ACCC in relation to the lack of competition fostered by the MBSP.

In academic literature, Coutts has argued that MBSP lacks the scope and the funding to deliver mobile coverage to every area which needs it and suggests allocating a portion of the Universal Service Obligation (USO) funding to be diverted to fund the expansion of the MBSP (2015, p. 100). This is a radical idea, but one that has potential to gain traction considering that the USO has increasingly come under scrutiny for being outdated and unresponsive to the needs of today's consumers. The challenge of securing funding through the program was also raised by Freeman and Hancock who argued that smaller and more remote communities lack the resources to make large offers of co-investment, despite desperately needing the infrastructure (2016, p. 939).

## Recipients of MBSP Funding

After each round of the MBSP, the Department of Communications and the Arts releases raw data detailing the location of the new funded base stations. This data also identifies which MNO has been awarded funding to build specific sites. Figure 3 shows the amount of mobile black spots sites that have been awarded to different MNOs under successive rounds of the program.



(Source:<sup>1</sup> Australian Government 2015; Australian Government 2016; Australian Government 2019a; Australian Government 2019b; Australian Government 2020a)

It is clear that one MNO, Telstra, has been awarded substantially more MBSP sites than any other MNO. Over the last five rounds of the MBSP. Telstra has been awarded 894 out of the total 1,229 new mobile base station sites, equating to over 70% of the new base stations under the program. The Optus has been awarded a total of 258 sites under the program and is delivering approximately 20% of new mobile base stations under the program. The disparity between allocation numbers

<sup>1</sup> Mobile Black Spot Locations were sourced from the electronic data sets on the Australian Government data.gov.au website.

is concerning, particularly in light of the evidence presented elsewhere in this report about Telstra's dominance in regional mobile telecommunications.

### Issues with Funding Allocation Criteria

Since there is a significant disparity between funding received by different MNOs, it is prudent to analyse the assessment criteria that the Department uses to allocate funding and mobile base locations. There are seven points of criteria used to assess an MNO and their co-investor's applications for a subsidised mobile black spot location (Department of Communications 2014, p. 17). These are:

1. **New Coverage:** The square kilometre footprint which will receive new handheld and external antenna coverage.
2. **Coverage benefit:** The number of premises and sections of major transport routes which will be covered by the new coverage.
3. **Member of Parliament Priority:** Whether the site has been flagged as a priority site from a Federal Member of Parliament from an eligible electorate.
4. **Co-contributions:** The amount of funds being co-contributed to the project by co-applicants, including State, Territory and Local governments, as well as third parties.
5. **Cost to Commonwealth:** The net cost to the Commonwealth for the proposed project.
6. **Service offering:** The type of service offered by the project in addition to the mandatory 3G HSPA+ technology, and whether roaming services will be offered.
7. **Commitment of use:** The number of other MNOs who have committed to using the new proposed base station and whether they have committed to using the station commercially for a minimum of 10 years.

In an evaluation of the program, the Australian National Audit Office (ANAO) found that certain criteria were weighted more than others. For example, there was a strong emphasis on the 'cost to the Commonwealth' and 'co-contributions' criteria and less emphasis on whether the proposed base station would meet the 'new coverage' and 'commitment of use' criteria (ANAO 2016). The ANAO noted that applications which presented low merit in terms of 'new coverage' scores would be ranked highly as long as they had significant levels of co-contribution and kept cost to the Commonwealth low (ANAO 2016). The fact that co-contribution is so heavily weighted also indicates that the MBSP's structure provides an advantage to MNOs which can invest the most amount of capital into the program. This means that MNOs which already have substantial market power in the telecommunications sector, such as Telstra, have an advantage over other MNOs which may not be able to invest the same level of capital in the program.



Additionally, the MBSP criteria of 'service offering' and 'commitment of use' are weighted as 'additional' points of criteria which can add to a proposal's score but are not essential for the allocation of funding (ANAO 2016, p. 27). This is problematic because these are elements of the funding allocation criteria which directly relate to facilitating competition in regional mobile network provision. This leaves the MBSP's main method of enabling competition to be encouraging the co-location of MNO equipment on new mobile towers funded by the MSBP. This method is flawed because the Department does not actually play a role in co-location process. It is up to MNOs to express willingness to co-build and co-locate mobile base stations under the program. This means that the Department is leaving the responsibility to ensure competition into the hands of MNOs, who have little commercial incentive to do so.

### Lack of Co-Location of Network Infrastructure

According to the Department, only 28 per cent of mobile coverage projects funded in Rounds 1 to 4 of the MBSP offer co-location or passive infrastructure sharing (Australian Government, 2020b, p. 8). Considering that one of the objectives of the program is to improve competition in mobile services for users in regional and remote areas, this is a disappointing result.

The Body of European Regulators for Electronic Communications (BEREC) (2018) has described mobile infrastructure sharing as follows:

Mobile infrastructure sharing (both passive and active) describes the process by which operators share infrastructure to deliver a mobile service to end users. "Passive sharing" is the sharing of the passive elements of network infrastructure such as masts, sites, cabinet, power, and air conditioning. "Active sharing" is the sharing of active elements in the radio access network such as antennas and radio network controllers (RNC). (p. 2)

Sharing mobile network infrastructure has advantages and limitations. It has cost-saving benefits in terms of construction, particularly in remote areas where deployment costs for a single operator would be high (BEREC 2018, p. 15). Sharing mobile sites is likely to become more common in the era of small cell 5G networks and it leads to increased consumer choice of mobile network, environmental benefits, and less visual pollution (Commerce Commission New Zealand 2019, p. 15; BEREC 2018, p. 15). However, from an operational perspective, infrastructure sharing involves a significant period of pre-planning and co-locating multiple MNOs equipment on one tower limits the ease and ability of individual MNOs to upgrade their network infrastructure (Commerce Commission New Zealand 2019, p. 15).

Furthermore, having fewer independent mobile sites may mean that areas will be less resilient during emergencies and national disasters.

In Australia, one of the main reasons that MNOs are reluctant to co-locate mobile equipment in regional areas is because of the high cost of backhaul transmission, which is the cost of carrying data from the regional mobile tower back to that MNO's network (ACCC 2017). Mobile black spots are located in remote areas where the usual backhaul network, the Domestic Transmission Capacity Service, is a declared service with regulated access prices. However, in many cases, an MNO will also have to pay for access for an additional backhaul component from a Telstra exchange back to that MNO's own network (ACCC 2017).

Furthermore, logistically, co-location is an aspect of a mobile base station that must be planned in advance (BEREC 2018, p. 15). New towers have to be designed to be strong enough to support another MNO's mobile network equipment and to be built in a location which suits both MNOs. Under the MBSP, MNOs looking to co-locate equipment usually engage after the funding has been awarded to the funding recipient (ACCAN 2020, p. 8). By this stage, the funding recipient has usually decided the location and type of mobile base station that is to be built and this often discourages attempts at co-location.

### New Zealand's Mobile Black Spot Fund

New Zealand's Mobile Black Spot Fund (MBSF) is an alternative model of mobile black spot program, characterised by strong government and industry collaboration. It was introduced in 2016 with the aim of providing mobile coverage for a number of state highway and tourism locations (Ministry of Business, Innovation and Employment 2021). The New Zealand Telecommunications Department has funded this program through a levy imposed on telecommunications providers and an additional \$75 million dollars in funding was provided by New Zealand's 3 MNOs - 2degrees, Spark and Vodafone (Rural Connectivity Group 2018). New Zealand's use of the telecommunications levy to fund its mobile coverage program presents a contrast to Australia, which only imposes a levy on its telecommunications providers to fund the maintenance of fixed-line services.

Another key element of the MBSF is the level of collaboration between the 3 major MNOs in New Zealand in building new mobile base stations. In 2017, 2degrees, Spark and Vodafone established the Rural Connectivity Group, a joint venture, equally owned by the three operators. The Rural Connectivity Group (rather than the individual MNOs) works with Crown Infrastructure Partners (a Crown-owned company) to plan and deliver the sites funded by the MBSF (Rural Connectivity Group 2018). An outcome of this collaboration is that all three major MNOs in New

Zealand are able to access and use the same Radio Access Network (RAN) infrastructure on the MBSF sites (Crown Infrastructure Partners 2020). Consumers are able to share in the benefits of improved rural coverage, regardless of their chosen provider and the system prevents the monopolisation of mobile network provision in rural areas of New Zealand.

## 4. Recommendations

### 1. Increase the transparency of network quality information by developing a standardised coverage mapping system.

There is a lack of accurate information published about the coverage capacities of mobile networks in regional areas, which makes it difficult and misleading for consumers when choosing a mobile service provider. The ACCC currently collects information from MNOs about infrastructure under the *Infrastructure Record Keeping Rules (RKR) 2013*. There is scope to expand MNO reporting obligations under these rules to include information about mobile coverage and to additionally develop a standardised metric to measure mobile network quality.

### 2. The Mobile Black Spot Program funding allocation criteria should be amended to mandate, not simply prioritise, co-location and infrastructure-sharing solutions.

To achieve the MBSP's objective of improving competitive outcomes for regional consumers, the funding allocation criteria should be targeted towards mobile base stations which will be used by more than one MNO. The program should be amended to ensure that all projects funded under the MBSP should be built to a standard that makes co-location possible. Optus has indicated that it would like to see collaborative co-building arrangements which involve partnering MNOs sharing preliminary designs upfront and participating in community consultation and development approvals for new sites (Optus 2017, p. 13).

### 3. The co-funding model of the Mobile Black Spot Program needs to be restructured so that Mobile Network Operators have continued incentive to invest in regional, remote, and peri-urban areas.

Decreased MNO engagement in recent funding rounds indicates that there is a pressing need to reform the funding model of the MBSP. Telstra has indicated that the funding model needs to be more 'creative' to ensure that it is commercially viable for MNOs to continue investment (Telstra 2017, p. 44). This report recommends trialling a tower co-building scheme similar to the RAN-sharing model in place in New Zealand, where partnering MNOs invest equally into the construction of new mobile infrastructure.

**4. The Mobile Black Spot Program should take into account the high cost of backhaul transmission.**

Current backhaul prices and conditions are not favourable to new entrants in regional mobile markets despite the funding offered in MBSP. Backhaul construction, as well as access fees act often outweigh the cost of the MNO servicing a remote area. Telecommunications provider and fibre specialist, Vocus, has suggested that the MBSP should offer separate funding for mobile towers and backhaul elements, to encourage bids from carrier-neutral, backhaul providers (Vocus 2019). This model would encourage more MNOs to engage with the MBSP through bidding and co-location, since backhaul service costs would be shared between competitors.

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