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7 September 2021

Hon Paul Fletcher MP  
Minister for Communications, Urban Infrastructure, Cities and the Arts  
Member for Bradfield  
Suite 1, Level 2,  
Lindfield NSW 2070

### Google's engagement with Australian public interest journalism

Dear Minister,

I am writing to share an update on Google's progress in partnering with news publishers in support of diverse and sustainable public interest journalism in Australia. In alignment with the News Media Bargaining Code (Code), Google continues to finalise agreements with a diverse range of Australian news media publishers to create partnerships that meet our shared objectives.

#### Google News Showcase

Google launched News Showcase in Australia in February 2021, and since that time we have negotiated partnerships with Australian publishers to provide content across Google's services. As of 3 September, we have reached commercial agreements with publishers representing more than 170 Australian publications, including large as well as small and regional publishers. These partners are now progressively publishing News Showcase panels and our partnerships are supporting their activities by providing analytics and guidance on best practices.

Among the larger publications to have joined News Showcase are Nine, News Corporation, Seven West Media, SBS, the Guardian and Junkee. We have also reached a commercial agreement with the ABC.

The negotiation of these deals is an intensive process and we continue to work hard to finalise agreements that are fair, make commercial sense for all parties and support the future of public interest journalism.

#### Smaller and regional publishers

Google continues to focus on partnering with a diverse range of regional and smaller publishers. We recognise the importance of local information and the role it plays in our communities and in Australians' lives.

At the time of the initial launch of News Showcase, our first partnerships provided financial support for some of Australia's most respected independent, local and regional publications including The Canberra Times, The Illawarra Mercury, The Saturday Paper, Crikey, The New Daily, InDaily and The Conversation.

Since that time, we have signed agreements with a range of regional and smaller publishers such as Independent Australia and Women's Agenda. Last week we announced an agreement with Country Press Australia that will see over 70 independently owned regional and local newspaper and online titles join Google News Showcase. Under this partnership agreement, Google will pay these publishers to curate content, build deeper relationships with readers and provide digital transformation funding to help them build a sustainable online model for news.

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This process is not without challenges. Some smaller publishers have operations that do not align with the eligibility criteria for News Showcase as an online news service, or are not apparently engaged in “public interest journalism” within the context of the Code. Some publishers, for example, provide very limited or no online content at all. In all circumstances, we take a flexible approach to our negotiations - including finding ways to support a publisher through their digital transformation and helping to build their online capability.

Google’s news partnerships team will continue to work with regional and smaller publishers to develop a shared understanding of how News Showcase works and where feasible to negotiate and finalise resulting agreements.

#### **Further support for regional and smaller publishers**

In addition to our support for Australian publishers through News Showcase, Google continues to provide dedicated training and support to publishers and newsrooms in regional communities. Over the last few years, we have trained more than 4,000 journalists in digital tools and more than 200 publications in new methods of engaging audiences and generating revenue.

In the past year alone we trained more than 1,500 people working in small and regional newsrooms, provided advertising support to more than 100 publications and spent significant time in direct personal consultations. Our current work with publishers includes:

- Project Kookaburra - took five regional publishers through a series of workshops and masterclasses over three months to build strategic plans for their digital future; and
- Google News Initiative Digital Growth Program - trained more than 400 regional news leaders in areas such as audience measurement and reader revenue.

We recently announced that we will join with News Corp Australia to establish the Digital News Academy, a world-leading education program dedicated to digital journalism. This initiative will provide training to 750 local and regional news professionals from across the Australian media sector over the next three years in skills including digital journalism, video and audio production, data journalism, audience measurement, reader revenue, digital business models and marketing. There will be a specific focus on regional Australia with Australian Community Media, Australia’s largest rural and regional publisher, becoming a major participant in the program.

Please feel free to contact me or s47F s47F if you would like to discuss any of these issues further.

Warm regards,

s47F

**Lucinda Longcroft**  
**Government Affairs and Public Policy**

s47F

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<b>CORRESPONDENCE RECEIVED</b>		<input type="checkbox"/> Urgent
The Hon Paul Fletcher MP		<input type="checkbox"/> Priority
Office Action:		<input type="checkbox"/> Routine
<input type="checkbox"/> To COS	<input type="checkbox"/> Invitation	
<input type="checkbox"/> To Adviser .....	<input type="checkbox"/> Electorate Correspondence	
Department Action: <b>18 JAN 2021</b>		
<input type="checkbox"/> Minister Reply	<input type="checkbox"/> Department Reply	
<input type="checkbox"/> COS Reply	<input checked="" type="checkbox"/> For Info	
<input type="checkbox"/> Adviser Reply	<input type="checkbox"/> NFA	
	<input type="checkbox"/> Campaign Response	



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18 January 2021

The Hon Paul Fletcher MP  
 Minister for Communications, Urban Infrastructure, Cities and the Arts  
 PO Box 6022  
 Canberra ACT 2600

Dear Minister,

## Update from Google

I am pleased to enclose a copy of Google Australia's latest Economic Impact Report prepared by AlphaBeta. The report outlines how Google Australia's products, people and programs are helping to support the Australian economy and community through an enormously challenging period for all.

### In particular the report highlights how:

- Google Australia invests over \$1 billion AUD every year in the Australian economy, supporting 116,200 direct jobs and 162,700 indirect jobs.
- More than 1.3 million Australian businesses rely on Google services to connect with customers, resulting in more than \$39 billion in business benefits every year.
- Productivity-enhancing tools like Google Maps, Drive, Photos, Docs, and Sheets provide Australian consumers with benefits worth AU\$6.1 billion to the economy each year.

The report also contains a number of case studies demonstrating how Australian small businesses have adapted to the challenges of COVID-19 and found success by using digital tools. Access the report or read more about Google in Australia at [g.co/google-in-australia](https://g.co/google-in-australia).

We look forward to continuing to work with you in 2021. If you have any questions, or would like a briefing on any matter, please do not hesitate to contact us using the details below.

Yours sincerely,

s47F [Redacted Signature]

**Lucinda Longcroft**  
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# GOOGLE'S ECONOMIC IMPACT IN AUSTRALIA

DECEMBER 2020



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Department of Infrastructure, Transport, Regional Development and  
the Arts



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Infrastructure, Transport, Regional Development, Communications and the Arts

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# GOOGLE'S ECONOMIC IMPACT IN AUSTRALIA



## BUSINESS BENEFITS



Google supports  
**AUS\$39 BILLION**  
in benefits  
to businesses  
in Australia<sup>1</sup>



Google directly supports an estimated  
**116,200 JOBS**  
in businesses that use Google products and generate a return on investment;  
**TWO-THIRDS**  
are created in small and medium-sized businesses



By allowing for almost instantaneous access to information online,  
**GOOGLE SEARCH**  
helps businesses  
**SAVE 46 HOURS A YEAR PER EMPLOYEE**



Each transport business in Australia  
**SAVES ABOUT 272 HOURS PER YEAR**  
by using  
**GOOGLE MAPS**  
to optimise their trips

## CONSUMER BENEFITS



Google supports  
**AUS\$14 BILLION**  
in annual benefits  
to consumers  
in Australia<sup>2</sup>



The average Australian  
**GOOGLE SEARCH USER**  
**SAVES 4.9 DAYS A YEAR**  
looking for answers, as  
compared to traditional  
offline methods



Thanks to its trip  
optimisation features,  
the average Australian  
**GOOGLE MAPS USER**  
**SAVES ABOUT 5.6 HOURS**  
**PER YEAR**  
on his or her personal trips

1. Business benefits refer to the estimated economic impact from the following products: Google Search; Google Ads; AdSense; Ad Grants; Google Play; Google Maps.

2. Consumer benefits refer to the estimated economic impact from the following products: Google Search; Google Maps; Google Drive; Docs, Sheets and Photos; Google Play.  
Note: The estimates are of Google's annual economic impact based on the latest available data (i.e., in 2019, or where available, more recent data spanning a 12-month period between 2019 and 2020). Estimates are based on AlphaBeta analysis using a range of original and third-party sources. See report's Appendix for methodology.

# EXECUTIVE SUMMARY

Digital technologies have become central to how Australians conduct their daily lives and work. As a rapidly growing number of Australian businesses and consumers buy, sell and interact with each other online, tools like Google's search, advertising, maps and productivity platforms generate significant value for businesses and consumers throughout the nation.

For businesses, such value is experienced in the form of revenue gains, access to new customers and markets, as well as cost and time savings. For consumers, these come in the form of increased convenience, greater productivity in their daily lives, as well as improved access to entertainment and information. Taking into consideration these benefits, **this study finds that the annual economic value presented by Google's applications and platforms are worth AU\$39 billion for Australian businesses, and AU\$14 billion for Australian consumers.**<sup>1</sup>

The key findings of this study are as follows:

- Google helps Australian businesses increase revenues.** Applications such as Google Search, Google Ads and AdSense help Australian businesses access new customers and create new revenue streams through online advertising. These business benefits are estimated at AU\$31.7 billion per year for Google Search and Ads, and AU\$63.9 million per year for AdSense. Meanwhile, Google Play
- enables Australian app developers to easily tap into both local and international markets.
- Google helps Australian businesses save time.** Businesses benefit from improved productivity through the use of Google Search and Google Maps. Google Search is estimated to help businesses save 46 hours (or 1.9 days) per employee per year by improving access to information needed for work, while each transport business saves about 272 hours of travel time each year from using Google Maps to optimise their work journeys.
- 97 percent of Google's business benefits go to non-technology sectors.** The professional and financial services sectors account for the largest share of the total business benefits at 37 percent (AU\$14.4 billion of the total AU\$38.8 billion), followed by the construction and retail sectors. Other non-technology sectors such as hospitality and restaurants as well as healthcare and social assistance also gain significant benefits from Google's applications and services.
- 60 percent of Google's business benefits go to small and medium-sized enterprises.** Search advertising through Google Ads is a cost-effective tool for micro, small and medium-sized enterprises (MSMEs) that lack the scale and resources to run

1. The Google applications and services included in the analysis of business benefits include Google Search and Ads, AdSense, Google Maps, Ad Grants, and Google Play. The Google applications and services included in the analysis of consumer benefits include Google Search, Google Maps, Google Play, Drive, Photos, Docs, and Sheets. The estimates are of Google's annual economic impact based on the latest available data (i.e., in 2019, or where available, more recent data spanning a 12-month period between 2019 and 2020).

## 6 EXECUTIVE SUMMARY



large marketing campaigns on traditional media. Furthermore, Google Search enables MSMEs and self-employed individuals to find information on market trends, allowing them to identify new growth opportunities at no cost.

- Beyond the 1,800 people employed by Google in Australia, a further 116,200 jobs are directly supported, while 162,700 jobs are indirectly supported in the economy through the use of Google's products.<sup>2</sup>** These jobs in the wider economy are created through the use of Google products that enable businesses to expand their customer base and increase revenue, thereby leading to increased hiring demand. In addition, a further 162,700 jobs could be supported indirectly in the supply chain. These jobs could be created as a result of the expanded demand for supplies and raw materials from businesses that underwent expansion due to the use of Google's products.<sup>3</sup>
- Australian consumers are estimated to derive total benefits worth AU\$14 billion from Google's services each year.** As Google's services are typically provided free of charge – meaning

there are no price indicators that reflect the values of the benefits derived by consumers from these services, the economic “consumer surplus” principle, referring to the economic value of benefits experienced, was adopted to size the value experienced by consumers from such services. An estimated AU\$6.1 billion worth of consumer surplus is derived from Google services that increase productivity and convenience – including Google Maps, Drive, Photos, Docs, and Sheets.





- Google helps Australian consumers save time in particular, Google Search saves the average Australian consumer almost 5 days a year on seeking information.** By providing almost instantaneous access to information online, consumers are estimated to save 4.9 days per year by using Google Search to find information versus offline methods, and 5.6 hours travelling on the roads per year by optimising their trips using Google Maps.

Exhibit E1 provides an overview of Google's annual economic benefits for businesses and consumers in Australia.

2. AlphaBeta (2019), Google economic impact: Australia 2019. Available at: [https://alphabeta.com/wp-content/uploads/2019/09/ab006\\_google\\_business\\_web-1.pdf](https://alphabeta.com/wp-content/uploads/2019/09/ab006_google_business_web-1.pdf)  
 3. Based on 2020 research by AlphaBeta (unpublished).

## EXHIBIT E1:

## OVERVIEW OF THE BENEFITS SUPPORTED BY GOOGLE IN AUSTRALIA

TYPE OF BENEFIT	PRODUCT/S	BUSINESS BENEFITS	CONSUMER BENEFITS
<b>Ease of access to information</b> 	<b>Google Search</b>	<ul style="list-style-type: none"> <li>By allowing for almost instantaneous access to information online, Google Search helps businesses save <b>46 hours</b> a year per worker. These time savings are estimated to worth <b>AU\$4.6 billion</b> in wage terms.</li> </ul>	<ul style="list-style-type: none"> <li>By providing almost instantaneous access to information, the average Google Search user in Australia saves about <b>4.9 days</b> on looking for answers online each year. The annual consumer surplus derived from Google Search in Australia is estimated at <b>AU\$5.1 billion</b>.</li> </ul>
<b>Entertainment and enrichment</b> 	<b>Google Play &amp; Android</b>	<ul style="list-style-type: none"> <li>Android enables app developers to save up to <b>25%</b> of development time and target more than <b>1 billion</b> users worldwide<sup>1</sup></li> <li>App developers in Australia earn more than <b>AU\$639 million</b> in revenue from both domestic and global markets through the Google Play platform annually</li> </ul>	<ul style="list-style-type: none"> <li>Consumers can choose from over <b>2.8 million</b> apps available on the Android ecosystem<sup>1</sup></li> <li>By gaining access to a range of digital entertainment options through Google Play, the consumer surplus benefits of this platform to Australian consumers are estimated at <b>AU\$2.8 billion</b> annually</li> </ul>
<b>Increased productivity and convenience</b> 	<b>Google Maps, Drive, Photos, Docs &amp; Sheets</b>	<ul style="list-style-type: none"> <li>Google Maps helps each transport business save about <b>272 hours</b> per year, which is equivalent to <b>AU\$1.7 billion</b> worth of total annual wages</li> </ul>	<ul style="list-style-type: none"> <li>By using Google Maps to optimise their trip journeys, the average user of this service in Australia saves about <b>5.6 hours</b> per year on the roads</li> <li>The total consumer benefits derived from productivity-enhancing tools of Google Maps, Drive, Photos, Docs, and Sheets is estimated to be worth <b>AU\$6.1 billion</b> in Australia each year</li> </ul>
<b>Advertising benefits</b> 	<b>Google Ads &amp; AdSense</b>	<ul style="list-style-type: none"> <li>Google Search and Ads bring about <b>AU\$31.7 billion</b> in net advertising benefits annually to Australian businesses<sup>2</sup></li> <li>Advertisers in Australia gain more than <b>AU\$63 million</b> in net advertising benefits from displaying advertisements on websites using AdSense<sup>2</sup></li> <li>Web publishers in Australia earn more than <b>AU\$196 million</b> annually through AdSense</li> </ul>	
<b>TOTAL BENEFITS:</b>		<b>AU\$39 BILLION</b>	<b>AU\$14 BILLION</b>

1. AlphaBeta (2018), "AlphaBeta research brief: The estimated economic impact from Android across five Asian markets".

Available at: <https://www.alphabeta.com/wp-content/uploads/2017/08/180820-Android-Economic-Impact.pdf>

2. Net advertising benefits refer to the additional revenue gained from advertising, less the investment made on the advertising tool.

Note: Figures are estimated based on the latest available annual data, (i.e., in 2019, or where available, more recent data spanning a 12-month period between 2019 and 2020).

Totals may not sum as not all benefits have been shown in this overview.

SOURCE: AlphaBeta analysis



# BUSINESS BENEFITS

Google creates significant economic benefits for businesses in Australia. Such benefits come in the form of increased revenue and productivity. The total economic benefits presented by Google Search, Google Ads, AdSense, Google Maps, Google Play, and Ad Grants are estimated at AU\$39 billion a year.<sup>4</sup> These comprise AU\$32.7 billion in revenue gains and advertising grants, and AU\$6.3 billion in time savings (measured in equivalent wage terms). Google helps Australian businesses increase revenue through advertisements on platforms such as Google Search and Ads and AdSense, and save time through the use of Google Maps and Google Search at work. In addition, Google Play also brings Australian app developers an estimated AU\$639 million in revenue annually from both domestic and international markets. A significant share of Google's business benefits, at 97 percent, go to non-technology sectors such as professional services, construction, and retail, while about 60 percent of the total benefits are realised by small and medium enterprises. Beyond the direct employment of 1,800 people, Google also directly supports 116,200 jobs, and indirectly another 162,700 jobs in Australia through enabling business expansion. The total business benefits and job impact brought about by Google are distributed across all states and territories.

4. These estimates are of Google's annual economic impact based on the latest available data (i.e., in 2019, or where available, more recent data spanning a 12-month period between 2019 and 2020). See Appendix for detailed methodology.

## 10 BUSINESS BENEFITS

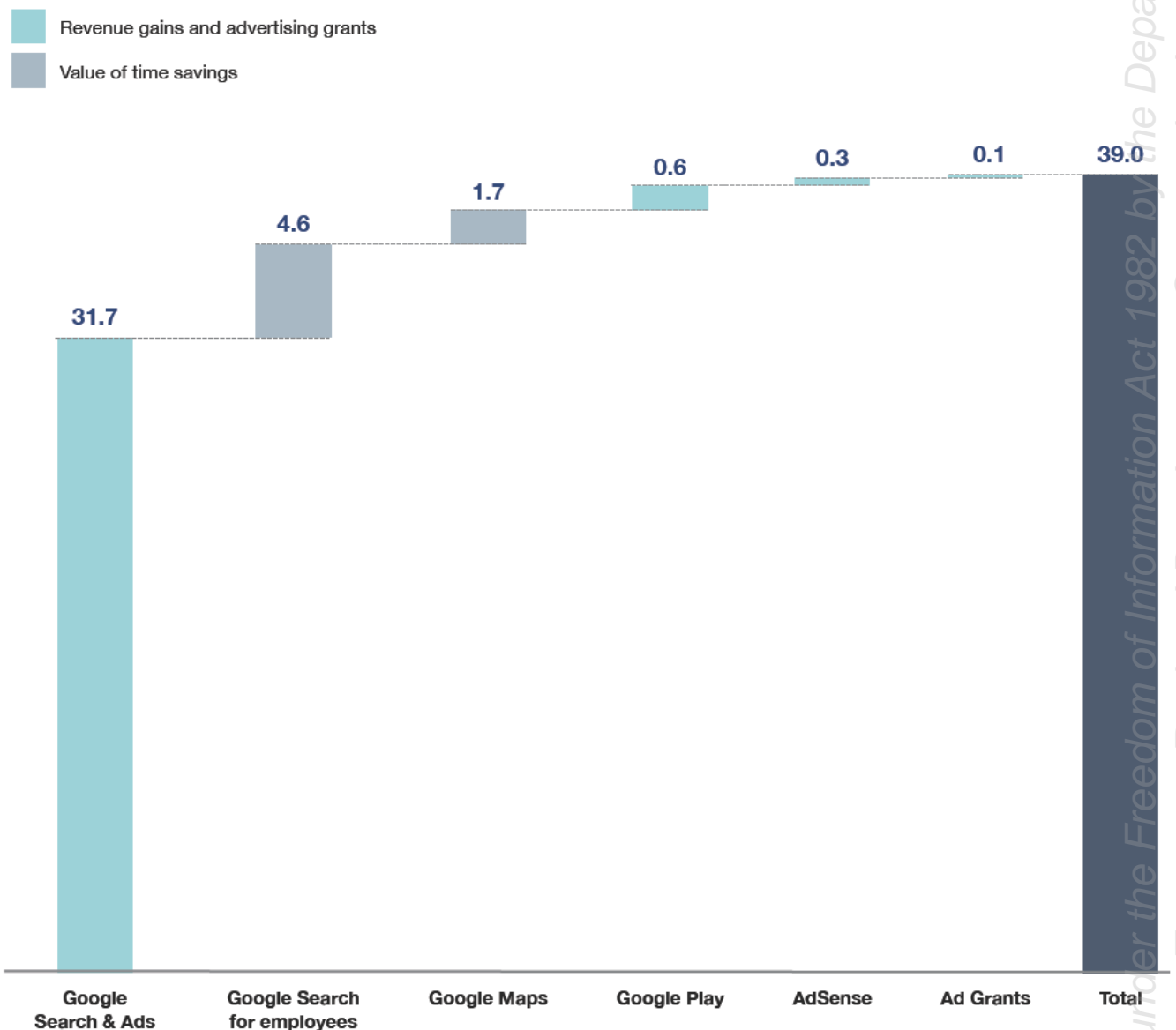
Google's services present benefits to Australian businesses in the form of increased revenue - through increased customer outreach and access to new markets,

as well as improved productivity - through time saved. Exhibit 1 reflects the breakdown of these benefits across the different services.

### EXHIBIT 1:

## GOOGLE IS ESTIMATED TO SUPPORT A TOTAL AU\$39 BILLION WORTH OF ECONOMIC BENEFITS TO AUSTRALIAN BUSINESSES ANNUALLY

### BREAKDOWN OF GOOGLE'S ESTIMATED ANNUAL BUSINESS BENEFITS IN AUSTRALIA AU\$ BILLIONS<sup>1</sup>



1. Based on average estimates (i.e., average of lower and upper bound estimates, where computed). Figures may not sum due to rounding.

Notes: Figures are estimated based on the latest available annual data, (i.e., in 2019, or where available, more recent data spanning a 12-month period between 2019 and 2020).

SOURCE: AlphaBeta analysis

# 1.1 GOOGLE HELPS AUSTRALIAN BUSINESSES INCREASE REVENUES

Google helps Australian businesses boost revenue by facilitating access to new customers, markets and revenue streams. Exhibit 2 summarises the estimated benefits experienced by Australian businesses from Google Search and Google Ads, AdSense, Ad Grants and Google Play.<sup>5</sup>

Google applications broaden the reach of Australian businesses to new customers and markets. Online advertising platforms such as **Google Ads** and **AdSense** allow businesses to conduct targeted advertising,

bringing their products and services to the right audiences and growing their customer base. **Google Ads** is estimated to generate AU\$31.7 billion annually in the form of net returns to Australian businesses from investing in placing advertisements on Google Search results of relevant keywords.<sup>6</sup> This online search advertising tool has proved to be particularly helpful during the COVID-19 pandemic, when businesses have been forced to shift their activities online. Boxes 1 and 2 showcase examples of how Google Ads have allowed small local businesses to flourish despite the pandemic.

## EXHIBIT 2:

### GOOGLE BRINGS ABOUT AN ESTIMATED AU\$32.7 BILLION WORTH OF ANNUAL BENEFITS IN THE FORM OF INCREASED REVENUE

PRODUCT	DESCRIPTION OF BENEFITS	ESTIMATED ANNUAL BUSINESS BENEFITS
<b>Google Search and Ads</b>	Net advertising benefits for advertisers <sup>1</sup>	AU\$31.7 billion
<b>AdSense</b>	Revenue generated by Australian website publishers through AdSense	AU\$196.9 million
	Net advertising benefits for advertisers <sup>1</sup>	AU\$63.9 million
<b>Ad Grants</b>	Amount of free advertising provided by Google to non-profits	AU\$75 million
<b>Google Play</b>	Revenue generated by Australian app developers from Google Play in both domestic and international markets	AU\$639 million
<b>TOTAL ANNUAL BUSINESS BENEFITS IN AUSTRALIA :</b>		<b>AU\$32.7 BILLION</b>

1. Net advertising benefits refer to the additional revenue gained from advertising, less the investment made on the advertising tool.

Note: Figures are estimated based on the latest available annual data, (i.e., in 2019, or where available, more recent data spanning a 12-month period between 2019 and 2020).

Figures may not sum due to rounding.

SOURCE: AlphaBeta analysis

5. The benefits to Ad Grants are in the form of free advertising provided to non-profits (not returns on advertising). They have been included in this section as this amount of free advertising will also lead to increased donor interest and funding for non-profits.

6. This refers to the increase in revenues and sales that can be directly attributed to advertising minus the related advertising expenditure.

## 12 BUSINESS BENEFITS

## BOX 1. BLISS GIFTS &amp; HOMEWARES



**LOCATION: NEW SOUTH WALES**  
**NUMBER OF EMPLOYEES: 12**

Set against the backdrop of 2020's bushfires and a global pandemic, the story of Bliss Gifts & Homewares is one of resilience and an astonishing turnaround from devastation to growth. Located in the regional coastal town of Ulladulla, Bliss Gifts & Homewares is an entirely female owned and operated retail business specialising in unique and high-quality homewares. At the end of 2019, founder and owner, Melissa, was geared up for the summer peak season with half a million dollars worth of stock ready to be sold. As quickly as the peak season started, it was halted with the presence of devastating bushfires hitting the region bringing tourism to a standstill. Like so many small businesses affected by the events of 2020, Melissa was left wondering "how is my business going to survive?". As a traditional brick-and-mortar shop relying mostly on foot traffic, she knew she had to adapt quickly. She always had a hunch that online was the future - now it was necessary for survival.

At the same time, she received an email from her local business chamber inviting small business owners to a Grow with Google virtual training for bushfire impacted regions. With little prior experience in online marketing, Melissa immediately signed up. The training helped her understand the importance of optimising her online presence, and she learnt digital skills like how to activate her free Google Business Profile, Search Engine Optimisation (SEO) and paid Google Search Ads. Leveraging these new skills, Bliss's online presence started to grow.

Against all odds, Melissa has been able to flourish during this period of uncertainty. In the space of a few months she was able to improve the performance of her digital ads and drive a 30:1 ROI on her investment - resulting in a 50% increase in her business' revenue in the wake of the bushfires. Going online helped expand Bliss to reach customers Australia-wide. Melissa was able to hire new staff and move into a bigger warehouse (that they're already outgrowing!). Today, 90% of her sales come from digital channels and in Melissa's words, "online is our home now".

## BOX 2. ELRACO DISTRIBUTORS



**LOCATION: SOUTH AUSTRALIA**  
**NUMBER OF EMPLOYEES: 2**

Started by brothers Errol and Ray Weber in 1985, Elraco Distributors is a family owned business that supplies hardware to the vibrant furniture and cabinet manufacturing industry in South Australia. Wanting to expand their reach to service customers nationally, Errol and Ray set up their online store ([hardware.net.au](http://hardware.net.au)) and have not looked back. Not only did their online presence mean they could reach Aussies nationwide, it also helped them broaden their audience to include furniture for schools, local city councils, government departments, and direct consumers who enjoy DIY (do-it-yourself) work.<sup>7</sup> Thanks to its online hardware store, customers can place orders and arrange delivery on its website at any time - without having to only conduct such transactions during the operating hours of its physical store.

When the COVID-19 pandemic hit, Elraco knew it had to shift its focus to online sales to sustain its business. Errol and Ray set out to optimise their existing Google Ads campaigns, which resulted in a 25% lift in the visibility of their ads and more online sales from their website. After the success of the campaigns, Elraco decided to increase its investment in digital advertising by 53% to further scale its campaigns and generate more revenue from online channels.

7. Elraco Distributors (2020), "About Elraco Distributors." Available at: [https://elraco.com.au/?page\\_id=1360](https://elraco.com.au/?page_id=1360)

## 14 BUSINESS BENEFITS

Many businesses have combined Google's search advertising with other forms of advertising such as video advertisements on **YouTube** to connect with more customers through engaging and memorable content on the video sharing platform. Box 3 shows an example of an Australian business that has made effective use of YouTube to boost customer outreach.

Beyond search and video advertising, Australian businesses also benefit from displaying advertisements on Google's network of publisher sites such as websites, blogs, and forums through **AdSense**. These net returns are estimated at AU\$63.9 million annually. In addition, Google provides new sources of income for content creators in Australia. By allowing content creators such as online journalists, media sites, bloggers and writers to earn income by hosting advertisements on their websites, AdSense helps these individuals monetise space on their websites, and is estimated to generate a total annual income of AU\$196.9 million to content creators in Australia.

By allowing companies to establish a strong online presence through online business listings that show up prominently on the relevant search results of customers in the vicinity, the **Google My Business** feature on Google Maps allows Australian businesses to be discovered by a larger range of customers. Box 4 illustrates an example of a local tourism business in Queensland which reached new customers during the COVID-19 pandemic by making use of Google My Business.

Google also supports organisations in the non-profit sector in Australia through **Ad Grants**, a programme that provides in-kind advertising to eligible non-profit organisations. Ad Grant recipients can leverage ads on Google Search result pages to promote their organisation, recruit volunteers, and attract donors. Since 2019, the Google Ad Grants program has provided non-profits in Australia with over AU\$75 million worth of free search ads.

In addition, Google's digital product distribution system, **Google Play**, as well as its operating system, **Android**, have resulted in a variety of benefits to app developers in the country. App developers are estimated to earn an annual income of about AU\$639 million from Google Play in both the domestic and global markets.<sup>8</sup> Further, through the Android operating system, app developers in Australia can readily reach more than 1 billion users globally.<sup>9</sup> It was additionally found that Android app developers can save up to 25 percent in development time from not having to port their apps across different operating systems.<sup>10</sup>

In addition, Google has made significant investments of more than US\$2 billion in **network infrastructure** to help improve the capacity of network services in the Asia Pacific (APAC) region, including Australia. These investments have provided huge boosts to overall economic activity and digital connectivity. Box 5 shows the impact of Google's network infrastructure investments on Australian businesses.

8. Google Play is a digital distribution service operated and developed by Google. It serves as the official app store for the Android operating system, which refers to the mobile operating system developed by Google for touchscreen mobile devices such as smartphones and tablets. Google Play users are able to browse and download applications developed with the Android software development kit.

9. AlphaBeta (2018), "AlphaBeta research brief: The estimated economic impact from Android across five Asian markets".

Available at: <https://www.alphabeta.com/wp-content/uploads/2017/08/180820-Android-Economic-Impact.pdf>

10. AlphaBeta (2018), "AlphaBeta research brief: The estimated economic impact from Android across five Asian markets".

Available at: <https://www.alphabeta.com/wp-content/uploads/2017/08/180820-Android-Economic-Impact.pdf>

## BOX 3. ONLINE AUTO PARTS



**LOCATION: QUEENSLAND**  
**NUMBER OF EMPLOYEES: 24**

Online Auto Parts is a 14-year-old business based in Queensland that innovated the traditional automotive parts industry by delivering products directly from the manufacturers to customers. Wanting to reach Aussies nationwide, they used Google Search Ads and Google Shopping, which helped customers to search for, visually explore, and buy their auto parts online. Having hit their sales goals with Google Search and Shopping Ads, they wanted to keep growing. To help reach more customers and capture more demand, they turned to YouTube.

Within a period of three months, they created three different YouTube campaigns to test which ad format, creative message and audience yielded the best results. Within a quarter, their campaigns drove 50% more conversions, like making an online purchase after viewing a video ad, and a 70% lift in sales revenue.

## BOX 4. WALKABOUT CULTURAL ADVENTURES



**LOCATION: QUEENSLAND**  
**NUMBER OF EMPLOYEES: 3**

Based in the Port Douglas Daintree region, Walkabout Cultural Adventures provides cultural tours within Kuku Yalanji country, focusing on Aboriginal culture, significant sites, environmental information and local attractions. Its founder, Juan Walker, has been guiding in the region for 19 years, and prides himself on providing a unique and personalised experience to his customers.

When the COVID-19 pandemic brought international travel to a standstill, Queensland's tourism industry was badly hit, and Juan knew he had to find ways to reach new customers. By updating important tour information to his free Google Business Profile and adding a feature to enable customers to buy tour tickets directly from the Google Search page, he was able to attract the attention of Aussies looking to explore their own backyard.

Walkabout Cultural Adventures is just one of the 1.3 million Australian businesses that have managed to stay connected to their customers through the use of free and paid Google tools.

## BOX 5. GOOGLE'S NETWORK INFRASTRUCTURE INVESTMENTS IN AUSTRALIA



By improving the capacity of network services, network infrastructure investments enable faster data transfers and greater efficiency in the operation of Google's applications, allowing business users to seamlessly deliver their services to customers around the globe. With the addition of submarine cables and edge infrastructure such as the trans-Pacific undersea fibre cable, businesses are able to benefit from connectivity improvements including faster end-user speeds and lower international connectivity costs.

A recent study found that by allowing for increased business activity through higher rates of Internet use, Google's investments in network, submarine cables and edge infrastructure in APAC collectively contributed a total US\$30 billion (AU\$42 billion) to Australia's GDP cumulatively from 2010 to 2019.<sup>11</sup> The study also found that Google's network infrastructure investment spurred job creation through two channels: direct job creation in the construction and telecommunications sectors, and indirect job creation facilitated by the improvement of broadband connectivity (especially in the IT, financial services and manufacturing sectors). The same study estimated that a total of 18,000 jobs were created as a result of Google's network investments in Australia in 2019.<sup>12</sup>

11. Analysys Mason (2020), *Economic impact of Google's APAC network infrastructure – Focus on Australia*. Available at: <https://www.analysysmason.com/consulting-redirect/reports/impact-of-google-network-APAC-2020/>

12. Analysys Mason (2020), *Economic impact of Google's APAC network infrastructure – Focus on Australia*. Available at: <https://www.analysysmason.com/consulting-redirect/reports/impact-of-google-network-APAC-2020/>

## 1.2 GOOGLE HELPS AUSTRALIAN BUSINESSES SAVE TIME AND ENHANCE PRODUCTIVITY

Google helps businesses save time by enhancing employees' productivity through improving the speed and ease of access of employees to information and research, and helping workers optimise their work journeys.

**Google Maps** supports businesses in the transport sector by providing free access to route planning and optimisation, allowing them to optimise their trips. In Australia, each transport business is estimated to save about 272 hours per year by making use of Google Maps to plan their journeys. This is equivalent to the total benefits of AU\$1.7 billion based on annual wages.

Meanwhile, **Google Search** minimises the time and costs for businesses to acquire information by arranging and simplifying the vast array of content on the internet. The ability to rapidly find relevant data and information provides tremendous productivity and time-saving benefits. It is estimated that Google Search helps each worker save about 46 hours - or 1.9 full days - per year on average. The total annual business benefits of Google Search are estimated at AU\$4.6 billion.

Exhibit 3 summarises the annual amount of time saved and the value of time savings (in wage terms) provided by Google Maps and Google Search to Australian businesses.

### EXHIBIT 3:

### GOOGLE SEARCH AND GOOGLE MAPS HELP BUSINESSES SAVE TIME, BRINGING ABOUT AN ESTIMATED ANNUAL ECONOMIC BENEFIT WORTH AU\$6.3 BILLION

#### ESTIMATED ANNUAL TIME SAVINGS OF GOOGLE SEARCH AND GOOGLE MAPS IN AUSTRALIA HOURS OF SAVED TIME AND EQUIVALENT VALUE IN WAGE TERMS

PRODUCT	TIME SAVED PER USER	BENEFITS PER USER	TOTAL BENEFITS
Google Search	46 hours per employee	AU\$1,400 per employee	AU\$4.6 billion
Google Maps	272 hours per transport business	AU\$8,800 per transport business	AU\$1.7 billion
TOTAL:			AU\$6.3 BILLION

Note: Figures are estimated based on the latest available annual data, (i.e., in 2019, or where available, more recent data spanning a 12-month period between 2019 and 2020).  
SOURCE: AlphaBeta analysis

# 1.3 97% OF GOOGLE'S BUSINESS BENEFITS GO TO NON-TECHNOLOGY SECTORS

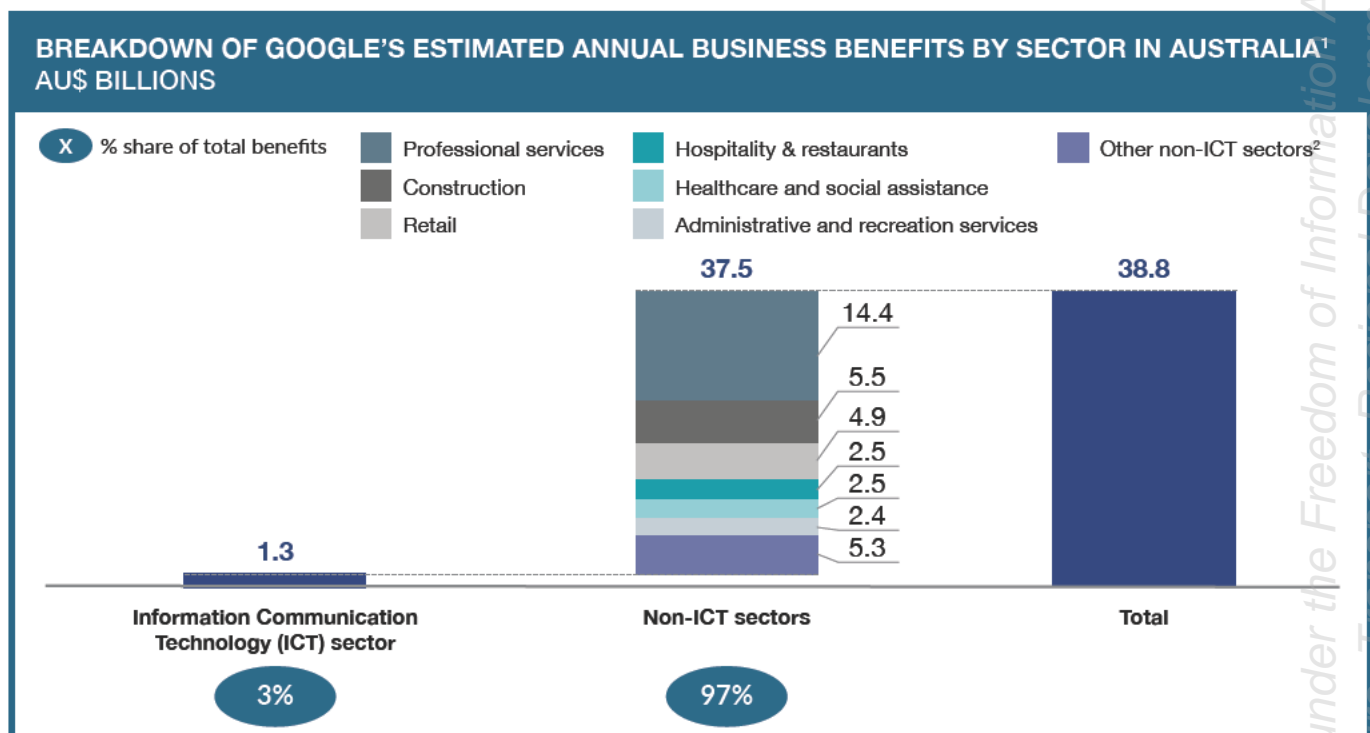
Contrary to common belief that digital products and services are likely to benefit digital or tech industries most, a substantial share of Google's business benefits - at 97 percent - is in fact estimated to be experienced by businesses in non-digital sectors. Indeed, the professional and financial services sectors account for the largest share of the total business benefits, at AU\$14.4 billion out of the total AU\$38.8 billion (37 percent), followed by the construction and retail sectors.<sup>13</sup> Other sectors such as hospitality and

restaurants as well as healthcare and social assistance also derive significant benefits from Google's applications and services, at between AU\$2.4 billion and AU\$5.5 billion per year (Exhibit 4).

Boxes 6 and 7 illustrate how two small Australian businesses in the healthcare sector have gained significant benefits from using Google's advertising products.

## EXHIBIT 4:

### 97% OF GOOGLE'S BUSINESS BENEFITS GO TO BUSINESSES IN NON-TECHNOLOGY SECTORS



1. This excludes revenue gained by website publishers who use AdSense as it may comprise freelancers and individuals who publish websites recreationally, and thus do not fall under any formal industry sector.

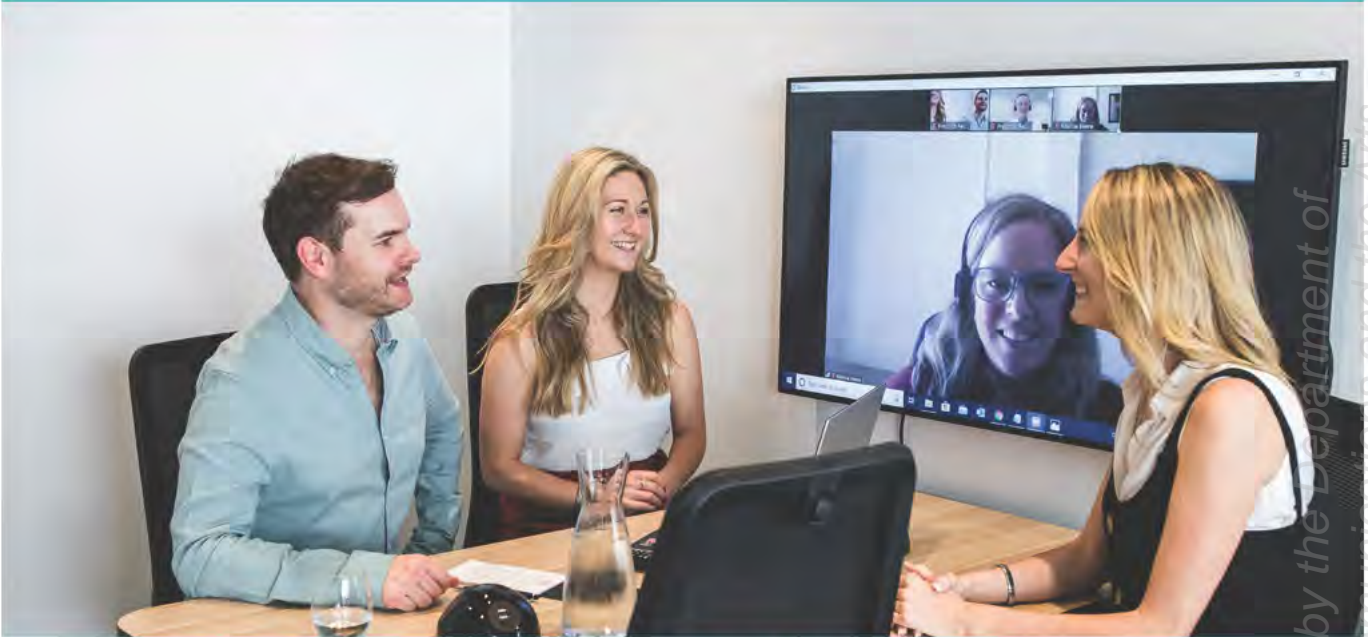
2. Other non-ICT sectors include Agriculture, Mining, Manufacturing, Utilities, Transport services.

Note: Figures are estimated based on the latest available annual data, (i.e., in 2019, or where available, more recent data spanning a 12-month period between 2019 and 2020). Figures may not sum due to rounding.

SOURCE: AlphaBeta analysis

13. This excludes revenue gained by website publishers who use AdSense as it may comprise freelancers and individuals who publish websites recreationally, and thus do not fall under any formal industry sector.

## BOX 6. PRESCRIPT RECRUITMENT



**LOCATIONS: NEW SOUTH WALES, VICTORIA, AND SOUTH AUSTRALIA**  
**NUMBER OF EMPLOYEES: 9**

Prescript is a medical recruitment company with a mission - fix the doctor shortage in regional and remote Australia. By placing doctors in locations where their expertise is most needed, Prescript has brought about an immeasurable difference to those communities.

Attracting doctors to regional and remote areas is a challenging task. Prescript must help potential doctors understand and visualise their lifestyle in the new town and connect with the community there. One of the main difficulties Prescript faced was generating interest from doctors in the vacant medical positions. To solve this, James, Prescript's founder, and his marketing manager decided to use Google Ads to reach more doctors directly.

Google Ads has delivered the highest conversion rate out of all other channels at 4.27%, helping Prescript attract more doctors to remote areas with doctor shortages and drive revenue growth. In addition, Prescript used publicly available online data to get more specific in serving doctors' needs. Making use of the intelligence provided by Google Trends around what doctors were searching for, Prescript was able to create online resources such as blogs and survey information that helped doctors with their research and exploration.

## BOX 7. PERTH PODIATRIC SURGERY



**LOCATION: WESTERN AUSTRALIA**  
**NUMBER OF EMPLOYEES: 7**

Established in 2015, Perth Podiatric Surgery is a specialist podiatry practice providing patients with on-the-spot diagnosis and a range of treatment approaches for foot and ankle conditions. They are the premiere provider of keyhole bunion surgery in Western Australia and have a second clinic dedicated to this procedure in Brisbane.

After COVID-19 led to a mandatory closure of the business during March and April 2020, Perth Podiatric Surgery decided to use the downtime to re-design their Google Ads set-up so that they could optimise returns on their advertising spend the moment the restrictions were lifted. The business was able to reopen in early May, and they saw a 350% lift in revenue-driving actions like appointment bookings, online from enquiries and phone calls, compared to the two months prior. These significant improvements in their digital advertising helped them to quickly get back on track. Following the success of their strategy in Perth, they have decided to adopt a similar approach to optimising the digital advertising of their Brisbane-based business.

## 22 BUSINESS BENEFITS

# 1.4 60% OF GOOGLE'S BUSINESS BENEFITS GO TO SMALL AND MEDIUM-SIZED ENTERPRISES

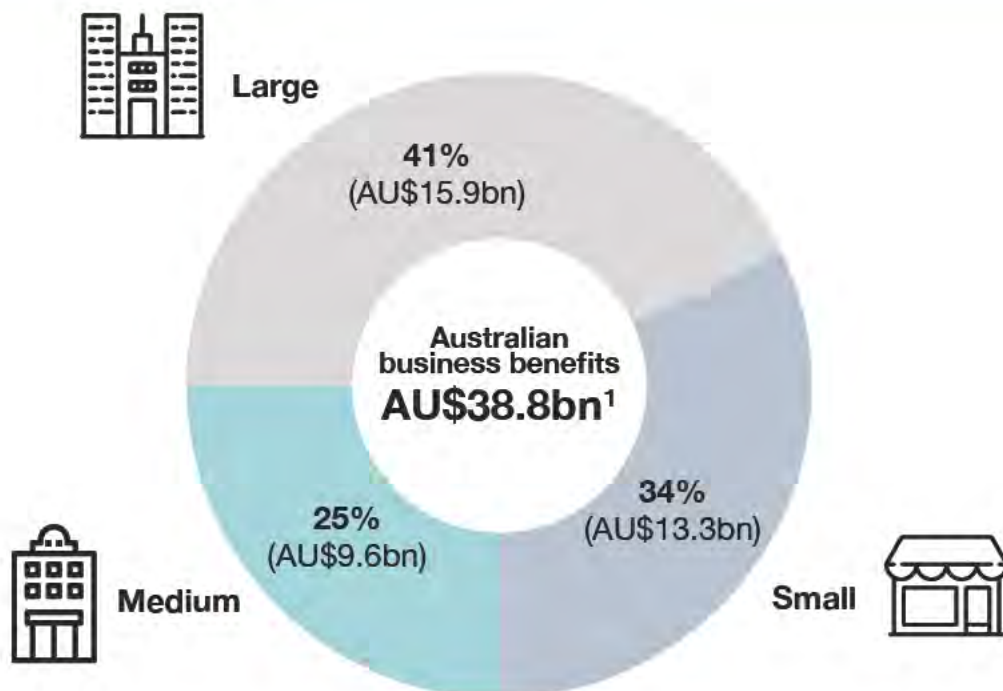
Google's applications are especially useful in helping micro, small and medium-sized enterprises (MSMEs) overcome barriers and reach new customers. Search advertising through **Google Ads** is a cost-effective tool for MSMEs that lack the scale and resources to run large marketing campaigns on traditional media such as television, radio and newspapers.

Meanwhile, **Google Search** enables MSMEs and self-employed entrepreneurs to find information on market trends and competitors to identify new growth opportunities at no cost. Taken together, the benefits realised by Australian MSMEs account for almost 60 percent of the total Google's business benefits in the country (Exhibit 5).

## EXHIBIT 5:

### ABOUT 60% OF BUSINESS BENEFITS DERIVED FROM GOOGLE PLATFORMS IN AUSTRALIA ARE DERIVED BY SMALL AND MEDIUM-SIZED BUSINESSES

% OF ANNUAL BUSINESS BENEFITS DERIVED FROM GOOGLE, BY SIZE OF BUSINESS



1. This value differs slightly from the total estimated business benefits of AU\$39 billion, as it excludes revenue gained by website publishers who use AdSense, many of whom are likely to be freelancers and individuals who do so recreationally, and thus do not belong to a formal business.

Note: Figures are estimated based on the latest available annual data, (i.e., in 2019, or where available, more recent data spanning a 12-month period between 2019 and 2020). Figures may not sum due to rounding.

SOURCE: AlphaBeta analysis

# 1.5 BEYOND THE 1,800 PEOPLE EMPLOYED BY GOOGLE IN AUSTRALIA, 116,200 JOBS IN THE WIDER ECONOMY ARE DIRECTLY SUPPORTED AND A FURTHER 162,700 JOBS ARE INDIRECTLY SUPPORTED

Beyond the 1,800 people employed by Google in Australia, the company directly supports another 116,200 jobs in the wider economy through the use of their products, and indirectly a further 162,700 jobs in the supply chains of companies that use their products (Exhibit 6).<sup>14</sup>

Through the use of Google products that lead to businesses expanding their customer bases and increasing revenue, the company directly supports an estimated 116,200 jobs in the wider economy.<sup>15</sup> For instance, businesses that expand their reach to new markets through Google's services like Google Ads and AdSense would require increased hiring to meet this additional demand. Further, new revenue streams generated via Google Play for app development companies can lead to businesses willing to hire more to expand their operations. Over two-thirds of these 116,200 jobs - at 79,200 jobs - are estimated to have been created in small and medium businesses (Exhibit 7).<sup>16</sup>

In addition, a further 162,700 jobs could be supported indirectly in the supply chain due to increased demand from businesses that use Google products.<sup>17</sup> These are jobs that get created in companies or industries which support those that have achieved business expansion due to the use of Google products. For instance, an online retail company that is able to access more customers through the use of Google Ads or by



establishing a free Business Profile on Google would need to increase its demand for raw materials or supplies, in order to produce more goods to meet greater customer demand. This increased demand for materials and supplies would in turn lead to increased hiring needs within those companies to meet the higher demand.

14. AlphaBeta (2019), Google economic impact: Australia 2019. Available at: [https://alphabeta.com/wp-content/uploads/2019/09/ab006\\_google\\_business\\_web-1.pdf](https://alphabeta.com/wp-content/uploads/2019/09/ab006_google_business_web-1.pdf)

15. AlphaBeta (2019), Google economic impact: Australia 2019. Available at: [https://alphabeta.com/wp-content/uploads/2019/09/ab006\\_google\\_business\\_web-1.pdf](https://alphabeta.com/wp-content/uploads/2019/09/ab006_google_business_web-1.pdf)

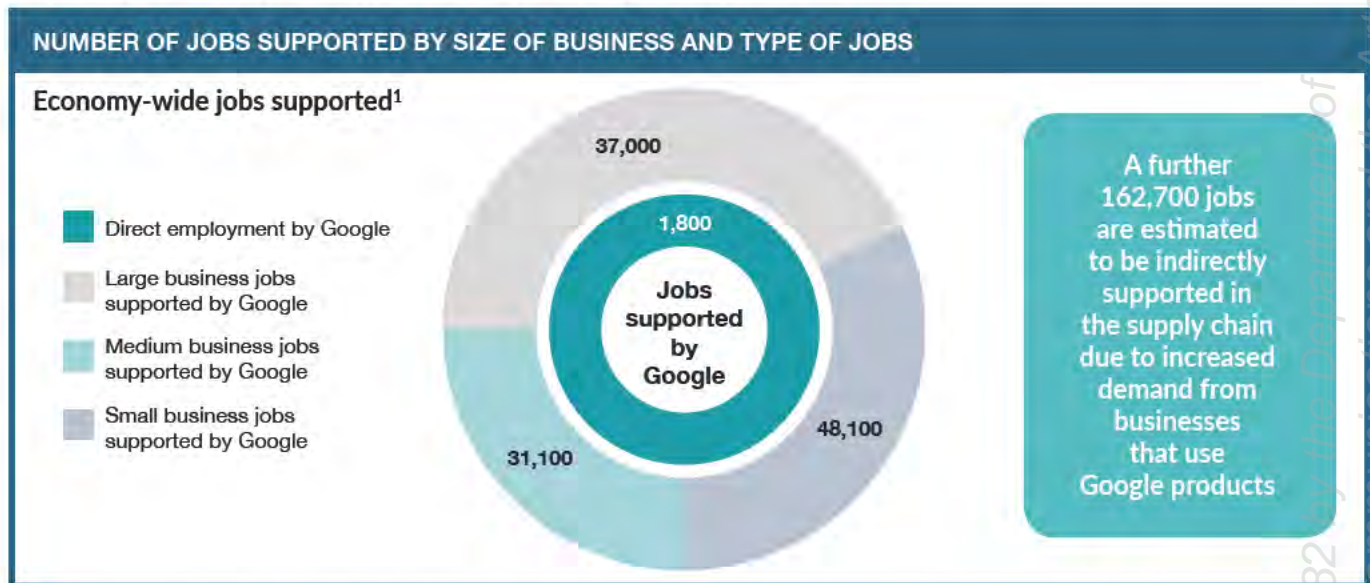
16. AlphaBeta (2019), Google economic impact: Australia 2019. Available at: [https://alphabeta.com/wp-content/uploads/2019/09/ab006\\_google\\_business\\_web-1.pdf](https://alphabeta.com/wp-content/uploads/2019/09/ab006_google_business_web-1.pdf)

17. Based on 2020 research by AlphaBeta (unpublished).

## 24 BUSINESS BENEFITS

**EXHIBIT 6:**

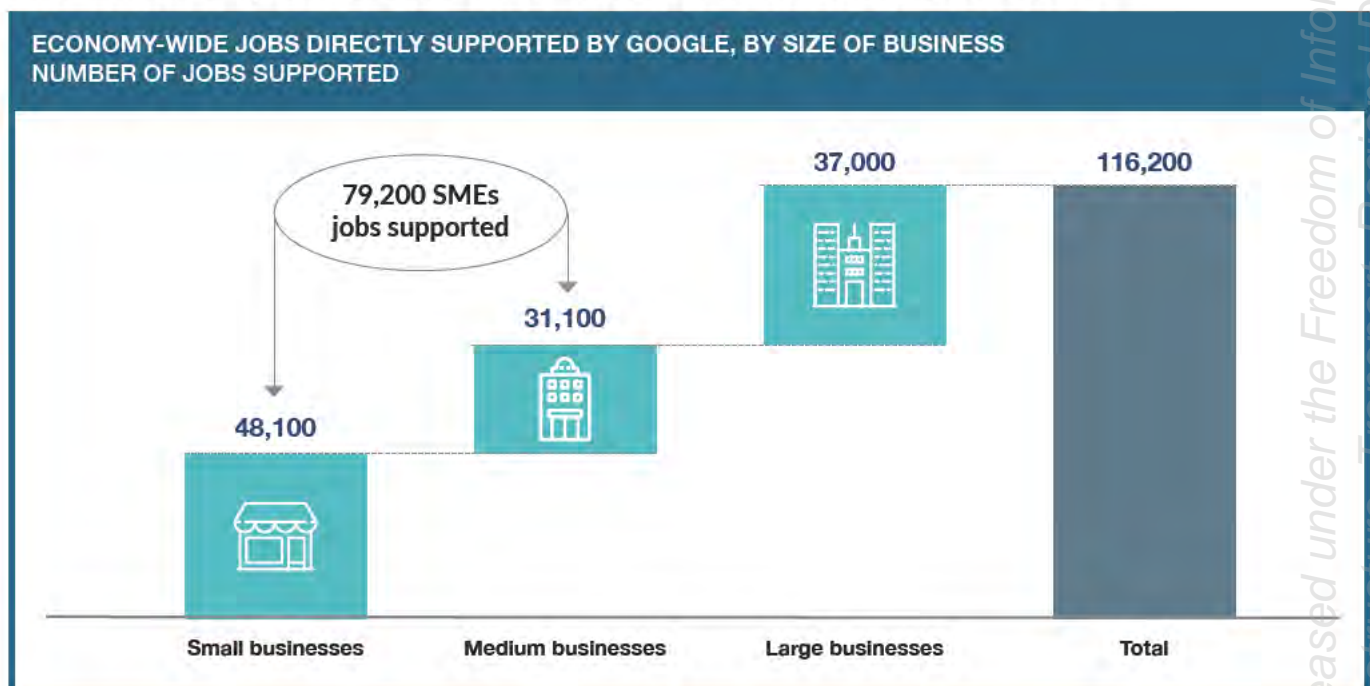
**BEYOND THE 1,800 PEOPLE EMPLOYED BY GOOGLE IN AUSTRALIA, 116,200 JOBS IN THE WIDER ECONOMY ARE DIRECTLY SUPPORTED AND A FURTHER 162,700 JOBS ARE INDIRECTLY SUPPORTED THROUGH THE USE OF THEIR PRODUCTS**



1. Jobs supported refer to new jobs that may have been created through a business' use of Google's platforms, as well as ongoing employment of jobs that previously existed.  
 SOURCE: AlphaBeta (2019), Google economic impact: Australia 2019. Available at: [https://alphabeta.com/wp-content/uploads/2019/09/ab006\\_google\\_business\\_web-1.pdf](https://alphabeta.com/wp-content/uploads/2019/09/ab006_google_business_web-1.pdf)

**EXHIBIT 7:**

**GOOGLE DIRECTLY SUPPORTS 116,200 JOBS IN AUSTRALIA, OF WHICH OVER TWO-THIRDS (79,200) ARE JOBS IN SMALL AND MEDIUM SIZED BUSINESSES**



SOURCE: AlphaBeta (2019), Google economic impact: Australia 2019. Available at: [https://alphabeta.com/wp-content/uploads/2019/09/ab006\\_google\\_business\\_web-1.pdf](https://alphabeta.com/wp-content/uploads/2019/09/ab006_google_business_web-1.pdf)

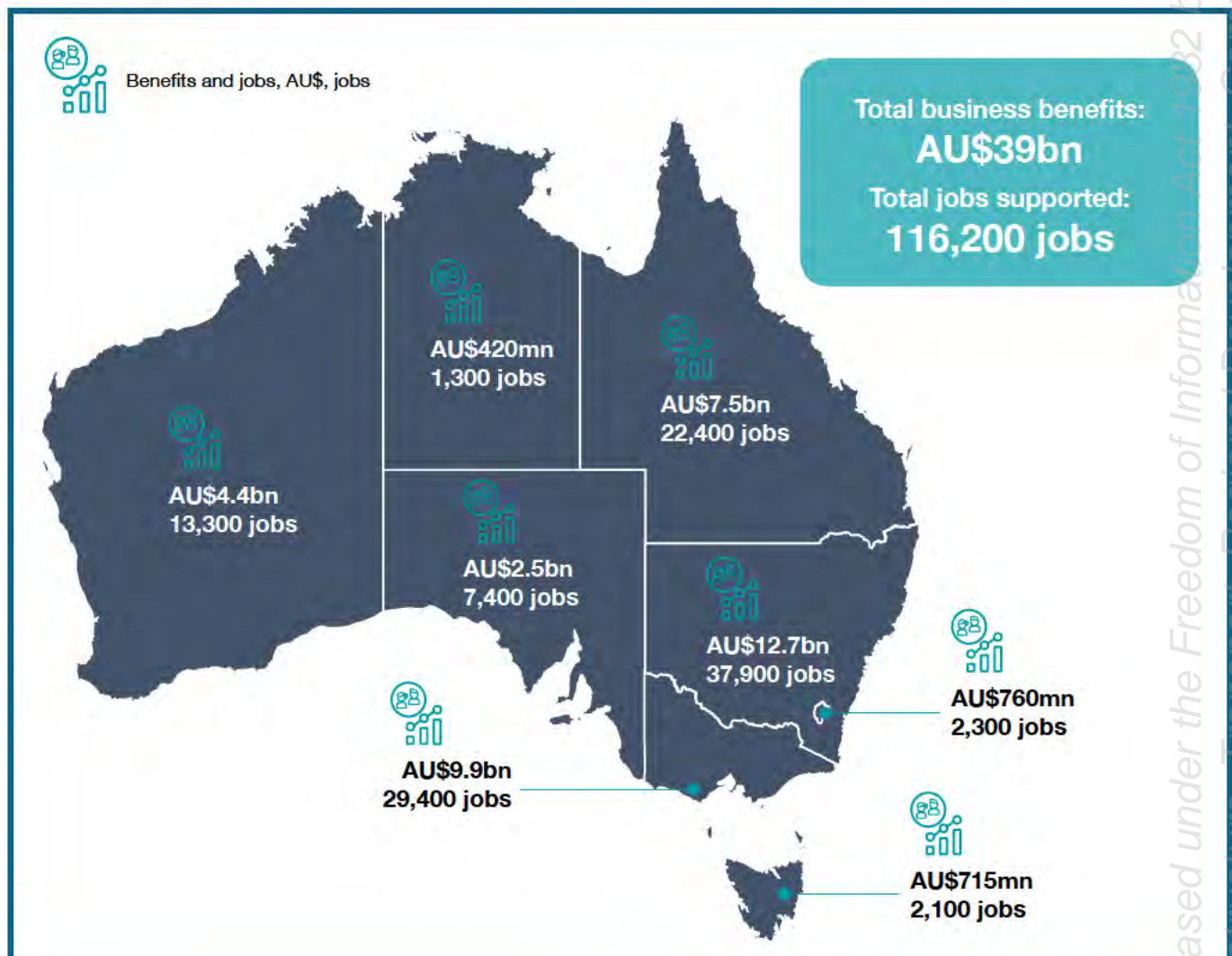
## 1.6 GOOGLE'S BUSINESS BENEFITS AND JOB IMPACTS ARE DISTRIBUTED ACROSS ALL STATES AND TERRITORIES

The benefits of Google's applications and services in terms of increased revenue, time savings, as well as job impact are distributed across all states and territories in Australia. These benefits range from AU\$420 million

and 1,300 jobs in Northern Territory to AU\$12.7 billion and 37,900 jobs in New South Wales. The regional breakdown of Google's total annual business benefits and direct job creation effects are shown in Exhibit 8.

### EXHIBIT 8:

#### GOOGLE'S BENEFITS ARE GENERATED ACROSS ALL STATES AND TERRITORIES IN AUSTRALIA



Note: Figures are estimated based on the latest available annual data, (i.e., in 2019, or where available, more recent data spanning a 12-month period between 2019 and 2020). Figures may not sum due to rounding.

SOURCE: AlphaBeta (2019), Google economic impact: Australia 2019. Available at: [https://alphabeta.com/wp-content/uploads/2019/09/ab006\\_google\\_business\\_web-1.pdf](https://alphabeta.com/wp-content/uploads/2019/09/ab006_google_business_web-1.pdf)

# CONSUMER BENEFITS

Released under the Freedom of Information Act

Consumers in Australia benefit from Google's applications through improved access to information, entertainment and enrichment, as well as increased productivity and convenience in their everyday lives. Taken together, Google Search, Google Maps, Google Play, Drive, Photos, Docs and Sheets are estimated to bring about total annual consumer benefits worth AU\$14 billion.<sup>18</sup> In addition, Google Search and Google Maps also bring about significant time savings to Australians. The average Australian user is estimated to save 4.9 days per year through the use of Google Search to find information. Thanks to the trip optimisation feature of Google Maps, the average user of this service in the country is estimated to spend 5.6 hours less travelling on roads each year.

18. This utilises the economic "consumer surplus" concept. Referring to the price the consumer is willing to pay for a product or service and the price that he or she actually pays, this concept is used in economic analysis to reflect the amount of utility that consumers receive from the product or service. Estimates of consumer surplus are based on latest available data (i.e., in 2019, or where available, more recent data spanning a 12-month period between 2019 and 2020). See Appendix for detailed methodology

## 28 CONSUMER BENEFITS

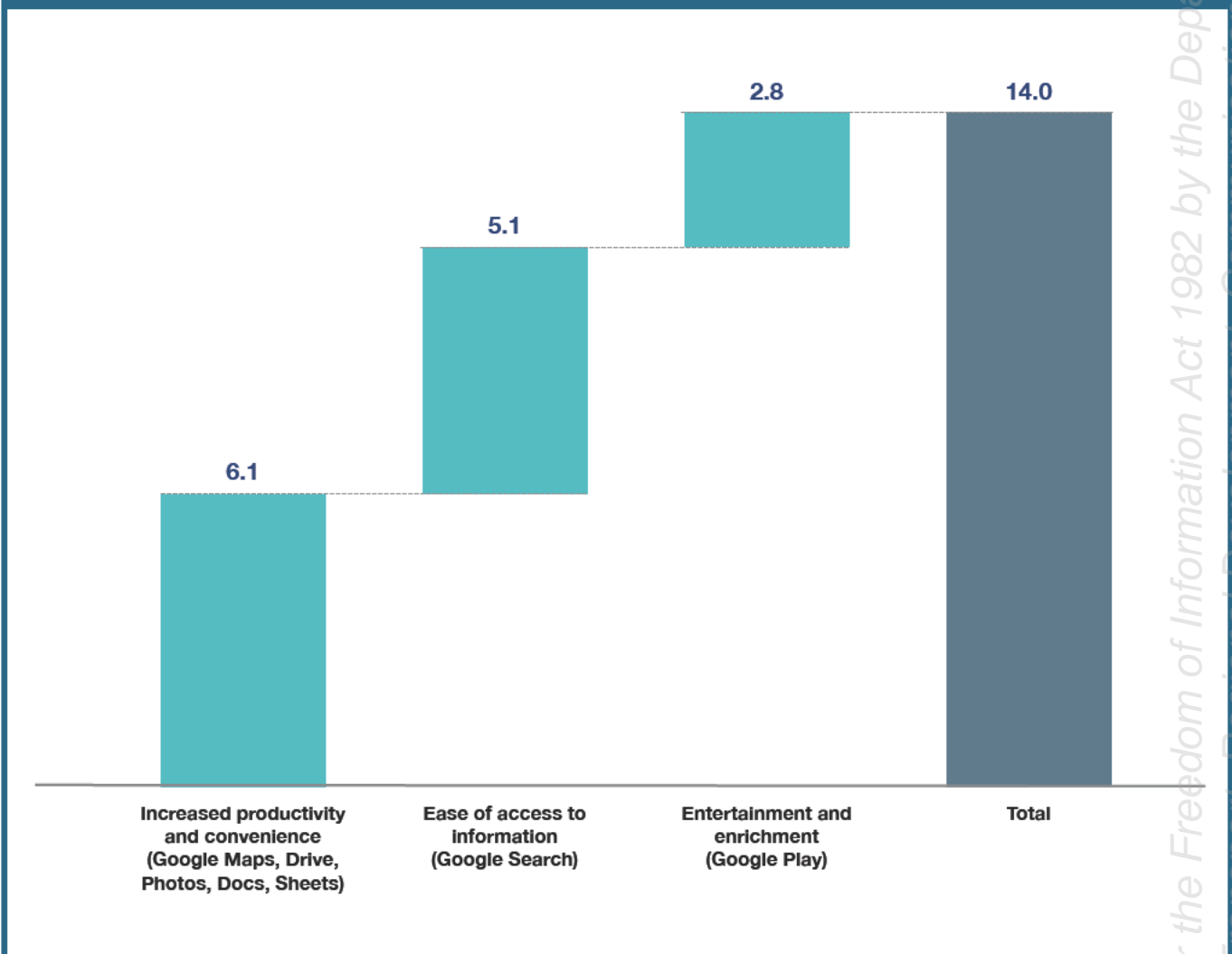
The consumer benefits supported by Google's applications come in the form of improved access to information, entertainment and enrichment, as well as increased productivity and convenience in the everyday

lives of Australians. Exhibit 9 reflects the distribution of these benefits across the different types of benefits and applications.

### EXHIBIT 9:

### GOOGLE IS ESTIMATED TO BRING A TOTAL OF AU\$14 BILLION WORTH OF CONSUMER BENEFITS TO AUSTRALIAN CONSUMERS ANNUALLY

**BREAKDOWN OF ANNUAL BENEFITS FROM THE USE OF GOOGLE PRODUCTS TO CONSUMERS IN AUSTRALIA**  
AU\$ BILLIONS<sup>1</sup>



1. Figures may not sum due to rounding.

Note: Figures are estimated based on the latest available annual data, (i.e., in 2019, or where available, more recent data spanning a 12-month period between 2019 and 2020).

SOURCE: AlphaBeta analysis

## 2.1 CONSUMERS DERIVE A TOTAL BENEFIT OF AU\$14 BILLION FROM GOOGLE'S SERVICES EACH YEAR

The consumer benefits supported by Google are challenging to measure in monetary terms because individuals typically do not pay for the services, meaning there is no ready price proxy for the value they place on these services. In the absence of price indicators, the economic "willingness to pay" principle was adopted to estimate the value of consumer benefits by asking individuals how much they value specific services – also known as consumer surplus. Taken together, the total value placed by consumers on Google's services (including Google Search, Google Play, Google Maps, Drive, Photos, Docs and Sheets) – which takes into account their perceived functionality and ease of using

these products – is estimated at more than AU\$14 billion per year.

Exhibit 10 provides a breakdown of the total consumer surplus by type of benefits. An estimated AU\$6.1 million worth of consumer surplus is derived from products that increase productivity and convenience for consumers, including Google Maps, Drive, Photos, Docs, and Sheets. The total consumer surplus supported by Google Search amounts to AU\$5.1 billion per year. Meanwhile, Google Play, which brings consumers access to a range of smartphone applications, digital books, music and films, bring about an annual benefit worth AU\$2.8 billion.

### EXHIBIT 10:

### GOOGLE'S PRODUCTS BRING ABOUT INCREASED ACCESS TO INFORMATION, MORE OPTIONS FOR ENTERTAINMENT AND ENRICHMENT, AND IMPROVED CONVENIENCE TO CONSUMERS

**ESTIMATED ANNUAL CONSUMER BENEFITS FROM GOOGLE PRODUCTS IN AUSTRALIA**  
CONSUMER SURPLUS (AU\$)

TYPE OF BENEFITS	PRODUCT	ANNUAL CONSUMER BENEFITS
Ease of access to information	Google Search	AU\$5.1 billion
Entertainment and enrichment	Google Play	AU\$2.8 billion
Increased productivity and convenience	Google Maps	AU\$6.1 billion
	Google Drive, Photos, Docs and Sheets	
TOTAL ANNUAL CONSUMER BENEFITS:		AU\$14 BILLION

Note: Figures are estimated based on the latest available annual data, (i.e., in 2019, or where available, more recent data spanning a 12-month period between 2019 and 2020). Figures may not sum due to rounding.

SOURCE: AlphaBeta analysis

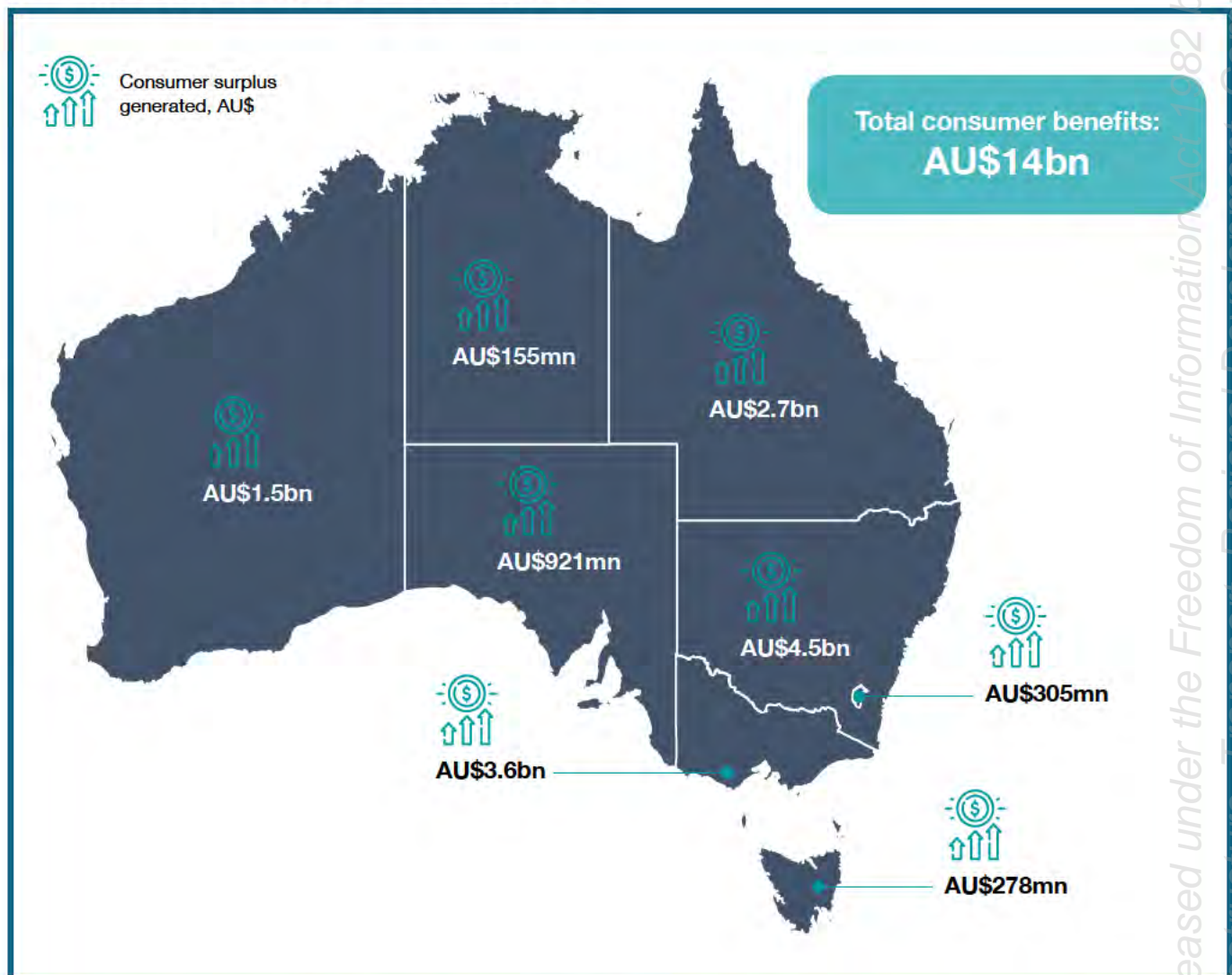
## 2.2 CONSUMER BENEFITS ARE DISTRIBUTED ACROSS ALL STATES AND TERRITORIES

The consumer benefits brought about by Google's services are distributed across all states and territories. These benefits are estimated to range from AU\$155 million in Northern Territory to AU\$4.5 billion in New

South Wales. Exhibit 11 shows the regional breakdown of the total annual consumer surplus realised by Australian consumers.

### EXHIBIT 11:

### CONSUMER BENEFITS FROM GOOGLE'S PRODUCTS ARE EXPERIENCED IN ALL STATES AND TERRITORIES IN AUSTRALIA



Note: Figures are estimated based on the latest available annual data, (i.e., in 2019, or where available, more recent data spanning a 12-month period between 2019 and 2020). Figures may not sum due to rounding.

SOURCE: AlphaBeta Analysis

## 2.3 GOOGLE HELPS AUSTRALIAN CONSUMERS SAVE TIME

Google's services also help Australian consumers boost productivity and save time in their everyday lives. As compared to offline methods of seeking out information, it is estimated that **Google Search** brings about a significant time saving of 4.9 full days to the average user in Australia each year. This is equivalent to over 118 hours that is freed up for other activities.

**Google Maps** also brings about greater convenience in the personal commuting and driving journeys of

Australian citizens through the service's wayfinding and navigation features. Such features optimise these trips using real-time data such as public transport arrival times and road traffic conditions. Thanks to such features, the average Google Maps user in Australia saves about 5.6 hours per year on the roads (Exhibit 12). Note that these time savings differ from those estimated in the business benefits section, as these relate to savings gained on non-work activities (e.g., using Google Search to find information for leisure purposes, and using Google Maps for personal trips).

### EXHIBIT 12:

### GOOGLE'S APPLICATIONS LIKE GOOGLE SEARCH AND GOOGLE MAPS BRING CONVENIENCE TO CONSUMERS BY HELPING THEM SAVE TIME

**ESTIMATED ANNUAL TIME SAVINGS OF GOOGLE SEARCH AND GOOGLE MAPS TO CONSUMERS**  
(AMOUNT OF TIME SAVED PER YEAR)

PRODUCT	 ANNUAL TIME SAVINGS PER USER <sup>1</sup>
Google Search	4.9 days per year
Google Maps	5.6 hours per year

1. These time savings differ from those estimated in the business benefits section, as these relate to savings gained on non-work activities (e.g., using Google Search to find information for leisure purposes, and using Google Maps for personal trips).

Note: Figures are estimated based on the latest available annual data, (i.e., in 2019, or where available, more recent data spanning a 12-month period between 2019 and 2020).

Figures may not sum due to rounding.

SOURCE: AlphaBeta analysis

# APPENDIX: METHODOLOGY

# SIZING GOOGLE'S ECONOMIC IMPACT IN AUSTRALIA

To estimate the benefits of Google's products to businesses, the economic value generated by businesses that use Google's applications and services was calculated. These are in the form of increased revenue (through increased customer outreach and access to new markets), as well as improved productivity (through time savings). The Google applications and services included in this analysis of business benefits include: Google Search, Google Ads, AdSense, Google Maps, and Google Play.

Estimating the consumer benefits supported by Google is a challenging task. This is because individuals typically do not have to pay for the Google's applications and services that they use. There are several established methodologies for estimating the benefits of free services, including consumer surplus based on the consumer's willingness to pay (how much

an individual values a Google's application or service) and value of time (how much time an individual saves by using a Google's application or service). This report uses both methods. Primary data used in the analysis was collected from a consumer survey of 535 internet users in Australia. This sample size is statistically significant based on Australia's online population, at a 95 percent confidence level (the level typically adopted by researchers). The survey was conducted online, which was deemed suitable given the intention to survey internet users. The sample was also checked for its representativeness of Australia's internet population based on demographic variables including age, income level, and the geographical location of respondents. The Google applications and services included in this analysis of consumer benefits include: Google Search, Google Maps, Google Play, Drive, Photos, Docs, and Sheets.

## BUSINESS BENEFITS

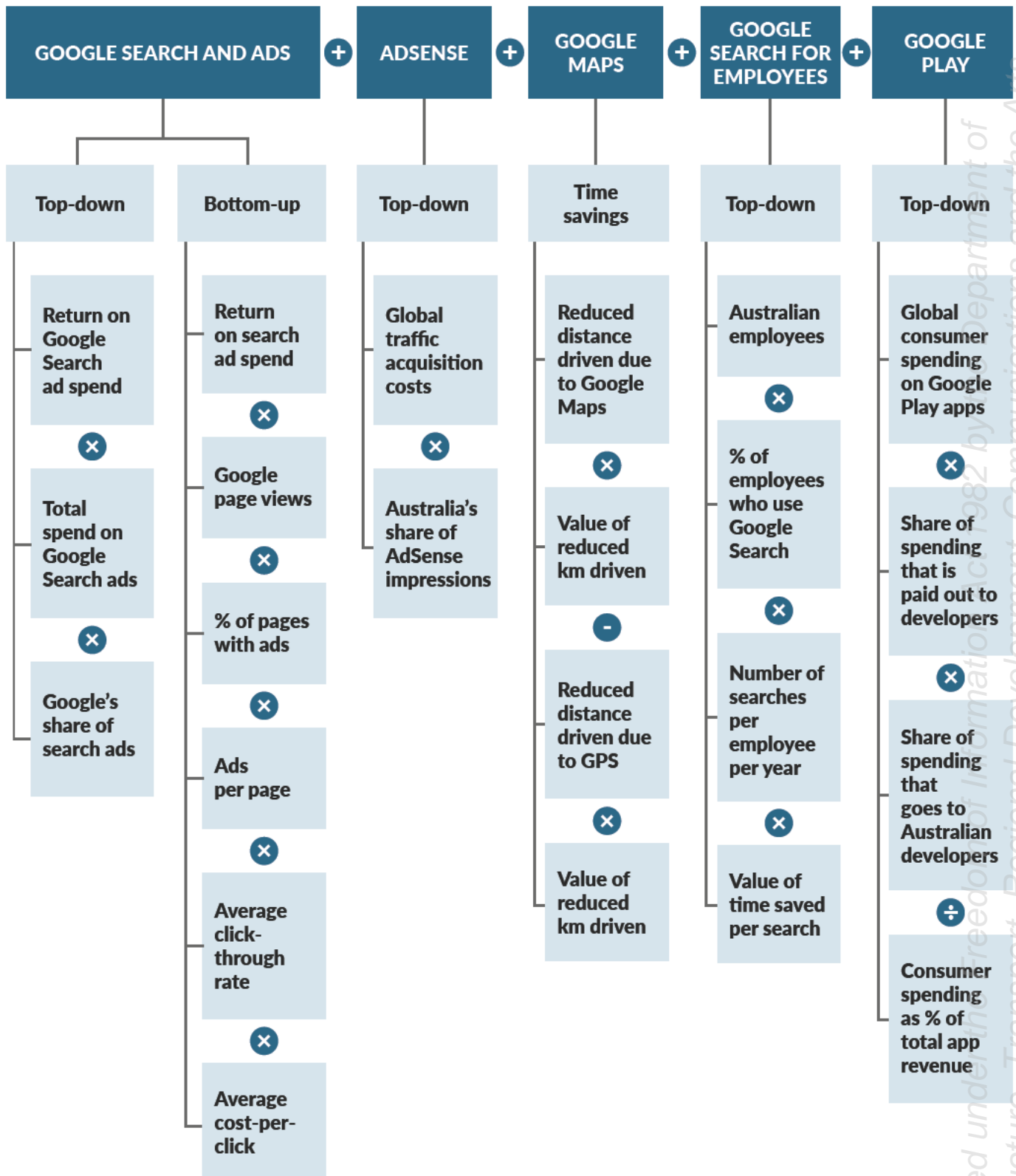
The business benefits supported by Google include the gross revenue, income or savings generated by businesses using Google products. These benefits do not include the flow-on economic effects generated, such as further purchases from their suppliers or the economic activity generated by the employees of these businesses who spend their wages in the broader economy. These

benefits also do not account for activity that may have been displaced by Google, nor attempt to estimate the incremental impact of Google on the Australian economy beyond what would be the case if Google didn't exist but other companies like it did. Exhibit A1 summarises the methodology used for sizing business benefits of Google's products.

## 34 APPENDIX: METHODOLOGY

## EXHIBIT A1:

## METHODOLOGY FOR SIZING BUSINESS BENEFITS FROM GOOGLE



## GOOGLE SEARCH AND ADS

The business benefits of Google Search and Ads were estimated using two methods – a top down approach and a bottom up approach. The top down approach estimated the total size of the search advertising segment in Australia and the proportion of this space that Google represents. The bottom up approach estimated the number of Google page views in Australia, the proportion of these pages that display advertisements, the number of advertisements on each page, the average click-through rate (CTR), and the average cost-per-click (CPC).

To estimate the benefits generated by businesses from using Google Search and Ads, a return on investment (ROI) ratio was applied to the total advertising spend of businesses on Ads, and both estimates were reported.<sup>19</sup> This ROI ratio was developed from a few assumptions:

- Using a large sample of proprietary data, Hal Varian, Google's Chief Economist, estimated

that businesses received US\$2 in revenue for every US\$1 spent on advertising. This finding was published in the American Economic Review in 2009.

- Businesses also receive free clicks because of unpaid Google Search. Using research published in the International Journal of Internet Marketing and Advertising in 2009 by Jansen and Spink, the Google US Economic Impact Study assumed that businesses receive five clicks for every click on a paid advertisement.
- Unpaid clicks are not considered as commercially valuable, so the US Economic Impact Study assumed their value at 70 percent of paid clicks.

Table 1 shows the inputs and sources used for estimating the business benefits of Google Search and Ads.

**TABLE 1: INPUTS AND SOURCES FOR CALCULATING BUSINESS BENEFITS OF GOOGLE SEARCH AND ADS**

APPROACH	METRIC	SOURCE
Top down approach	Total online search advertising market size	<ul style="list-style-type: none"> <li>• IAB Australia (2020)<sup>20</sup></li> <li>• Statista (2020)<sup>21</sup></li> </ul>
	Google Search's market share	<ul style="list-style-type: none"> <li>• StatCounter (2020)<sup>22</sup></li> </ul>
Bottom up approach	Google Search page views	<ul style="list-style-type: none"> <li>• Nielsen (2019)<sup>23</sup></li> </ul>
	% of pages that display advertisements	<ul style="list-style-type: none"> <li>• Varian (2014)<sup>24</sup></li> </ul>
	Advertisements per page on average	<ul style="list-style-type: none"> <li>• Varian (2014)<sup>25</sup></li> </ul>
	Average CTR for Google Search (Estimate)	<ul style="list-style-type: none"> <li>• AdStage(2020)<sup>26</sup></li> </ul>
	Average CPC for Google Search (Estimate)	<ul style="list-style-type: none"> <li>• AdStage(2020)<sup>27</sup></li> </ul>

19. ROI reflects the net advertising benefits that businesses receive from online advertising (i.e. total revenue minus online advertising cost).

20. IAB Australia (2020), "Australian Digital Advertising Market Hits AU\$9.3B In 2019".

Available at: <https://iabaustralia.com.au/news/australian-digital-advertising-market-hits-9-3b-in-2019/>

21. Statista (2020), "Search advertising – Australia". Available at: [https://www.statista.com/outlook/219/107/search-advertising/australia?currency=AU\\$](https://www.statista.com/outlook/219/107/search-advertising/australia?currency=AU$)

22. StatCounter (2020), "Search engine market share Australia". Available at: <https://gs.statcounter.com/search-engine-market-share/all/australia>

23. Nielsen (2019), "Nielsen Digital Landscape Surfing Report". Available at: <https://digitallandscape.nielsendashboards.com.au/surfing-report>

24. Hal Varian (2014), "Economic value of Google" (Presentation).

Available at: <http://cdn.oreillystatic.com/en/assets/1/event/57/The%20Economic%20Impact%20of%20Google%20Presentation.pdf>

25. Hal Varian (2014), "Economic value of Google" (Presentation).

Available at: <http://cdn.oreillystatic.com/en/assets/1/event/57/The%20Economic%20Impact%20of%20Google%20Presentation.pdf>

26. AdStage (2020), Paid Media Q1 2020 Benchmark Report. Available at: <https://www.adstage.io/resources/adstage-benchmark-reports/>

27. AdStage (2020), Paid Media Q1 2020 Benchmark Report. Available at: <https://www.adstage.io/resources/adstage-benchmark-reports/>

**TABLE 1 (CONT'D): INPUTS AND SOURCES FOR CALCULATING BUSINESS BENEFITS OF GOOGLE SEARCH AND ADS**

APPROACH	METRIC	SOURCE
Top down approach	ROI ratio	<ul style="list-style-type: none"> <li>• Varian (2009)<sup>28</sup></li> <li>• Jansen &amp; Spink (2009)<sup>29</sup></li> <li>• Google (2018)<sup>30</sup></li> </ul>

## ADSENSE

The direct business benefits from AdSense were estimated as the net advertising benefits generated by businesses placing advertisements on publisher sites such as websites, blogs, and forums.<sup>31</sup> We estimated this figure using Google's published global advertising revenue from Google network's websites and multiplied this by the country's share of global AdSense impressions.<sup>32</sup> In addition, we applied an ROI ratio that advertisers earn using display advertising, derived from academic literature.

The benefits of AdSense to content creators were also estimated as the total income that they earn from placing advertisements sourced through Ads next to content on their website. The total income earned by Australian content creators was estimated from Google's global payments to website publishers, also known as their traffic acquisition costs, and applying Australia's share of AdSense impressions to estimate the payments specific to Australia.

Table 2 shows the inputs and sources used for estimating the business benefits of AdSense.

**TABLE 2: INPUTS AND SOURCES FOR CALCULATING BUSINESS BENEFITS OF ADSENSE**

ESTIMATION	METRIC	SOURCE
Net advertising benefits for advertisers	Advertising revenue from Google Network Member's websites	• Alphabet (2019) <sup>33</sup>
	ROI ratio	• Gupta et al. (2015) <sup>34</sup>
Revenue to content creators	Global traffic acquisition costs related to AdSense	• Alphabet (2019) <sup>35</sup>
Country's share of global AdSense benefits (applicable to both of the above)	Country's share of global impressions on AdSense	• DoubleClick (2012) <sup>36</sup>

28. Varian, H. R. (2009), "Online Ad Auctions". *The American Economic Review*, Vol. 99, No. 2, pp. 430-434.

29. Jansen, B. J., & Spink, A. (2009), "Investigating customer click through behaviour with integrated sponsored and non-sponsored results." *International Journal of Internet Marketing and Advertising*, Vol. 5, No. 1-2, pp. 74-94.

30. Google (2018), *Economic Impact Report*. Available at: <https://kstatic.googleusercontent.com/files/ed56d1f0ea72190c83db9077931ab69a53406ce48b0621788e53b05c909b5e4e358d80b90976f9224368866edc00de1e36c3fb89c569b2452bf20a352500f5c4>

31. This refers to the increase in revenues and sales that can be directly attributed to advertising minus the related advertising expenditure.

32. This methodology does not account for price differences across countries due to the lack of availability of reliable data on cost per impression by country.

33. Alphabet (2019). Form 10-K for fiscal year ended December 31, 2019 - Submission to US SEC.

Available at: <https://www.sec.gov/Archives/edgar/data/1652044/000165204420000008/goog10-k2019.htm>

34. Gupta, S., Pauwels, K., & Kireyev, P. (2015), Do display ads influence search? Attribution and dynamics in online advertising. *International Journal of Research in Marketing*.

35. Alphabet (2019). Form 10-K for fiscal year ended December 31, 2019 - Submission to US SEC.

Available at: <https://www.sec.gov/Archives/edgar/data/1652044/000165204420000008/goog10-k2019.htm>

36. Google DoubleClick (2012). What's trending in display for publishers?

Available at: <https://www.slideshare.net/RFONNIER/display-business-trends-publisher-edition-google-2012>

## GOOGLE PLAY

We estimated the revenue earned by Australian app developers from Google Play based on global consumer spending on Google Play, the share of the spending that is paid out to app developers, and the share of the

spending that goes to Australian app developers.

Table 3 shows the inputs and sources used for estimating the business benefits of Google Play.

**TABLE 3: INPUTS AND SOURCES FOR CALCULATING BUSINESS BENEFITS OF GOOGLE PLAY**

METRIC	SOURCE
Global consumer spending on Google Play	<ul style="list-style-type: none"> <li>• Sensor Tower (2020)<sup>37</sup></li> </ul>
Share of the spending that is paid out to app developers	<ul style="list-style-type: none"> <li>• Google (2020)<sup>38</sup></li> </ul>
Share of the spending that goes to Australian app developers	<ul style="list-style-type: none"> <li>• Caribou Digital (2016)<sup>39</sup></li> </ul>
Distribution of mobile app revenue between consumer spending and ads	<ul style="list-style-type: none"> <li>• Appota/AdSota (2017)<sup>40</sup></li> </ul>

## GOOGLE MAPS

The benefits that Australian businesses derived from Google Maps were estimated by calculating the difference in the value of time saved by businesses using Google Maps relative to a counterfactual scenario where businesses are assumed to have access to GPS technology. We first estimated the value of time saved from using Google Maps based on total kilometres travelled each year by businesses, the proportion of trips that involves the use of Google Maps, the reduction in trip time due to Google Maps, the average trip speed,

and the average hourly wage in Australia. We then estimated the value of time saved using GPS following a similar method, considering the proportion of trips that involves the use of GPS and the reduction in trip time using GPS. This approach did not quantify the avoided vehicle operating costs and externalities associated with travel time and distance savings of Google Maps.

Table 4 shows the inputs and sources used for estimating the business benefits of Google Maps.

37. Sensor Tower (2020), "Consumer Spending in Mobile Apps Grew 17% in 2019 to Exceed AU\$83 Billion Globally".

Available at: <https://sensortower.com/blog/app-revenue-and-downloads-2019>

38. Google (2020). Available at: <https://support.google.com/googleplay/android-developer/answer/112622?hl=en>

39. Caribou Digital (2016), *Winners and Losers in the Global App Economy*.

Available at: <https://www.cariboudigital.net/wp-content/uploads/2016/02/Caribou-Digital-Winners-and-Losers-in-the-Global-App-Economy-2016.pdf>

40. AdSota (2017), *Vietnam Mobile App Advertising and Monetization Report (Q2-2017)*. Available at: [https://www.slideshare.net/AdsotaAds/vietnam-mobile-app-advertising-monetization-report?qid=3ab11c21-44c9-4fbb-9cb4-41b57d471f3c&v=&b=&from\\_search=7](https://www.slideshare.net/AdsotaAds/vietnam-mobile-app-advertising-monetization-report?qid=3ab11c21-44c9-4fbb-9cb4-41b57d471f3c&v=&b=&from_search=7)

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TABLE 4: INPUTS AND SOURCES FOR CALCULATING BUSINESS BENEFITS OF GOOGLE MAPS

ESTIMATION	METRIC	SOURCE
Value of time saved using Google Maps whilst driving (for business trips)	Proportion of online population	• We Are Social & Hootsuite (2020) <sup>41</sup>
	Proportion of online population that use Google Maps	• AlphaBeta Consumer Survey (2020)
	Proportion of trips that use Google Maps when available	• Alphabet (2017) <sup>42</sup> • TNO (2007) <sup>43</sup>
	Proportion of kilometres reduced through the use of Google Maps	• TNO (2007) <sup>44</sup>
	Total business kilometres travelled by all vehicles in a year	• Australian Bureau of Statistics (2019) <sup>45</sup>
	Trip speed	• Bureau of Transport Statistics (2014) <sup>46</sup>
	Value of time saved per hour (based on average hourly wage)	• Australian Bureau of Statistics (2020) <sup>47</sup>
Value of time saved under counterfactual (for business trips)	Proportion of cars with GPS devices	• TNO (2007) <sup>48</sup>
	Proportion of trips that use GPS	• Alphabet (2017) <sup>49</sup>
	Proportion of kilometres reduced through the use of GPS	• TNO (2007) <sup>50</sup>
	Total business kilometres travelled by all vehicles in a year	• Australian Bureau of Statistics (2019) <sup>51</sup>
	Trip speed	• Bureau of Transport Statistics (2014) <sup>52</sup>
	Value of time saved per hour (based on average hourly wage)	• Australian Bureau of Statistics (2020) <sup>53</sup>

41. We Are Social & Hootsuite (2020), Digital 2020 – Australia. Available at: <https://wearesocial.com/au/digital-2020-australia>

42. AlphaBeta (2017), Google Economic Impact Australia 2015. Available at: <https://alphabeta.com/our-research/google-economic-impact-australia-2015/>

43. TNO (2007), "Independent research by Dutch research institute"

44. TNO (2007), "Independent research by Dutch research institute"

45. Australian Bureau of Statistics (2019), "Survey of Motor Vehicle Use, Australia".

Available at: <https://www.abs.gov.au/statistics/industry/tourism-and-transport/survey-motor-vehicle-use-australia/latest-release>

46. Bureau of Transport Statistics (2014), Transport for NSW Annual Report 2014.

Available at: <https://www.transport.nsw.gov.au/sites/default/files/media/documents/2017/tfnsw-annual-report-2013-2014.pdf>

47. Australian Bureau of Statistics (2020), "Average Weekly Earnings, Australia".

Available at: <https://www.abs.gov.au/statistics/labour/earnings-and-work-hours/average-weekly-earnings-australia/latest-release>

48. TNO (2007), "Independent research by Dutch research institute"

49. AlphaBeta (2017), Google Economic Impact Australia 2015. Available at: <https://alphabeta.com/our-research/google-economic-impact-australia-2015/>

50. TNO (2007), "Independent research by Dutch research institute"

51. Australian Bureau of Statistics (2019), "Survey of Motor Vehicle Use, Australia".

Available at: <https://www.abs.gov.au/statistics/industry/tourism-and-transport/survey-motor-vehicle-use-australia/latest-release>

52. Bureau of Transport Statistics (2014), Transport for NSW Annual Report 2014.

Available at: <https://www.transport.nsw.gov.au/sites/default/files/media/documents/2017/tfnsw-annual-report-2013-2014.pdf>

53. Australian Bureau of Statistics (2020), "Average Weekly Earnings, Australia".

Available at: <https://www.abs.gov.au/statistics/labour/earnings-and-work-hours/average-weekly-earnings-australia/latest-release>

## GOOGLE SEARCH FOR EMPLOYEES

Google Search supports Australian businesses in the form of time savings from employees for work related tasks. To calculate the savings businesses experience, we estimated the proportion of Australian employees that value and regularly use Google Search in their employment, the value of time saved per search

conducted and the number of searches per employee.

Table 5 shows the inputs and sources used for estimating the business benefits of Google Search in terms of time savings for employees.

**TABLE 5: INPUTS AND SOURCES FOR CALCULATING BUSINESS BENEFITS OF GOOGLE SEARCH**

METRIC	SOURCE
Number of employees in Australia	<ul style="list-style-type: none"> <li>Australian Bureau of Statistics (2020)<sup>54</sup></li> </ul>
Number of searches per employee	<ul style="list-style-type: none"> <li>AlphaBeta Consumer Survey (2020)</li> </ul>
Google Search's market share	<ul style="list-style-type: none"> <li>StatCounter (2020)<sup>55</sup></li> </ul>
Proportion of employees that use Google Search at least once a day	<ul style="list-style-type: none"> <li>Public First (2018)<sup>56</sup></li> </ul>
Proportion of employees that value Google Search	<ul style="list-style-type: none"> <li>Public First (2018)<sup>57</sup></li> </ul>
Estimated time saved per search	<ul style="list-style-type: none"> <li>Varian (2014)<sup>58</sup></li> <li>Chen et al. (2014)<sup>59</sup></li> </ul>
Value of time saved per hour	<ul style="list-style-type: none"> <li>Australian Bureau of Statistics (2020)<sup>60</sup></li> </ul>

## BREAKDOWN OF BUSINESS BENEFITS BY STATE AND TERRITORY

We estimated the breakdown of Google's business benefits by state and territory through various metrics. These metrics provided very similar approximations for each state's share of benefits, however some carry more weight for states that have a larger share of output or number of businesses. To minimise the weighting of such

metrics, we took an average of the metrics listed in the table below.

Table 6 shows the inputs and sources used for calculating the breakdown of business benefits by state and territory.

54. Australian Bureau of Statistics (2020), "Labour Force, Australia".

Available at: <https://www.abs.gov.au/statistics/labour/employment-and-unemployment/labour-force-australia/latest-release#key-statistics>

55. StatCounter (2020), "Search engine market share Australia". Available at: <https://gs.statcounter.com/search-engine-market-share/all/australia>

56. Public First (2018), "Google's impact in the UK: At Home, At School, At Work".

Available at: <http://www.publicfirst.co.uk/wp-content/uploads/2018/10/GoogleImpact2018.pdf>

57. Public First (2018), "Google's impact in the UK: At Home, At School, At Work".

Available at: <http://www.publicfirst.co.uk/wp-content/uploads/2018/10/GoogleImpact2018.pdf>

58. Hal Varian (2014), "Economic value of Google" (Presentation).

Available at: <http://cdn.oreillystatic.com/en/assets/1/event/57/The%20Economic%20Impact%20of%20Google%20Presentation.pdf>

59. Chen, Y., YoungJoo Jeon, G., & Kim, Y.-M. (2014), "A day without a search engine: an experimental study of online and offline searches". *Experimental Economics*, Vol 17, Issue 4, pp 512-536.

60. Australian Bureau of Statistics (2020), "Average Weekly Earnings, Australia".

Available at: <https://www.abs.gov.au/statistics/labour/earnings-and-work-hours/average-weekly-earnings-australia/latest-release>



## BREAKDOWN OF BUSINESS BENEFITS BY STATE AND TERRITORY

We estimated the breakdown of Google's business benefits by state and territory through various metrics. These metrics provided very similar approximations for each state's share of benefits, however some carry more weight for states that have a larger share of output or number of businesses. To minimise the weighting of such

metrics, we took an average of the metrics listed in the table below.

Table 6 shows the inputs and sources used for calculating the breakdown of business benefits by state and territory.

**TABLE 6: INPUTS AND SOURCES FOR CALCULATING THE BREAKDOWN OF BUSINESS BENEFITS AND JOB IMPACT BY STATE AND TERRITORY**

METRIC	SOURCE
Share of Gross Domestic Product (GDP) for each state	• Australian Bureau of Statistics (2019) <sup>61</sup>
Share of state final demand for each state	• Australian Bureau of Statistics (2020) <sup>62</sup>
Share of businesses in each state	• Australian Bureau of Statistics (2020) <sup>63</sup>
Share of population for each state	• Australian Bureau of Statistics (2020) <sup>64</sup>

61. Australian Bureau of Statistics (2019), "Australian National Accounts: State Accounts".

Available at: <https://www.abs.gov.au/statistics/economy/national-accounts/australian-national-accounts-state-accounts/latest-release#analysis-of-results>

62. Australian Bureau of Statistics (2020), "Australian National Accounts: National Income, Expenditure and Product".

Available at: <https://www.abs.gov.au/statistics/economy/national-accounts/australian-national-accounts-national-income-expenditure-and-product/latest-release>

63. Australian Bureau of Statistics (2020), "Counts of Australian Businesses, including Entries and Exits".

Available at: <https://www.abs.gov.au/statistics/economy/business-indicators/counts-australian-businesses-including-entries-and-exits/latest-release>

64. Australian Bureau of Statistics (2020), "National, state and territory population".

Available at: <https://www.abs.gov.au/statistics/people/population/national-state-and-territory-population/latest-release>

## BREAKDOWN OF BUSINESS BENEFITS BY BUSINESS SIZE

We estimated the breakdown of Google's business benefits by business size using the relative size of their internet income. Business size is determined based on the number of employees (i.e. micro businesses are those with less than 5 employees, small businesses are those with 5-19 employees, medium businesses are those with

20-200 employees, and large businesses are those with more than 200 employees).

Table 7 shows the inputs and sources used for calculating the breakdown of business benefits by business size.

**TABLE 7: INPUTS AND SOURCES FOR CALCULATING THE BREAKDOWN OF BUSINESS BENEFITS BY BUSINESS SIZE**

METRIC	SOURCE
Total income by business size	<ul style="list-style-type: none"> <li>Australian Bureau of Statistics (2020)<sup>65</sup></li> </ul>
Internet income as % of total income by business size	<ul style="list-style-type: none"> <li>Australian Bureau of Statistics (2020)<sup>66</sup></li> </ul>

## BREAKDOWN OF BUSINESS BENEFITS BY SECTOR

The breakdown of business benefits by sector was calculated based on the share of businesses using different types of digital products or services. The list

of metrics used to break down the benefits of different Google's applications and services is provided in Table 8.

**TABLE 8: INPUTS AND SOURCES FOR CALCULATING THE BREAKDOWN OF BUSINESS BENEFITS BY SECTOR**

ESTIMATION	METRIC	SOURCE
Breakdown of business benefits for Google Search and Ads and AdSense	Businesses using social media to develop company image or market products from each sector as % of total	<ul style="list-style-type: none"> <li>Australian Bureau of Statistics (2019)<sup>67</sup></li> </ul>
Breakdown of business benefits for Google Maps (time savings)	Businesses with a mobile wireless broadband connection from each sector as % of total	<ul style="list-style-type: none"> <li>Australian Bureau of Statistics (2020)<sup>68</sup></li> </ul>
Breakdown of business benefits for Google Search (time savings)	Businesses with internet access from each sector as % of total	<ul style="list-style-type: none"> <li>Australian Bureau of Statistics (2020)<sup>69</sup></li> </ul>

65. Australian Bureau of Statistics (2020), "Characteristics of Australian Business".

Available at: <https://www.abs.gov.au/statistics/industry/technology-and-innovation/characteristics-australian-business/latest-release>

66. Australian Bureau of Statistics (2020), "Characteristics of Australian Business".

Available at: <https://www.abs.gov.au/statistics/industry/technology-and-innovation/characteristics-australian-business/latest-release>

67. Australian Bureau of Statistics (2019), "Characteristics of IT in Australian Businesses".

Available at: [http://stat.data.abs.gov.au/Index.aspx?DataSetCode=ABS\\_IT\\_SUPPORT](http://stat.data.abs.gov.au/Index.aspx?DataSetCode=ABS_IT_SUPPORT)

68. Australian Bureau of Statistics (2020), "Characteristics of IT in Australian Businesses".

Available at: <https://www.abs.gov.au/statistics/industry/technology-and-innovation/characteristics-australian-business/latest-release#:~:text=The%202018%2D19%20Business%20Characteristics,performance%20indicators%2C%20barriers%20and%20skills>

69. Australian Bureau of Statistics (2020), "Characteristics of IT in Australian Businesses".

Available at: <https://www.abs.gov.au/statistics/industry/technology-and-innovation/characteristics-australian-business/latest-release#:~:text=The%202018%2D19%20Business%20Characteristics,performance%20indicators%2C%20barriers%20and%20skills>

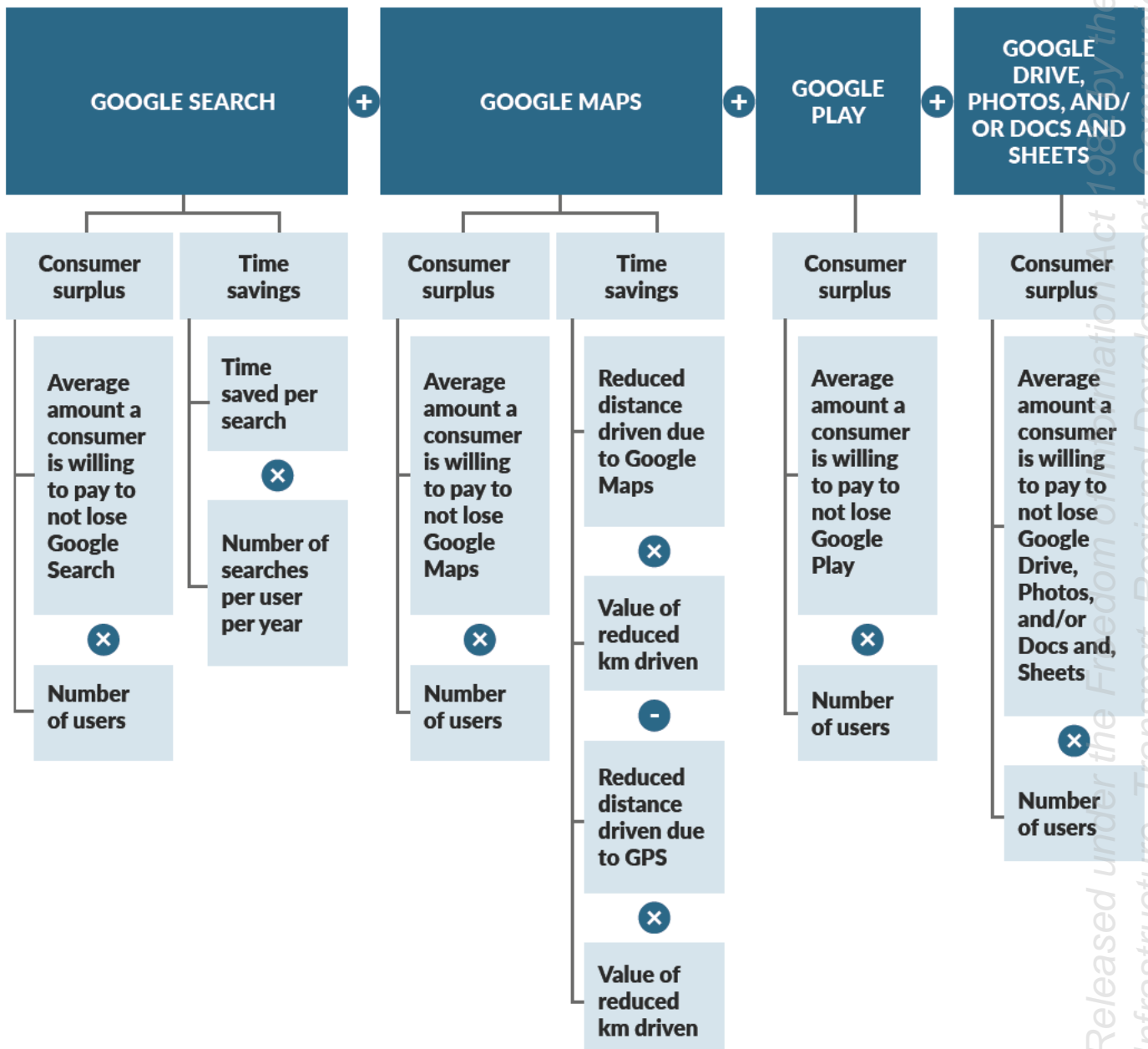
# CONSUMER BENEFITS

The consumer benefits supported by Google are challenging to measure and calculate because individuals typically do not pay for the services. In the absence of price indicators, we adopted the economic “willingness to pay” principle to estimate the value of consumer benefits by asking individuals how much they value specific services (through the consumer survey) also

known as consumer surplus. We also calculated the time savings accrued to consumers from their use of Google Maps (which optimises their journeys) and Google Search (which increases the efficiency of information gathering). Exhibit A2 summarises the methodology used for sizing consumer surplus and time savings of relevant products.

## EXHIBIT A2:

### METHODOLOGY FOR SIZING CONSUMER BENEFITS FROM GOOGLE



## GOOGLE SEARCH

We estimated the benefits of Google Search to consumers using two metrics: consumer surplus and time savings.

To calculate the consumer surplus for Google Search, we multiplied the number of Google Search users with the average willingness to pay obtained from the consumer survey.

To calculate time savings, we applied time saving estimates from an experiment that measured the time taken to conduct a search online versus a search at the library.<sup>70</sup> This study found that a search that takes 21 minutes in the library takes 7 minutes online. After accounting for the fact that people now ask more

questions due to the ease of online search, we estimated the time saved across Australia by using Google Search.

The number of Google Search users in the country who have made use of Google Search for self-enrichment purposes such as learning new skills or acquiring knowledge in a new topic was also estimated using the consumer survey. To estimate these figures, the share of respondents who stated that Google Search is their most frequently used search engine and who have made use of it for self-enrichment purposes was multiplied by the number of Google Search users in the country.

Table 9 shows the inputs and sources used for calculating the consumer benefits of Google Search.

**TABLE 9: INPUTS AND SOURCES FOR CALCULATING CONSUMER BENEFITS OF GOOGLE SEARCH**

ESTIMATION	METRIC	SOURCE
Consumer surplus	Amount that consumers value product per year (WTP)	• AlphaBeta Consumer Survey (2020)
	Online Population (OP)	• We Are Social & Hootsuite (2020) <sup>71</sup>
	Google Search users as % of OP	• AlphaBeta Consumer Survey (2020)
Time saved per user	Time saved per search	• Varian (2014) <sup>72</sup> • Chen et al. (2014) <sup>73</sup>
	Average daily searches per user	• AlphaBeta Consumer Survey (2020)

70. Chen et al. (2014) A day without a search engine: an experimental study of online and offline searches. *Experimental Economics*, Vol 17, Issue 4, pp 512-536.

71. We Are Social & Hootsuite (2020), Digital 2020 – Australia. Available at: <https://wearesocial.com/au/digital-2020-australia>

72. Hal Varian (2014), "Economic value of Google" (Presentation).

Available at: <http://cdn.oreillystatic.com/en/assets/1/event/57/The%20Economic%20Impact%20of%20Google%20Presentation.pdf>

73. Chen, Y., YoungJoo Jeon, G., & Kim, Y.-M. (2014), "A day without a search engine: an experimental study of online and offline searches". *Experimental Economics*, Vol 17, Issue 4, pp 512-536.

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## GOOGLE MAPS

We sized the benefits of Google Maps to consumers using willingness to pay, where consumers were asked to value their favourite online Google Maps service. We also estimated the time saved by using Google Maps for personal trips.

To calculate the consumer surplus for Google Maps, we multiplied the number of Google Maps users with the average willingness to pay obtained from the consumer survey.

The time saved per user by using Google Maps was estimated by calculating the difference in kilometres driven by consumers using Google Maps relative to a counterfactual where consumers are assumed to have access to GPS technology.

Table 10 shows the inputs and sources used for calculating the consumer benefits of Google Maps.

**TABLE 10: INPUTS AND SOURCES FOR CALCULATING CONSUMER BENEFITS OF GOOGLE MAPS**

ESTIMATION	METRIC	SOURCE
Consumer surplus	Amount that consumers value product per year (WTP)	• AlphaBeta Consumer Survey (2020)
	Online Population (OP)	• We Are Social & Hootsuite (2020) <sup>74</sup>
	Google Maps users as % of OP	• AlphaBeta Consumer Survey (2020)
Value of time saved using Google Maps whilst driving (for personal trips)	Proportion of online population	• We Are Social & Hootsuite (2020) <sup>75</sup>
	Proportion of online population that use Google Maps	• AlphaBeta Consumer Survey (2020)
	Proportion of trips that use Google Maps when available	• AlphaBeta (2017) <sup>76</sup> • TNO (2007) <sup>77</sup>
	Proportion of kilometres reduced through the use of Google Maps	• TNO (2007) <sup>78</sup>
	Total kilometres travelled by all vehicles in a year (personal trips)	• Australian Bureau of Statistics (2019) <sup>79</sup>
	Trip speed	• Bureau of Transport Statistics (2014) <sup>80</sup>
	Value of time saved per hour	• Australian Bureau of Statistics (2020) <sup>81</sup>

74. We Are Social & Hootsuite (2020), Digital 2020 – Australia. Available at: <https://wearesocial.com/au/digital-2020-australia>

75. We Are Social & Hootsuite (2020), Digital 2020 – Australia. Available at: <https://wearesocial.com/au/digital-2020-australia>

76. AlphaBeta (2017), Google Economic Impact Australia 2015. Available at: <https://alphabeta.com/our-research/google-economic-impact-australia-2015/>

77. TNO (2007), "Independent research by Dutch research institute"

78. TNO (2007), "Independent research by Dutch research institute"

79. Australian Bureau of Statistics (2019), "Survey of Motor Vehicle Use, Australia".

Available at: <https://www.abs.gov.au/statistics/industry/tourism-and-transport/survey-motor-vehicle-use-australia/latest-release>

80. Bureau of Transport Statistics (2014), Transport for NSW Annual Report 2014.

Available at: <https://www.transport.nsw.gov.au/sites/default/files/media/documents/2017/tfns-annual-report-2013-2014.pdf>

81. Australian Bureau of Statistics (2020), "Average Weekly Earnings, Australia".

Available at: <https://www.abs.gov.au/statistics/labour/earnings-and-work-hours/average-weekly-earnings-australia/latest-release>



TABLE 10 (CONT'D): INPUTS AND SOURCES FOR CALCULATING CONSUMER BENEFITS OF GOOGLE MAPS

ESTIMATION	METRIC	SOURCE
Value of time saved under counterfactual (for personal trips)	Proportion of cars with GPS devices	• TNO (2007) <sup>82</sup>
	Proportion of trips that use GPS	• AlphaBeta (2017) <sup>83</sup>
	Proportion of kilometres reduced through the use of GPS	• TNO (2007) <sup>84</sup>

## GOOGLE PLAY

We calculated the benefits of Google Play to consumers using willingness to pay, where consumers were asked to value their favourite online distribution platform for digital products. Results from the survey of Australian

online population were used.

Table 11 shows the inputs and sources used for calculating the consumer benefits of Google Play.

TABLE 11: INPUTS AND SOURCES FOR CALCULATING CONSUMER BENEFITS OF GOOGLE PLAY

ESTIMATION	METRIC	SOURCE
Consumer surplus	Amount that consumers value product per year (WTP)	• AlphaBeta Consumer Survey (2020)
	Online population (OP)	• We Are Social & Hootsuite (2020) <sup>85</sup>
	Google Play users as % of OP	• AlphaBeta Consumer Survey (2020)

82. TNO (2007), "Independent research by Dutch research institute"

83. AlphaBeta (2017), Google Economic Impact Australia 2015. Available at: <https://alphabeta.com/our-research/google-economic-impact-australia-2015/>

84. TNO (2007), "Independent research by Dutch research institute"

85. We Are Social & Hootsuite (2020), Digital 2020 – Australia. Available at: <https://wearesocial.com/au/digital-2020-australia>

## GOOGLE DRIVE, PHOTOS, DOCS, AND SHEETS

We calculated the benefits of Google Drive, Photos, Docs, and Sheets to consumers using willingness to pay, where consumers were asked to value their favourite online cloud-based file storage and document collaboration service. Results from the survey of

Australian online population were used.

Table 12 shows the inputs and sources used for calculating the consumer benefits of Google Drive, Photos, Docs, and Sheets.

**TABLE 12: INPUTS AND SOURCES FOR CALCULATING CONSUMER BENEFITS OF GOOGLE DRIVE, PHOTOS, DOCS, AND SHEETS**

ESTIMATION	METRIC	SOURCE
Consumer surplus	Amount that consumers value product per year (WTP)	• AlphaBeta Consumer Survey (2020)
	Online population (OP)	• We Are Social & Hootsuite (2020) <sup>86</sup>
	Users of Google Drive, Photos, Docs, and Sheets as % of OP	• AlphaBeta Consumer Survey (2020)

## BREAKDOWN OF CONSUMER BENEFITS BY STATE AND TERRITORY

We estimated the breakdown of Google's consumer benefits by state and territory through two different metrics, and took an average of these metrics.

Table 13 shows the inputs and sources used for calculating the breakdown of consumer benefits by state and territory.

**TABLE 13: INPUTS AND SOURCES FOR CALCULATING THE BREAKDOWN OF CONSUMER BENEFITS BY STATE AND TERRITORY**

METRIC	SOURCE
Share of state final demand for each state	• Australian Bureau of Statistics (2020) <sup>87</sup>
Share of population for each state	• Australian Bureau of Statistics (2020) <sup>88</sup>

86. We Are Social & Hootsuite (2020), *Digital 2020 – Australia*. Available at: <https://wearesocial.com/au/digital-2020-australia>

87. Australian Bureau of Statistics (2020), "Australian National Accounts: National Income, Expenditure and Product".

Available at: <https://www.abs.gov.au/statistics/economy/national-accounts/australian-national-accounts-national-income-expenditure-and-product/latest-release>

88. Australian Bureau of Statistics (2020), "National, state and territory population".

Available at: <https://www.abs.gov.au/statistics/people/population/national-state-and-territory-population/latest-release>

## Important Notice on Contents – Estimations and Reporting

This report has been prepared by AlphaBeta for Google. All information in this report is derived or estimated by AlphaBeta analysis using both proprietary and publicly available information.

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**PAUL FLETCHER MP**

Federal Member for Bradfield

Minister for Communications,  
Cyber Safety and the Arts

Ms Lucinda Longcroft

Director

Government Affairs and Public Policy Australia and New Zealand

Google

48 Pirrama Road

Pyrmont NSW 2009

Dear Ms Longcroft

I write to in relation to management of misinformation on YouTube, and the risk to Australian public health from content propagating false claims regarding to coronavirus (COVID-19).

I acknowledge previous correspondence outlining the measures that Google is employing to ensure Australians have access to credible and trusted information on COVID-19, and Google's efforts to remove misinformation across its various platforms. I note that Google has taken down thousands of YouTube videos featuring dangerous or misleading COVID-19 information, including videos that promote medically unproven claims. I also appreciate that Google has recently given \$6.5 million to fact-checker and non-profit organisations to combat misinformation around the world, with an immediate focus on COVID-19.

However, I am remain concerned about misinformation connecting 5G technology and COVID-19 in YouTube content, which my office has raised Google. The science is very clear – there is no evidence that 5G is harmful to people's health and furthermore, any suggestion that 5G is linked in any way to COVID-19 is utterly baseless.

The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), which is the Australian Government's independent authority on radiation protection and nuclear safety, has consistently advised that there is no established evidence that low level radio exposure from sources like 5G telecommunications networks is harmful. ARPANSA's most recent advice on this issue is available on ARPANSA's website at [www.arpansa.gov.au/news/5g-and-other-telecommunications-do-not-affect-immune-system](http://www.arpansa.gov.au/news/5g-and-other-telecommunications-do-not-affect-immune-system).

My office has been in ongoing discussions with Google in relation to its evolving misinformation policy, including conspiracy theories harmful to public health. I understand Google has offered to begin reducing the recommendations and advertising associated with videos which contain such content. Given the significant harm that could arise from false health advice relating to the COVID-19, I am concerned that Google does not intend to remove all such videos from its platform, unless it specifically breaches Google's policy or Australian law.

Many Australians are working from home, with their children, and will be accessing digital resources more than usual. While YouTube enables people to access many useful resources during this time, this situation also increases the likelihood of vulnerable people accessing false and misleading information. The wellbeing of families and individuals isolating at home is a key tool the Government has to slow the spread of COVID-19, and the proliferation of misinformation could very well reduce public health outcomes and put lives at risk.

I further note that many of these videos are monetised, meaning that their creators and YouTube are generating advertising revenue. I note that the Australian Consumer Law prohibits misleading and deceptive conduct in trade and commerce. I have asked my department to raise this matter with the Australian Competition and Consumer Commission (ACCC).

Finally, I understand that other digital platforms are marking such content as 'false information' and have published the specific categories of COVID-19 related misinformation that they commit to remove from their platform. I would welcome further efforts by Google to identify and remove misleading videos that risk public health by falsely connecting the spread of COVID-19 with 5G telecommunications networks or other such baseless claims.

Sincerely



Paul Fletcher

6 / 4 / 2020

Released under the Freedom of Information Act 1982 by the Department of Infrastructure, Transport, Regional Development, Communications and the Arts



Google Australia Pty Ltd  
48 Pirrama Road  
Pyrmont, NSW 2009

16 November 2021

**The Hon Paul Fletcher MP**

Minister for Communications, Urban Infrastructure, Cities and the Arts  
PO Box 6022  
Canberra ACT 2600

Dear Minister,

**Google's Digital Future Initiative in Australia: Impact in Bradfield**

I am pleased to share that Google has announced it will invest \$1 billion in Australia through our Digital Future Initiative. This five year commitment represents the single largest investment by Google in Australia to date.

The five year commitment includes:

- a significant expansion of Google's digital infrastructure, local engineering capability and office space;
- the establishment of a Google Research Hub in Australia, similar to Google research hubs overseas;
- partnerships with CSIRO, commercial partners, and other leading Australian research institutions.

Analysis by economist Henry Ergas AO and Green Square Associates has found that Google's Digital Future Initiative will support 28,057 total jobs and deliver \$6.716 billion in total economic impact in Australia.

Please find enclosed the briefing document for Bradfield, a copy of Henry Ergas' report, and a copy of *In An Australian Light*, a celebration of the Australian spirit and landscape by Jo Turner. The book features a forward by Australian galactic astrophysicist Dr Rebecca Allen.

We look forward to continuing to work with you in 2022. Please don't hesitate to let us know if you have any questions, or would like a briefing on any matter.

Warm regards,

s47F



**Lucinda Longcroft**

Director, Government Affairs and Public Policy  
Google Australia & New Zealand

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Government Affairs and Public Policy Senior Manager  
Google Australia & New Zealand

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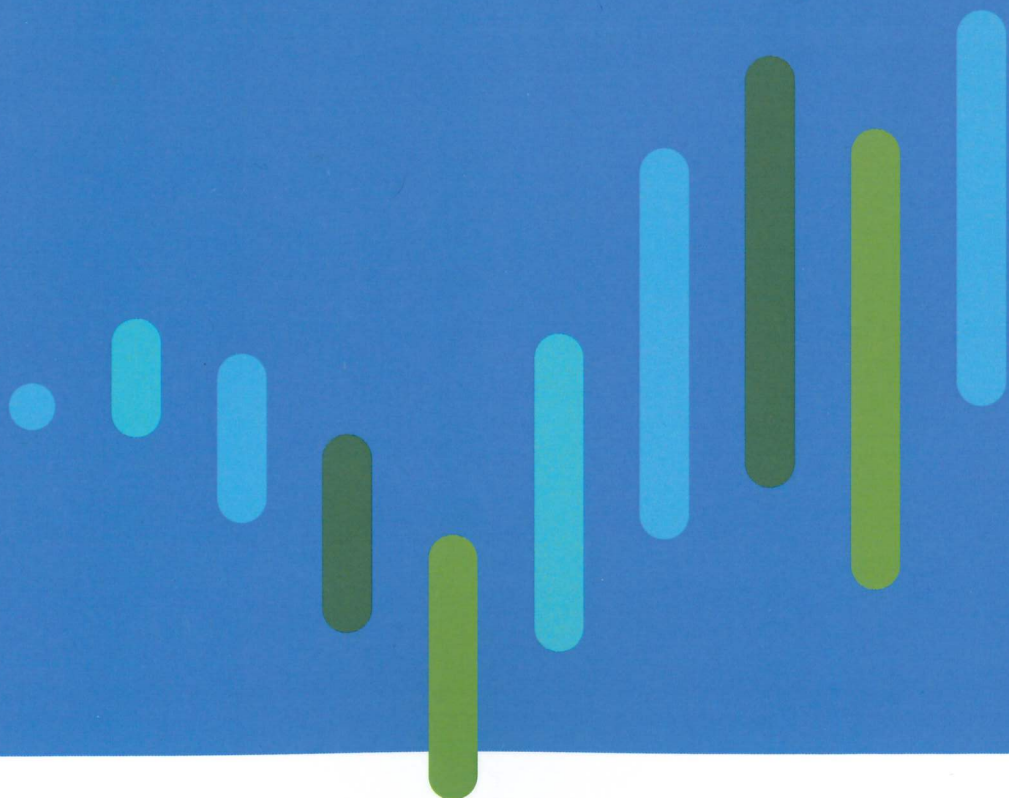
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# The contribution of Google to Australia's post-Covid recovery

October 2021

Henry Ergas AO



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## This Report

This report was commissioned by Google and has been prepared by Henry Ergas AO supported by a small team of experienced economists, including Dr Stephen Beare (macroeconomic modelling), and Sabine Schnittger and Joe Branigan (economic research and analysis).

Henry Ergas AO is an economist who has worked at the OECD, Australian Trade Practices Commission (now the ACCC) as well as heading a number of economic consulting firms. He chaired the Australian Intellectual Property and Competition Review Committee set up by the Australian Federal Government in 1999 to review Australia’s intellectual property laws as they relate to competition policy. He was Adjunct Professor of Economics at the National University of Singapore and has taught at the Kennedy School of Government at Harvard University, the Centre for Research in Network Economics and Communications at the University of Auckland, Monash University and at the École nationale de la statistique et de l’administration économique in Paris. From 2009 to 2016, he was Professor of Infrastructure Economics at the University of Wollongong, and also served as Senior Economic Adviser to Deloitte Australia. He was an independent contributor to a paper submitted to the U.S. Federal Communications Commission on net neutrality. In 2013, Henry was appointed a member of the NBN Cost-Benefit Analysis and Review of Regulation Panel of Experts. In the 2016 Australia Day awards, Henry was made an Officer of the Order of Australia for “distinguished service to infrastructure economics, and to higher education, to public policy development and review, and as a supporter of emerging artists”. He is a weekly columnist for The Australian newspaper.

Dr Stephen Beare is the director and principal of ANALYTECON, a boutique consulting firm that specialises in the quantitative and strategic analysis of market, resource and investment issues for public and private sector clients. Prior to forming ANALYTECON Stephen was a Principal at Concept Economics where his work focussed on the telecommunications industry, resources industries and competition issues. Prior to joining Concept Economics Stephen was the Chief Economist of the Australian Bureau of Agricultural and Resource Economics (ABARE) where he had oversight of a wide range of research into issues faced by the agriculture and resource industries. Stephen holds a B.Sc. degree from the University of California and M.Sc. and PhD degrees from Oregon State University.

Sabine Schnittger and Joe Branigan are experienced economists and long-time associates of Green Square Associates.

## Abbreviations

AI	Artificial intelligence	GPT	General purpose technology
APAC	Asia-Pacific	GRH	Google Research Hub
CS	Computer science	ICT	Information and communications technology
CSIRO	Commonwealth Scientific and Industrial Research Organisation	IO	Input-Output (analysis)
GCP	Google Cloud Platform	IXP	Internet Exchange Points
GDP	Gross Domestic Product	POP	Points of Presence
GGC	Google Global Cache	R&D	Research and development

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# Key Points

## \$1 billion

Google plans to **invest more than \$1 billion in Australia** over the next five years under its Digital Future Initiative.

## \$1.3 billion

The direct economic impact of these investments amount to **\$1.3 billion in additional GDP and 6,500 jobs** across the Australian economy.

## \$1.5 billion

### R&D benefits

The establishment of research partnerships and the Google Research Hub will bring significant additional research capability to Australia and produce spillover benefits to the national economy, which could amount to **\$1.5 billion in net present value terms over 10-years**.

## \$447 million

### Consumer benefits

Further, consumers benefit from recent Google investments in network infrastructure such as the undersea cables that connect Australians to the world of information, applications and entertainment sourced from beyond our shores. We estimate a consumer surplus benefit related to a reduction in latency, not otherwise counted, of **\$447 million in net present value terms over 10-years**.

### The investments include:

1.

a significant expansion of Google's digital infrastructure and a sizable increase in Google's local engineering capability and office space.

2.

the establishment of an Australian Google Research Hub to add to similar research hubs overseas.

3.

partnerships with CSIRO, commercial partners, and other leading Australian research institutions.

The flow-on economic impact amounts to a **further \$3.5 billion in GDP and 21,500 jobs** supported across the Australian economy as a result of Google's investments.

More than these macroeconomic impacts, Google's investment in digital infrastructure will **enable businesses to innovate and raise their productivity, supporting higher economic growth in the future**.

### Benefits of Digital Resilience

Although these broader, dynamic effects are significant, they are probably less important, in the long run, than the **benefits of digital resilience**, which have been highlighted by the current pandemic and which, we believe, will continue to be of overwhelming importance in the uncertain and complex world which lies ahead.

### Increased economic flexibility

What increasingly matters to Australia's future prosperity is the capacity to adjust to shocks that are difficult to foresee, and even harder to predict with any accuracy. That capacity to absorb shocks, by altering the way everyday things are done, is at the heart of digital resilience; and if Australia weathered the pandemic as well as it has, it is in no small part thanks to the digital transformation of our economy and society, which has been, and will be, **supported by Google's significant investment in Australia's post-Covid economic recovery**.

# Executive Summary

**Google Australia Pty Ltd commissioned Green Square Associates to assess the economic impacts and wider economic benefits of its planned \$1 billion investment in Australia over the next five years.<sup>1</sup>**

The investment comprises a range of initiatives, including:

- a significant investment in digital infrastructure, including Google's cloud regions in Australia;
- a sizable increase in Google's local engineering capability and office space;
- the establishment of an Australian Google Research Hub to add to similar research hubs overseas; and
- partnerships with the CSIRO, industry partners and other research institutions.

Taken together, the investments have been designed to strengthen Google's capacity to meet double-digit demand growth for its suite of products and services. These expenditures represent a substantial long-term commitment whose benefits for Google will take many years to fully materialise, especially where its research and development (R&D) investments are concerned.

## Economic impacts of Google's investment in digital infrastructure

Looking solely at the tangible economic consequences of these expenditures, we expect Australia to directly benefit from these investments in terms of additional employment, income and value added generated. We estimate that Google's investment in digital infrastructure and expansion in engineering expertise and office space, will increase the gross expenditure of the Australian 'digital economy' sector by around \$5.3 billion, which will in turn increase gross domestic product (GDP) by \$1.3 billion. The additional wages and salaries paid to workers across the Australian economy, which are a component of GDP, are expected to amount to around \$620 million.

These outcomes will, in turn lead to 'flow-on' economic effects in other industries across Australia that will further add to the initial, direct impacts. If all industry effects are considered, the impact would amount to around \$4.8 billion, with more than 28,000 full-time additional jobs supported by Google's investments.

## Implications of Google's investment in digital infrastructure for the productivity and resilience of the Australian economy

These direct and flow-on impacts of Google's digital infrastructure investments matter a great deal for Australia's future economic growth and prosperity, but do not capture potentially more significant broader effects.

Some of these effects have been extensively examined in the scholarly literature. Thus, Google's investment in digital infrastructure will enable businesses to deploy advanced information and communications technologies (ICTs). ICTs help businesses to innovate, for instance, by offering customers a higher quality Internet experience, and to raise their productivity to best practice. Improved business productivity directly translates into economic growth, more opportunity and an improvement in our standard of living that can be shared by all Australians.

Although these broader, dynamic effects are often hard to measure, there is little doubt that they are material. But they are probably less important, in the long run, than the impacts which have been highlighted by the current pandemic and which, we believe, will continue to be of overwhelming importance in the uncertain and complex world which lies ahead.

In effect, increasingly, what matters to Australia's future prosperity is not simply the extent to which, and the efficiency with which, resources are used at any one moment in time but the capacity to adjust to shocks that are difficult to foresee, much less to predict with any accuracy. That capacity to absorb shocks, by altering the way everyday things are done, is at the heart of resilience; and if Australia weathered the pandemic as well as it has, it is in no small part thanks to the digital transformation of our economy and society.

For example, the experience of the past two years through the Covid pandemic has proven the value of digital resilience and flexibility, enabling a profound structural change in Australia's labour and transport markets with up to 40 percent of the Australian labour force working from home (WFH) (at peak lockdowns) that would otherwise

have been impossible. Moreover, it is inconceivable that the pandemic's impact on schools and universities could have been managed without a high quality digital infrastructure.

Equally, the effects on producers and retailers would have been even more adverse had online shopping (and payment) not been as high quality an alternative to "bricks and mortar" as it now is. And population health would have suffered far more had it not been for tele-medicine, as well as for the extensive digitalisation of our health sector.

In all these ways, the digital infrastructure provides what economists refer to as "option value"—that is, the value of being able to reconfigure ways of doing things as and when circumstances change. There is an important difference between the option value associated with an investment and its value as conventionally measured (say, by discounting to the present the future stream of benefits): while uncertainty reduces the value as conventionally measured (because it raises the discount rate which must be applied), it increases the value of flexibility, and hence of the option. As a result, in circumstances of acute uncertainty, the social value of an investment that increases society's margins of flexibility can be many times that of the same investment when conventionally measured.

The value of Google's investments is therefore not merely in expanding economic activity in the ways we discuss below; rather, it is every bit as much in strengthening our economic and social flexibility, at a time of far-reaching uncertainty, by making it even easier for firms and individuals to rely on the digital infrastructure to reconfigure how they carry out crucial activities.

For example, Google Cloud's regions in Melbourne and Sydney offer both large and small customers the ability to access low latency, high performance cloud services. At the same time, the availability of distributed, secure infrastructure via Google's APAC network of cloud regions and data centres protects against service disruptions and aids in disaster recovery, while maintaining data security and sovereignty.

<sup>1</sup> Unless otherwise stated, figures in this report are presented in Australian dollars.

For customers, access to these resources is scalable, meaning that Google Cloud's enterprise customers can flexibly access remote data handling capability and sophisticated applications as ever-shifting business circumstances require. Instead of having to divert resources into configuring and reconfiguring their own infrastructure, the flexibility inherent in the cloud and associated value added services enables customers to focus on their core business objectives when and as needs change. It will also reduce barriers to entry by allowing new or expanding businesses to buy cloud services rather than buy and build in-house IT infrastructure, and thereby enhance competition with all of its positive effects. And cloud computing capacity in Australia promotes competition among providers of digital infrastructure such as online payment platform services.

### Consumer benefits from network infrastructure investments

Google's investments in recent years in (non-cloud) network infrastructure such as the undersea cables that comprise the fibre optic telecommunications trunks to Australia benefit consumers directly, providing increased reliability, greater bandwidth and lower latency than would otherwise be available.

During the pandemic, consumers utilised this network infrastructure more than ever to get things done online (such as for grocery shopping, telehealth appointments, working from home, or entertainment). For example, over the early months of 2020 as businesses increased their reliance on connecting an at-home workforce, Google experienced a surge in the use of Google Meet where day-over-day growth in demand surpassed 60 per cent and, as a result, by April daily usage was more than 25 times what it was in January. Despite this growth, the demand was well within the bounds of Google's network capacity.<sup>2</sup>

Based on monthly data collected by the ACCC, Australia's broadband telecommunications network performed remarkably well thanks in part to Google's pre-pandemic investments.

Consumers value increased reliability, higher bandwidth and lower latency to run the hundreds, if not thousands, of consumer applications that rely on the network infrastructure that connects Australia to overseas providers of internet content. To the extent that consumers rely on, and value, Google's network infrastructure (a subset of the total telecommunications network infrastructure) to run these (often) unpriced applications, the consumer benefits are not measured in the national accounts.

We have used recent estimates of the impact of Google's network investments on bandwidth and latency, and recent economic studies of WTP, to value Google's recent incremental investments to Australia's network infrastructure. We estimated an annual benefit of \$58 million per year, or \$447 million in net present value terms over a 10-year period.

### Implications of Google's investment in research and development

The establishment of research partnerships and the Google Research Hub will bring significant additional research capability to Australia. In combination with the opportunities that Google offers highly skilled engineers, these initiatives make it more likely that Australia keeps its 'best and brightest' computer science, artificial intelligence, and quantum computing graduates and postdoctoral researchers.

R&D benefits everyone. It is, in particular, well established that R&D and the innovations it generates give rise to spillovers as new knowledge diffuses throughout the economy, and businesses and consumers benefit from cost reductions and improvements in quality. As a result, above and beyond the gains that accrue directly to the firm that undertakes it, R&D can result in large returns to society that translate into measurable productivity impacts and a higher standard of living, as well as less tangible benefits, such as new low-cost or even free services or health benefits that consumers value highly.

A broad range of economic studies conclude that the corresponding social rate of return to R&D investment easily exceeds \$10 per \$1 spent on R&D. Accordingly, based on Google's planned investments in R&D over the next five years, we estimate that the social benefit to Australia of Google's R&D investment pipeline exceeds \$1.5 billion in present value terms.

### Google is vital to Australia's economic and social prosperity

The direct benefit of Google's \$1 billion investment in Australia's future amounts to \$1.3 billion in GDP and 6,500 additional jobs in FTE terms. The flow-on (or supply-chain) benefits of Google's \$1 billion investment amount to \$3.5 billion in GDP and 21,500 jobs across the Australian economy. While this is a substantial economic and social footprint, particularly for a technology company in a country traditionally focussed on agricultural and mining resources development, it is only one part of the whole story.

Taken together, the total impact of Google's \$1 billion investment in the Australian economy is at least \$6.3 billion, comprising:

- \$4.8 billion in direct and flow-on macroeconomic impacts from the Digital Future Initiative; and
- \$1.5 billion in R&D benefits from the Digital Future Initiative.
- The total number of jobs created or supported by Google's investment is in the order of 28,000 FTEs across the Australian economy.

GSA has also estimated a direct benefit to Australian consumers that is not otherwise measured in the national accounts of \$447 million as a result of recent Google investments in primary network infrastructure such as the undersea cables that connect Australia to overseas markets. This estimate is based on an assumed reduction in latency of 20 milliseconds as a result of these investments, which has been previously reported by AnalysysMason (2020).

Google's overall investment—including its commitment to establish a research hub in Australia, one of only a handful around the world—is an important vote of confidence in this country's economic and social future. Above and beyond the direct effects, that vote of confidence, by one of the world's most highly respected enterprises, should help place us on the path to a full and prompt recovery from the pandemic and facilitate our smooth adjustment to the stresses and disruptions which lie ahead.

**During the pandemic, consumers utilised this network infrastructure more than ever to get things done online (such as for grocery shopping, telehealth appointments, working from home, or entertainment).**

<sup>2</sup> <https://cloud.google.com/blog/topics/inside-google-cloud/how-google-cloud-is-helping-during-covid-19>

# Introduction

Google is proposing to undertake a program of investment in the order of \$1 billion in Australia over the next five years. Green Square Associates has been asked to prepare an economic impact analysis (EIA) of these expenditures based on information provided by Google.

## 1.1 Implications of Google's investment for Australia

Google's program of investment consists of both tangible investment in digital infrastructure, including engineering staff and office space, as well as investment in research and development (R&D).

In this report, we consider the implications for Australia of Google's planned investment from different perspectives.

Looking solely at the tangible economic consequences of these expenditures, we expect Australia to benefit from the 'direct' impacts of Google's investment program in terms of employment, income and contribution to gross domestic product (GDP). These outcomes will, in turn lead to 'flow-on' economic effects on other industries across Australia that will further add to these initial, direct impacts.

These aspects of Google's investments matter a great deal for Australia's future economic growth and prosperity. However, there is also a broader perspective that is all the more relevant given the current pandemic and increasing global uncertainties.

A large share of Google's investment relates to digital infrastructure, in the form of Google Cloud Regions in Australia. Access to this digital infrastructure and, relatedly, the value added applications the network supports, enables business customers to access secure distributed services and expertise remotely, and in a manner that can be adapted flexibly to changing circumstances. Improved digital infrastructure will also enable businesses to deploy advanced information and communications technologies (ICTs), which enable innovations that raise business productivity and benefit customers. Looking more broadly at an uncertain and complex world in which many risks cannot be predicted, the value of Google's digital infrastructure investment lies not just in its direct economic impact but additionally in strengthening Australia's adaptive capacity and digital resilience to stresses and disruptions. An important component of this resilience is the geographically distributed nature of Google's digital infrastructure.

The implications of Google's R&D program also extend beyond its immediate monetary benefit, in terms of the income that accrues to researchers. R&D benefits everyone. R&D and the innovations it generates result in large returns to society that translate into measurable productivity impacts and a higher standard of living, as well as less tangible benefits, such as new services for consumers or better health outcomes.

## 1.2 About this report

This report has been prepared by Henry Ergas AO, Director of Green Square Associates, supported by a small team of experienced economists, including Dr Stephen Beare (macroeconomic modelling), and Sabine Schnittger and Joe Branigan (economic research and analysis).

This report is structured as follows:

- **Section 2** describes Google's history in Australia, and the scope of Google's program of investment;
- **Section 3** focuses on the direct and flow-on impacts of Google's investment;
- **Section 4** considers the broader implications for Australia of Google's investment in digital infrastructure; and
- **Section 5** considers the impact for Australia of Google's investment in R&D.
- **Appendix A** provides a description of the methodology used in the economic impact analysis (EIA).

# About Google and Google's program of investment in Australia

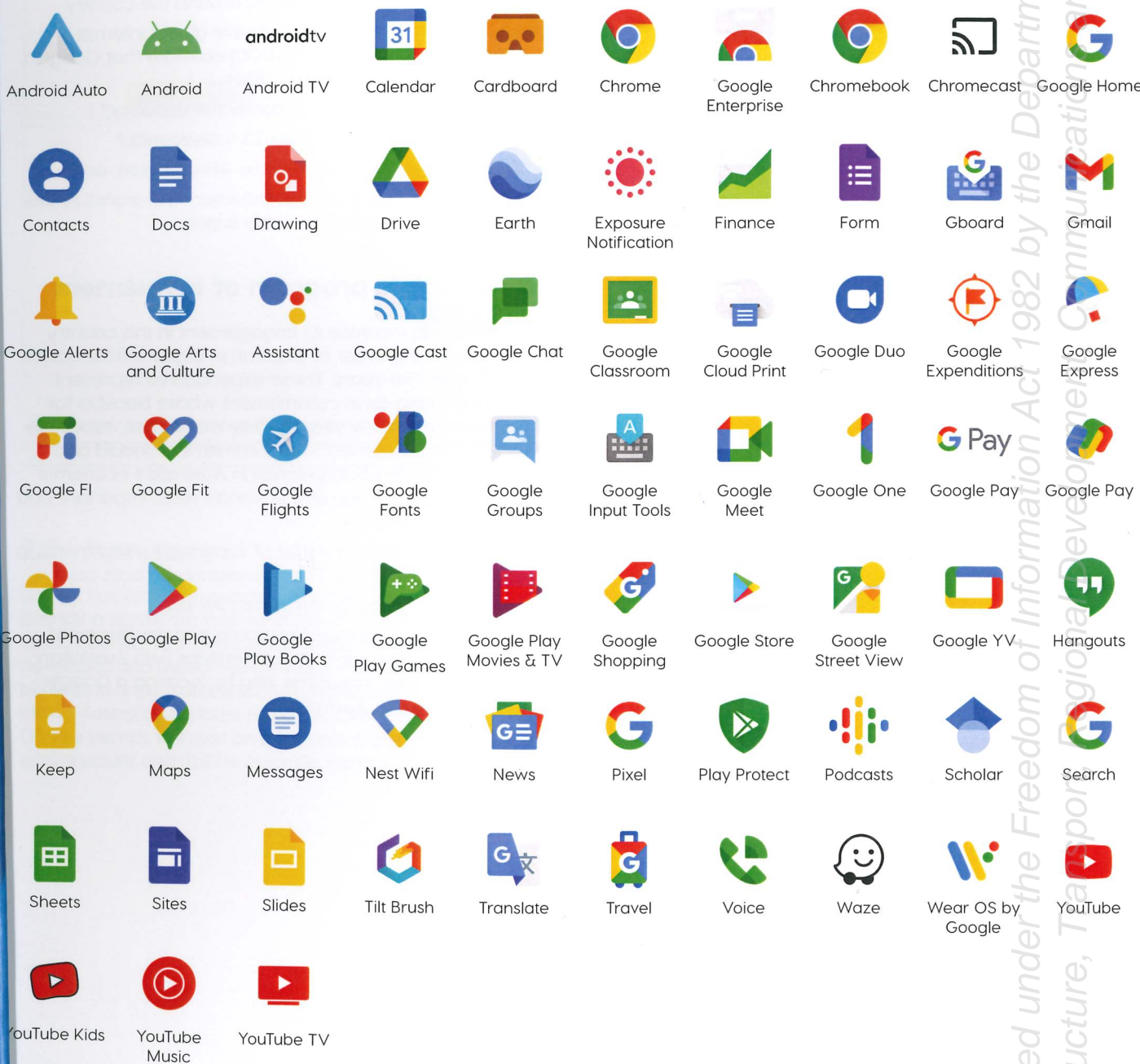
Google is ubiquitous in today's world. Google's name has become synonymous with its search engine, but also for the innovative products and services that it has launched around the world. Google also has a significant presence in Australia that will be further strengthened by its planned investment in digital infrastructure and support for R&D.

## 2.1 Google in Australia

In less than 25 years, Google's global footprint has grown to include over 4 billion Google searches per day, 2 billion YouTube users, 1.5 billion Gmail users, 3 billion Chrome users, and 1 billion Maps users.<sup>3</sup> Consumers are among the biggest beneficiaries of the great spectrum of products and services that have been developed and

are maintained by Google, many of which are free to use for consumers (Figure 2-1). Today, Google is also a leading cloud service provider, and a leading developer globally of new computer science and artificial intelligence, machine learning, robotics, and digital technology.

**FIGURE 2-1.**  
**A schematic of Google's main products**



Source: Google Australia (supplied).

<sup>3</sup> Data sourced from various trade journals and publicly available information.

While Google's global reach is well-known, Google presence and continued engagement in Australia has been far less visible. Google started its operations in Sydney in 2000. From 2002, Australian consumers were able to use an Australian-based Google search engine to search for whatever information they wanted to know. In turn, local businesses were able to advertise their products and services locally, attract new customers and grow.

### 2.1.1 Google Maps

Google Maps was invented in Australia and continues to be developed locally. In 2018, Google brought wheelchair accessible routes to Sydney before other cities around the world. And building on this achievement, Google has launched indoor Street View imagery for 130 train stations and a dozen metro stations in Sydney allowing commuters to virtually navigate interactive, panoramic imagery inside Sydney stations. In addition, Google has brought navigation directions for accessible routes across 70 complex train and metro stations across Sydney to Google Maps. These tools allow all types of commuters to find the best and most accessible entrances, exits, signage and paths within the station and better anticipate in-transit travel times along these pathways.

In a world first, Google is sharing these navigation directions with Transport for NSW so it can be published to the NSW government's Open Data Portal. This will allow the transport industry and app developers to access this valuable information and find more solutions to enable accessible transit travel in the future.

The development of Google Maps in Australia has provided benefits to Australia's bushfire response and, more broadly, emergency management. Throughout the bushfire crisis, Australians searched for updates on fire conditions near them, as well as safety information. In 2019, "fires near me" was the highest Search query in Australia, highlighting the demand for accurate and timely information.

Google has also collaborated with Infoxchange to add a bushfire services section to the Ask Izzy website, which lists over 370,000 support services across Australia to connect people with help in times of need. Google also provided digital skills training for small businesses in bushfire impacted communities to help them get back on their feet and connect with customers, such as in Shellharbour in March 2020.

### 2.1.2 Recent investments

Google has invested more than \$2 billion in network infrastructure across the Asia-Pacific (APAC) region in the past three years to support the capacity and improve the low latency of Google products and services offered in the Australian market (AnalysysMason, 2020). Key investments include two of the primary fibre optic communications links to Australia: the Japan-Guam-Australia-South (JGA-S) cable, and the Indigo West and Central cables from Singapore to Perth and Sydney (Figure 2-2). Apart from investments in international and local capacity, Google has built edge infrastructure and deployed Points of Presence (PoPs) in private peering facilities, cross-connected to Internet Exchange Points (IXPs), and has invested in content caches with GGC nodes deployed around the country.

These and other investments improve global internet connectivity. AnalysysMason (2000) estimate that Google's investments in Australia will, by 2024:

- add 72Tbits per second in additional capacity;<sup>4</sup>
- reduce end-user latency by 20 milliseconds;<sup>5</sup>
- double download speeds in the APAC region; and
- drive a 20 per cent annual reduction in IP transit prices due to strong submarine cable supply.

### 2.2 Google's program of investment

Google plans to increase its engagement in this country by investing in the order of \$1 billion in digital infrastructure and R&D over five years. These expenditures represent a substantial long-term commitment whose benefits for Google will take many years to fully materialise, especially where R&D is concerned. This commitment should also be taken as a vote of confidence in Australia's economic and social future by one of the world's most important and successful corporations.

Google is proposing a number of substantial investments in Australia over five years. These investments focus on:

- the creation of digital infrastructure, and
- a significant program of research and development (R&D) both in the form of partnerships with Australian businesses and institutions, and by locating a Google Research Hub in Australia.

FIGURE 2-2.

### Google submarine cable investments to Australia



Source: <https://www.submarinecablemap.com/multiselect/submarine-cable?ids=japan-guam-australia-south-jga-s,indigo-west,indigo-central> TeleGeography; <https://www.submarinecablemap.com/multiselect/submarine-cable?ids=indigo-central,indigo-west,japan-guam-australia-south-jga-s> accessed on 7 September 2021

### 2.3 Summary

Google has had a presence in Australia since 2002 and is already a significant investor in the infrastructure Australians use to connect to the rest of the world. Google invented, developed and tested Google Maps in Australia, providing benefits to organisations such as Transport for NSW and aiding Australia's bushfire response. Over the next five years, Google intends to invest an additional \$1 billion in digital infrastructure and R&D in Australia, commencing in 2021.

As we discuss in subsequent sections of this report, Google's investment program benefits Australia in a number of different ways. Perhaps the most apparent relates to the positive economic impact that additional expenditures on new digital infrastructure, additional local engineering capabilities, and the expansion of Google's site will have on the Australian and state/territory economies (Section 3).

In Sections 4 and 5 we consider the benefits to Australia of Google's investment in digital infrastructure and local skills, as well as its R&D investment in more depth.

<sup>4</sup> The transmission capacity of a connection (the quality and speed of the Internet connection) is its bandwidth. Bandwidth is measured in bits per second (bps). High capacity networks have bandwidths measured in megabits per second (Mbps), gigabits per second (Gbps), or even terabits per second (Tbps, or 1,000,000,000,000 bits per second).

<sup>5</sup> Latency is measured in milliseconds (ms) and is the time a signal takes to travel to its destination and back. For instance, latency indicates the delay between when a user clicks a link to a webpage and when the browser displays that webpage.

# Economic impacts of Google's investment in digital infrastructure

In this section we assess the economic impacts on Australia and Australian states and territories of Google's investment in digital infrastructure. These impacts consist of:

- 'direct' impacts; that is, the immediate effects of the investment, for example, in terms of jobs created, income paid to the workforce, and value added generated; and additionally,
- 'flow-on' impacts; that is, the impacts that arise because other sectors of the economy are needed to produce the goods and services for Google's investment program, in turn generating further economic activity.

Appendix A describes the methodology we have used.

## 3.1 Direct economic impacts of Google's investment

Google's (non-R&D) investment program consists of the digital infrastructure to support Google Cloud Platform (GCP), an expansion of Google's local engineering capability and investment in Google's site in Sydney. Overall, Google's non-R&D investment program will amount to around 80 per cent of its total investment.

As a result of that investment, Google can be expected to earn revenues in Australia, to generate 'value added', and thereby to contribute to gross domestic product (GDP)<sup>6</sup>. We have assumed that Google would aim to achieve a commercial return on that investment, and that Google would need to generate revenues to achieve that return. We note that these estimates represent an approximation; Google has not provided any financial information to Green Square Associates to support this estimate.

### 3.1.1 Representing the Australian digital economy

Although the Australian Bureau of Statistics (ABS) has recently published experimental estimates of digital activity, the sectors that make up the digital economy are not separately identified under conventional (and arguably dated) national accounting conventions.<sup>7</sup> To estimate key economic parameters implied by Google's program investment (such as compensation paid to employees and value added), we have constructed a modified 'input-output' (IO) table to incorporate a 'digital economy' sector.<sup>8</sup>

The modified IO table builds on the most recent (2018-19) table published by the Australian Bureau of Statistics (ABS). The 'new' digital economy sector essentially incorporates economic activity from other relevant industry sectors, such as Information, Media and Telecommunications, or Professional, Scientific and Technical Services, holding GDP constant. We have furthermore assumed that the (industry-wide) relationships between output, value added, and other economic parameters for the digital economy sector in the input-output table are approximately representative of Google's business.

A central assumption in constructing a separate digital economy sector concerns the share of GDP that the sector accounts for in Australia. The size of the digital economy has been officially measured at more than \$100 billion in value-added terms, comprising about 5.5 per cent of Australia's \$1.8 trillion economy in 2018-19.<sup>9</sup> AlphaBeta (2019) estimated the size of Australia's digital economy to be around \$122 billion or 6.6 per cent of GDP in 2018. For the United States, the Bureau of Economic Analysis (2021) estimated a share of the digital economy of 9.6 per cent in 2019. Given the structural shift to online communications (e.g., Google Meet, Zoom and Microsoft Teams) and all

manner of interactions as a result of the pandemic (e.g., the very rapid increase in online shopping), for this analysis we have assumed estimated that the digital economy in Australia is accounts for 7.5 per cent of GDP.

### 3.1.2 Direct increase in Australian production

In national accounting terms, the output that Google would need to generate to recover its investment and a return on that investment represents an increase in domestic production by the Digital Economy, specifically an increase in the 'gross operating surplus'. Based on our representation of the digital economy, we estimate that the increase in domestic output corresponding to Google's investment program is around \$5.3 billion.

We are then able to derive the following direct changes in economic outcomes as a result of Google's investment in digital infrastructure, increase in engineering presence and office space:

- additional compensation of employees across the Australian economy (28 per cent of the \$5.3 billion increase in domestic production) corresponding to around 1.5 billion; and
- additional value added (44.5 per cent of the \$5.3 billion) corresponding to around \$2.3 billion.

## 3.2 Flow-on impacts of Google's investment

'Flow-on' impacts refer to the adjustments in the economy that follow on from the direct effects. An initial investment sets the economy in motion as the productive sectors buy and sell additional goods and services from one another, and households earn additional incomes.

For instance, in order to generate an increase in output in the Digital Economy of \$5.3 billion, Google will need to purchase a range of goods and services from other businesses, including from other businesses in the Digital Economy, and to a lesser extent, from other sectors of the economy. Some share of goods and services will also be imported. In order for these other businesses to supply the required goods and services to Google, these businesses will in turn employ workforces, buy goods and services from other businesses and so forth. In this way, an initial increase in economic activity 'boosts' the activity of downstream industries that supply the required inputs.

<sup>6</sup> From an economic perspective, value added is a key metric of a business' contribution to the economy. A business buys 'inputs' (labour and intermediate products) to generate value added: the additional value of goods and services that are newly created in an economy, and that are available for domestic consumption or for export. Value added is a central concept in the Australian System of National Accounts. Subject to adjustments to ensure that valuations are internally consistent by accounting for various taxes and subsidies, the sum of gross value added across all industries in a country equals GDP.

<sup>7</sup> These sectors include digital enabling infrastructure (computer hardware, software, telecommunications equipment and network support services), digital media (digital audio, video and advertisement broadcasting services that can be created, accessed, stored or viewed on digital devices); and e-commerce (ABS 2021).

<sup>8</sup> Input-output tables are derived from national accounts aggregates and are produced by statistical agencies such as the ABS to map trade flows throughout the economy, including across industries. The 'industry by industry flow' table indicates, for each industry, the value of intermediate products purchased from other industries, how much that industry paid in wages, the various taxes that were paid, what overall output that industry produced, and what value added that industry generated.

<sup>9</sup> <https://www.abs.gov.au/articles/digital-activity-australian-economy-2018-19>

3.2.1 Input-output analysis

In this report, an IO approach has been used for estimating the flow-on impacts of Google's investment program, building on the modified IO table discussed above. Economic flow-on impacts can be measured in terms of the effects on employment (the number of full-time equivalent or FTE employees), the income accruing to that workforce, and the value added (contribution to GDP) that an initiative such as Google's program of investment generates.

We have derived two types of flow-on impacts of Google's digital infrastructure investment:

- the 'initial' or 'first-round' effects, which capture the immediate impacts on income, employment and value added in all industries whose output is required for Google's investment; and
- combined initial and subsequent 'industrial support' effects, which capture subsequently impacts across industries that occur after the first-round effects have played out. These subsequent effects reflect the fact that the initial effects from an investment will induce additional output in other industries, which will in turn lead to further rounds of effects and so on.

3.2.2 Australia-wide initial and combined industry-support flow-on impacts

Table 3-1 shows the estimated flow-on impacts of Google's digital infrastructure investment for Australia. These flow-on effects are additional to the direct (employment, income and value added) impacts of the investment:

- If only 'first-round' effects on other Australian industries whose output is required for Google's investment are considered, the additional value added generated is estimated at around \$1.3 billion, the additional income paid to workers at around \$620 million, and expected increases in employment of around FTE 6,500 jobs.
- If the industrial flow-on effects on the Australian economy that incorporate the expanded output arising from the initial expansion needed to meet demand for inputs into the digital economy are considered, the additional value added is estimated at around \$4.8 billion, the additional income paid to workers is estimated at \$2.6 billion, and additional employment is expected to amount to around FTE 28,000 jobs across the Australian economy.

TABLE 3-1.

First-round and combined industrial flow-on effects of Google's investment in Australia – Australia-wide

National accounts aggregate	First-round flow-on effects	Combined industrial flow-on effects
Employment (FTEs)	6,528	28,057
Income (millions)	\$620	\$2,628
Value added (millions)	\$1,295	\$4,769

Notes: NPVs have been derived using a discount rate of 5 per cent.

3.2.3 Initial and combined industry-support flow-on impacts by State

Table 3-2 shows how the estimated flow-on impacts of Google's digital infrastructure investment are expected to be distributed by State or Territory. For this calculation we have assumed that Google would recover the value of its investment across States/Territories in proportion to the population of these jurisdictions as opposed to the exact distribution of its investments which, at this stage, is unknown in a number of cases.

TABLE 3-2.

First-round and combined industrial flow-on effects of Google's investment in Australia – by State/Territory

State/ Territory	National accounts aggregate	First-round flow-on effects	Combined industrial flow-on effects
NSW	Employment (FTEs)	2,167	9,309
	Income (millions)	\$208	\$879
	Value added (millions)	\$378	\$1,414
Victoria	Employment (FTEs)	1,739	7,486
	Income (millions)	\$165	\$702
	Value added (millions)	\$290	\$1,106
Queensland	Employment (FTEs)	1,268	5,555
	Income (millions)	\$119	\$516
	Value added (millions)	\$371	\$1,347
South Australia	Employment (FTEs)	436	1,890
	Income (millions)	\$41	\$175
	Value added (millions)	\$74	\$278
Western Australia	Employment (FTEs)	638	2,893
	Income (millions)	\$61	\$272
	Value added (millions)	\$137	\$489
Tasmania	Employment (FTEs)	132	595
	Income (millions)	\$11	\$52
	Value added (millions)	\$21	\$86
Northern Territory	Employment (FTEs)	49	229
	Income (millions)	\$5	\$21
	Value added (millions)	\$9	\$34
ACT	Employment (FTEs)	100	100
	Income (millions)	\$10	\$10
	Value added (millions)	\$15	\$15

3.3 Summary

The analysis of the economic effects of Google's five-year program of investment in Australia suggests a direct increase in GDP of \$1.3 billion, and an additional total increase in GDP increase of \$4.8 billion if broader industry flow-on effects are considered.

These estimates add to a number of reports released in recent months highlighting the importance of Google's products and services globally as well as studies that are specific to Australia. The results of studies estimating the total economic footprint of Google in Australia, have correspondingly identified very large economic benefits. AlphaBeta, for example, have estimated the economic

impact of Google and, in particular, its cloud infrastructure to Australia:

- the economic impact of Google Cloud's Sydney and Melbourne regions and related services was estimated at \$3.2 billion in annual gross benefits, comprising \$1.4 billion in reduced costs and increased revenues for Australian businesses and \$1.8 billion in benefits (or 'consumer surplus') to Australian consumers (or 'consumer surplus') (AlphaBeta, July 2021); and
- Google's total economic impact in Australia has been estimated at \$39 billion in business benefits and \$14 billion in consumer benefits annually (AlphaBeta, December 2020).

# Google's investment in digital infrastructure

In this section we discuss the implications for Australia of Google's investment in digital infrastructure and local engineering capabilities.

The share of the digital economy as a proportion of GDP has been growing in recent years, a shift to which Google's investment will further contribute. The importance of the digital economy to Australia's standard of living is heightened as a result of:

- the flexibility and therefore resilience conferred by digital infrastructure, which has, for example, helped Australia to manage and overcome many of the disruptions wreaked by the Covid pandemic to daily life and commerce; and
- more generally, the effect on business productivity and therefore Australia's standard of living that is enabled by the ICTs that the digital infrastructure supports.

## 4.1 Digital infrastructure

### 4.1.1 Google's investment in digital infrastructure

Google plans to invest around a third of the \$1 billion into its digital infrastructure and, as part of this investment, has launched a Melbourne cloud region<sup>10</sup>. The Melbourne Cloud Region operates alongside the Sydney Cloud Region (which opened in 2017), and nine other regions throughout the APAC region, including in Mumbai, Singapore, Hong Kong and Tokyo.

The investment in the Melbourne Cloud Region represents a second Google Cloud region in Australia and represents the 11th Google Cloud region in APAC. The Melbourne Cloud Region initially offers 23 of 39 possible services (compared to Sydney offering 37 of 39 services).<sup>11</sup> Connected via Google's high-performance network, the Melbourne Cloud Region offers distributed, secure infrastructure to customers to meet their IT requirements while maintaining the redundancy needed for increased reliability and business continuity (eg. disaster recovery).

### 4.1.2 Google Cloud Platform

The 'Cloud' refers to the delivery of on-demand computing services – including servers, storage, databases, networking, software, analytics, and intelligence – over the Internet. Rather than locating the necessary resources on-site, services are provided remotely without requiring customers to actively manage the resources they use.

Core services included as part of GCP include:

- Cloud based computing power: Google Cloud customers are able to use GCP to develop applications in a remote environment. The applications include Compute Engine, App Engine, Cloud Run, and Kubernetes Engine. Compute Engine allows businesses to remotely create and run virtual machines on Google's infrastructure. GKE allows businesses to develop, test and operate applications in a 'containerised' environment, providing benefits related to reducing system downtime and portability.
- Cloud based storage and databases: Google Cloud customers are able to store their data 'on the cloud' rather than in-house. Applications include Cloud Storage, Cloud SQL, Cloud Firestore, Bigtable, Spanner, and Memorystore to provide object, file and block storage in addition to relational and NoSQL database services that are secure, fast, and scalable.
- Utilising the Cloud Network: Applications include Virtual Private Cloud, Cloud VPN, Cloud Load Balancing, Cloud CDN, and Network Intelligence Centre. These applications provide private and secure environments that monitor and optimise the network. Content is cached in the geographic regions where end users are accessing applications by using Google's global network.
- Providing AI and machine learning (ML): Access to

the GCP includes access to application programming interfaces (APIs) such as Translation API, Vision API, and Speech-to-Text API, allowing businesses to add sight, language, conversation, and structured data into their applications, along with AutoML custom model development capabilities without needing ML expertise.

- Cloud based data analytics capabilities: Includes products and services such as BigQuery, Dataflow, Pub/Sub, Data Fusion, and Dataproc, which help Google partners make data-driven decisions while eliminating constraints on scale, performance and cost.
- Security and identity: Includes services such as Cloud IAM for identity and access management, Cloud DLP for data protection, Cloud Armor for network security, and Security Command Centre for vulnerability management and security monitoring to help customers comprehensively protect their cloud deployments.

## 4.2 Increased local engineering capabilities

In addition to the creation of a Research Hub (see Section 5), Google plans to invest in advanced technology (or STEM) jobs. Google Australia plans to increase existing engineering headcount over the next five years including high paying advanced technology jobs such as skilled engineering, computer science and AI roles.

Combined with other growth across Google, this increase in STEM headcount would bring the number of Google employees in Australia towards 2,500 FTEs within the coming years. This significant increase in headcount aligns with Commonwealth Government policy to grow STEM jobs and the policy priorities of the leading industry association to "boost growth of the Australian tech sector; support talent attraction and development; and ensure regulatory settings across the economy work for the tech-enabled economy". (TechCouncil of Australia, 2021).<sup>12,13</sup>

### 4.2.1 Google support for STEM

Google supports the growth of STEM-based human capital in Australia in a number of ways, including sponsoring PhD students, professors; research contracts, and post-docs<sup>14</sup>. Additionally, the proposed Research Hub (see Section 5) will provide for a substantial increase in the number of researchers able to receive direct support from, and work with Google.

<sup>10</sup> <https://cloud.google.com/blog/products/infrastructure/the-google-cloud-region-in-melbourne-is-now-open>; accessed 20 September 2021.

<sup>11</sup> <https://cloud.google.com/about/locations#regions>

<sup>12</sup> Australian Government STEM policy is set out here: <https://www.industry.gov.au/policies-and-initiatives/science-technology-engineering-and-mathematics-stem>

<sup>13</sup> <https://techcouncil.com.au/policy/>

<sup>14</sup> <https://blog.google/around-the-globe/google-asia/australia/supporting-future-computer-science-2021-google-phd-fellowships>

### 4.2.2 Benefits to employees

Most of the benefits of Google's significant increase in investment in human capital accrues to Google employees and Google Australia in the form of increased wages and profits. These gross returns to labour and capital are counted in the national accounts along with the taxes paid. Accordingly, these benefits are reflected in the estimates of the direct and flow-on benefits of Google's digital infrastructure investment (Section 3).

### 4.2.3 Education spillovers

There are also broader spillover benefits to the Australian tertiary education system labour market from Google's decision to increase its economic footprint in Australia. For young people thinking about a career in STEM, the enlarged presence of Google in Australia – in particular the establishment of another research hub, will be potentially enormously impactful.

Based on the research output and achievements of Google's global research hubs, the planned Australian research hub is likely to be a major attraction to young people thinking about a career in STEM for a number of reasons.

First, as one of the 'big five' global technology companies, the opportunities Google creates are likely to draw young people into studying STEM subjects. Second, Google's presence will improve employment prospects in STEM and hence increase the expected returns to a STEM education. Third, there is a knowledge spillover effect that occurs as people spend a stint working with Google and then work elsewhere. As a global technology leader across computer science, AI, machine learning and robotics this effect is potentially significant. And fourth, there is a signalling effect of Google's investment, both in the labour market, universities, and to other firms deciding where to locate R&D facilities.

In Australia, 65 per cent of economic growth per capita from 1964 to 2005 can be ascribed to improvements in our use of capital, labour and technological innovation—made possible in large part by STEM (Office of the Chief Scientist, 2014). International research indicates that 75 per cent of the fastest growing occupations now require stem skills and knowledge. As the digital economy continues to grow as a share of GDP, the demand for STEM skills will only continue to grow as we compete in the emerging global economy.

### 4.3 Site investment

The growth in staff numbers will be matched by suitable local spaces. Google Australia plans to invest in Sydney, where it is currently headquartered, including the heritage redevelopment and in an office fit-out for its recently purchased REVY site in Pyrmont, Sydney.

## 4.4 Customer benefits from the Cloud

### 4.4.1 Flexibility and the ability to adapt

For customers, the Sydney and Melbourne Cloud Regions deliver distributed and secure resources that are scalable to suit their data handling and storage needs, as well as remote expertise in terms of system applications that suit customers' requirements.<sup>15</sup> Cloud services offer businesses the advantage that up-front capital expenditures on computer system resources are reduced, and that significant computing expertise is offered via a 'rent' rather than 'buy' model. Accordingly, in recent years there has been a fundamental shift towards Cloud computing for most medium to large enterprises, especially those that require large amounts of storage, privacy and/or security features, as well as merchant services for online sales.

The cloud thus promotes an economic process whose central importance was recognised centuries ago by Adam Smith: the division of labour, which combines specialisation and the partition of a complex production task into several (or many) sub-tasks. In other words, banks can concentrate on being good bankers, rather than trying to be great IT service providers to themselves.

As well as encouraging managerial specialisation, the division of labour facilitates the realisation of economies of scale in production. Thus, concentrating businesses' demand for data storage and associated services allows those services to be provided in a manner that fully exploits the efficiency gains of greater scale. Additionally and importantly, the cloud enables even smaller players to take advantage of the economies of scale in the supply of IT services, while still allowing them to differentiate their service offerings at the applications layer.

The existence of the cloud therefore yields a productive or technical efficiency resulting in cost savings, as well as promoting competition (as more players benefit from the economies of scale), which itself yields allocative, productive, and dynamic efficiencies. Overall, the cloud and the layer of services that can be provided across the cloud represent an almost classic Smithian dynamic: the growing extent of the market allows a deeper division of labour which makes for greater static and dynamic efficiency.

### 4.4.2 Quality of service

The additional cloud infrastructure in Sydney and Melbourne will enhance a key aspect of quality: maintaining sub-second latency. For consumers, low latency means search time savings, a more immersive gaming experience, and less buffering on video streaming services, including on video calls and other digital communication tools. In the current environment where person-to-person interactions have become problematic in many contexts, low latency implies an improved learning experience for young people being taught remotely, and more effective interactions between patients and doctors in a telemedicine context.

For businesses, low latency makes cloud services and applications more responsive and capable. Digital communication and collaboration tools are an essential part of an effective organisation, particularly in the current environment where the ability to work from home has become a crucial aspect of ensuring that businesses can continue to operate. Low latency services ensure near-

instant access to files and information stored digitally, the faster processing of online payments, and more generally, enhanced access to real-time information and the ability to respond instantaneously to rapidly changing data. Table 4-1 provides an overview of industries where low latency is key to service quality.

TABLE 4-1.

### Industries where low latency services are key to service quality

Industry	Application and services
Education	<ul style="list-style-type: none"> <li>• video conferencing</li> <li>• live-streaming</li> <li>• rich learning content</li> <li>• dynamic e-learning platforms</li> <li>• presentation applications</li> <li>• dynamic administration tools</li> <li>• Cloud-based applications</li> </ul>
Healthcare	<ul style="list-style-type: none"> <li>• Picture Archiving Communications Systems (PACS)</li> <li>• telemedicine, telehealth applications</li> <li>• diagnostic imaging</li> <li>• Electronic Medical Records (EMR)</li> <li>• patient portals</li> <li>• mobile healthcare applications and equipment</li> </ul>
Media and entertainment	<ul style="list-style-type: none"> <li>• live-streaming breaking news</li> <li>• television shows</li> <li>• videoconferencing</li> <li>• movies over Internet</li> <li>• transfer large files, images, and videos from the field to studios around the world</li> <li>• real-time gaming</li> </ul>
Government	<ul style="list-style-type: none"> <li>• interaction between communities and their governments</li> <li>• transportation management,</li> <li>• emergency response and general commerce</li> <li>• circulation of documents</li> <li>• self-service portals</li> </ul>
Legal	<ul style="list-style-type: none"> <li>• sharing large, bandwidth-intensive files quickly and securely</li> <li>• secure and high speed access to critical files "24 hours a day, 7 days a week"</li> </ul>
Finance	<ul style="list-style-type: none"> <li>• High-Frequency Trading (HFT) and high speed information exchange</li> <li>• financial transactions</li> <li>• connections to brokers, dealers, exchanges, hedge funds and information feeds</li> </ul>

Source: Spolitis et al. 2014.

<sup>15</sup> <https://cloud.google.com/blog/products/infrastructure/the-google-cloud-region-in-melbourne-is-now-open>, accessed 20 December 2021

#### 4.4.3 Data safety, privacy and compliance

Remote storage and data handling enables businesses to manage a range of challenges and risks, ranging from compliance with regulatory requirements in relation to data privacy to physical risks that extend as far as disaster recovery. The Sydney and Melbourne Cloud Regions are certified for, and regularly undergo independent verification against, an increasing number of compliance standards.<sup>16</sup> For Australia, Google Cloud is audited annually for compliance with the Australian Privacy Principles, as well as for data safety, privacy and security.<sup>17</sup>

- GCP and infrastructure redundancy. Google's cloud regions are geographically distributed to minimise the effects of regional disruptions; in the event of hardware, software or network failure, data is automatically shifted from one facility to another. The 'redundancy of everything' model applies to the server design, how data is stored, network and Internet connectivity and the software services.
- Security. Google maintains multiple levels of control to ensure that its infrastructure security is not compromised. These controls include electronic card key and biometric access systems, 24/7 on-site security operations, and heightened controls for accessing secure floors. Electrical power systems are designed to be redundant, as well as climate and temperature controlled.
- Protection of data in transit. Data sent to Google Cloud by a customer is secured in transit with authentication, integrity and encryption protocols.
- Protection of stored data. Google Cloud automatically encrypts customer content when it is uploaded for storage. Data are broken into encrypted chunks, with the encryption keys themselves being encrypted with a higher level protocol. In addition, customers can select one of a number of data privacy management solutions.
- Data access and privacy. Google Cloud has strong authentication and access management. Customers can manage all aspects of access control with different levels of authentication protocols, while different applications assist customers in managing individual access permissions.

#### 4.4.4 Implications for competition

Google Cloud's digital infrastructure and value added services intensifies downstream competition by providers of digital infrastructure for Australian customers. Increased competition in this space translates into pressures on prices, as well as additional impetus for qualitative improvements to the benefit of customers. As noted above, these improvements in quality include ongoing reductions in latency that are increasingly essential for businesses and valued by consumers.

Greater competition in the provision of digital infrastructure in turn fosters competition between businesses downstream. The scalable nature of the cloud and the sophisticated applications supported by Google Cloud effectively reduces entry barriers for new users of these services competitors, both in terms of hardware

and software requirements, as well as IT expertise. Ready access to specialised and supporting applications enables businesses to focus on their core competencies and on their customers instead.

#### 4.4.5 Resilient digital infrastructure

One of the key lessons from the current pandemic is the importance of a resilient digital infrastructure in helping to manage and, at least in part, overcome the enormous disruption that the pandemic has brought to all aspects of life. Australia's digital infrastructure has contributed to the resilience of the economy, in terms of reinforcing its ability to flexibly adapt in response to stresses and shocks, and to recover from these (Blum et al. 2014).

One of the key attributes of Google's cloud regions in Australia is, therefore, the increased flexibility and therefore resilience it promotes in the face of an increasingly complex and uncertain world. Resilient systems incorporate diversity, flexibility and adaptability in their components, and these attributes are readily apparent in the nature of the Cloud. The availability of distributed, secure infrastructure protects against service disruptions and aids in disaster recovery. Additional capacity enables the quality of digital services to be improved in a context where far more interactions of all kinds – be they business or social in nature – take place online. Perhaps more importantly, there seems little doubt that for businesses that have had to shift internal and customer communications online, the flexibility afforded by the cloud in terms of scalability of services has played a major role in limiting the fallout from the pandemic. In effect, the flexibility of the cloud confers an 'option value' on actual and potential users in the sense that they can incrementally scale up their online presence in response to changing circumstances.

Flexibility increases welfare but it does not necessarily increase productivity, at least as conventionally measured. For instance, a dedicated mass production line outfitted with specially designed machine tools that is designed to produce one complex output (say, a particular model of car) will always be more 'productive' than a modular arrangement where many parts interact to produce different models. However, this example also illustrates that a modular system that is essentially a collection of building blocks may be more flexible and therefore more effective in circumstances where the environment is highly uncertain. From this perspective, Google's investment in the Cloud has additional value: the value of a digital system that can flexibly adapt and that is therefore resilient against stresses and disruptions in a world in which all things Internet are increasingly essential to commerce and to our private lives.

#### 4.5 Digital infrastructure and the deployment of ICTs

Australian cloud regions will enable businesses to make greater use of complex ICT services, including Cloud-based computing, Cloud-based analytics, AI and machine learning (Section 2.1). ICT technologies, in turn, represent a 'general purpose technology' (GPT) that supports business productivity and innovation.<sup>18</sup>

##### 4.5.1 ICTs as general purpose technologies

ICTs refer to a spectrum of technologies encompassing all aspects of computing and data management, telecommunications, broadcast media, audiovisual processing and transmission systems, as well as network-based control and monitoring functions. The ubiquity and enormous range of applications of ICTs means that these are generally viewed as 'general purpose technologies' (GPTs, OECD 2013). GPTs are 'engines for growth' (Brynjolfsson et al. 2021). These are technologies that induce substantial and long-term consequences for economic growth, because they:

- are pervasive in the sense that they can be applied in many different contexts and support many applications;
- improve over time and support ongoing experimentation; and
- lead to complementary innovations and co-inventions.

##### 4.5.2 ICTs, business productivity and economic growth

The role of ICTs in spurring innovations, productivity gains and economic growth has been the subject of a large amount of economic research, with sometimes contradictory findings at the economy-wide level. At the level of the individual firm, however, there is clear evidence that investment and usage of ICTs raise firm output and productivity and enable ongoing innovations. As such, ICTs have set in motion four main innovative trends (OECD 2016):

- improved real-time measurement of business activities;
- faster and cheaper business experimentation;
- more widespread and easier sharing of ideas; and
- the ability to replicate and scale up innovations.

It is perhaps not surprising that those productivity gains at the firm level do not materialise immediately after the deployment of ICTs. To apply ICT effectively, businesses must change existing processes, develop managerial experience, train workers, adapt software and build other intangibles. A significant component of the value of ICT then rests in its ability to enable complementary organisational investments such as enhanced workforce

skills, business processes and changed work practices. These indirect effects of ICTs on growth and productivity take time to play out, as businesses learn how to use them and learn how to improve their performance.

Large-sample empirical studies at the firm level then show a clear positive relationship between productivity and ICT investment. Digital technologies enable firms to innovate, for example by improving business processes, and to automate certain routine tasks; they also reduce the costs of interacting with suppliers and customers (OECD 2019). Empirical studies also show that the returns to ICT investment are (far) higher over a period of a number of years than they are in the short run. The lag between the time the investment is made and the time in which it becomes mostly productive is interpreted as the time needed to build the complementary human and organisational skills when businesses invest in ICT.

##### 4.5.3 ICT and business innovation

Business innovation is a key determinant of both individual business success and national economic growth (OECD 2010). ICT supports business innovation by enabling firms to increase output quality in the form of new products or in improvements in intangible aspects of existing products like convenience, timeliness, quality, and variety. ICT further supports innovative activities via spillovers and network effects: by speeding up the diffusion of information, enabling networking among firms and closer links with customers, and by reducing or eliminating geographic limitations.

The empirical research then finds that businesses that invest in ICT are significantly more likely to engage in services innovation (Gago and Rubalcaba 2007, Polder et al., 2009), and that these firms also innovate more in terms of the management and marketing practices they adopt (OECD 2010). These effects are significant and large both in the manufacturing and services sectors.

##### 4.5.4 Digital infrastructure and ICTs in a dynamic environment

In recent years, the importance of ICTs in enabling businesses to prosper and grow has come into sharper focus. It has been noted for some time that the uptake and diffusion of digital technologies by businesses has been uneven across OECD economies (Andrews et al. 2018, OECD 2019). At the same time, there is a pronounced and growing gap between a share of businesses that are very productive and in some sense at the forefront of the productivity frontier, and 'laggard' firms that exhibit low productivity and appear to be falling further behind. These gaps in productivity performance are associated with significant differences in the implementation of ICTs and the operationalisation of these technologies.

<sup>16</sup> <https://cloud.google.com/security/compliance>; accessed 20 August 2021.  
<sup>17</sup> Google, n.d. Google Cloud and Australian Privacy Principles, Cloud Whitepaper

<sup>18</sup> Productivity and innovation underpin a country's economic growth and prosperity, as measured in per capita income. We discuss this relationship in more depth in Section 3.

One important aspect of this outcome relates to the availability of digital infrastructure. There are other barriers to the deployment of ICTs (for instance, skills shortages), but at a basic level, investment in digital infrastructure to enable the deployment of ICTs at the business level is clearly crucial. Overall, this research points to the importance, both at the level of the individual business and from a broader economic perspective, of creating new infrastructure and supporting the deployment of new ICTs that in turn enable new and better ways of doing things.

## 4.6 Consumer benefits

Google's investments in (non-cloud) network infrastructure such as the undersea cables that comprise the primary fibre optic communications trunks to Australia benefit consumers directly, providing increased reliability, greater bandwidth and lower latency than would otherwise be available.

During the pandemic, consumers utilised this network infrastructure more than ever to get things done online (such as for grocery shopping, telehealth appointments, working from home, or entertainment). Based on monthly data collected by the ACCC, Australia's broadband telecommunications network performed remarkably well thanks in part to Google's pre-pandemic investments. For example, between November 2019 and May 2020, latency for most service providers increased from between 10-15 ms to 15-20 ms, which is a barely discernible increase, despite the significant increase in demand as a result of the WFH arrangements.<sup>19</sup>

A recent study by AnalysysMason reported that Google has invested more than \$2 billion in network infrastructure across the Asia-Pacific (APAC) region in recent years (AnalysysMason, 2020). In addition, Google has built edge infrastructure and deployed Points of Presence (PoPs) in private peering facilities, cross-connected to Internet Exchange Points (IXPs), and has invested in content caches with GGC nodes deployed around the country. These investments have expanded Australia's telecommunications network capacity and improved the (already low) latency of consumer applications offered in the Australian market.

These investments have supported the hundreds, if not thousands, of popular consumer applications, including the many social media applications, requiring high bandwidth and low latency to operate as designed.

### 4.6.1 Consumer surplus definition

It has been shown in the academic economics literature that much of these consumer benefits are not measured in the National Accounts, which aggregates the quantity of goods and services sold in the economy by the price of those goods and services.<sup>20</sup> Since the monetary price of many consumer applications that Google's network infrastructure investment supports is zero (eg. 'free Apps'), the welfare benefits to consumers of these applications must be measured in a different way.

Consumer surplus can be measured via surveys of consumers' willingness to pay (WTP) for a product or service or willingness to accept (WTA), which in simple terms measures the payment that would need to be made to compensate for the service no longer being available.

### 4.6.2 The value of bandwidth and latency

In its 2020 report, AnalysysMason found that:

- Google's network infrastructure investments will reduce latency for information sourced from overseas by 20 ms; and
- Google's network infrastructure investments will expand bandwidth in Australia by 72 TB (or 72 million MB), (AnalysysMason, 2020).

In a recent study by Lui et al (2018), consumers in the United States were surveyed to discover their WTP for additional bandwidth and reduced latency. The study measured households' willingness-to-pay for changes in key home broadband internet connection features using data from discrete choice surveys that included features such as price, data caps, download and upload bandwidth and latency. The author's found that households' valuation of bandwidth is higher at lower incremental increases, with relatively little added value beyond 100 Mbps.

For example, the study found that households are willing to pay USD\$2.34 per Mbps monthly to increase bandwidth from 4 Mbps to 10 Mbps (or USD\$14 per month in total), USD\$1.57 per Mbps to increase from 10 to 25 Mbps (USD\$24), and only USD\$0.02 per Mbps for an increase from 100 Mbps to 1,000 Mbps (USD\$19). The author's also found households' willing to pay to be USD\$8.66 per month to reduce latency from levels obtained with satellite internet service (about 300-600 ms) to levels more common to a fibre optic cable service (around 10 ms).

### 4.6.3 The value of Google's investments in network infrastructure

Based on the two studies highlighted above, we have estimated the value of Google's investments to consumers, as follows.

The AnalysysMason study estimated the reduction in latency from Google's network infrastructure investments to be 20 ms. Based on the Lui et al study, we have estimated the value of a reduction in latency of 20ms to be \$5.76 per household per year.<sup>21</sup>

Although the increased bandwidth to Australian households resulting from Google's undersea cable investments is material, there are issues in measuring the effect of Google's investments at a household level. These issues relate to the various types of retail broadband plans selected by households and the 'last mile' NBN network limitations. Therefore, GSA has not estimated a consumer surplus benefit from the increased bandwidth deriving from Google's undersea cable investments. Further, GSA has not estimated an improved reliability benefit, although there is a clear benefit to Australian households from increased connectivity to overseas markets.

On that basis, we have estimated the consumer surplus from Google's investment in additional network infrastructure to Australian consumers, solely based on the reduced latency benefit, to be \$58 million per year. Over a 10-year period, in net present value terms using a 5 per cent discount rate, the total consumer surplus is estimated to be \$447 million.

## 4.7 Summary

Business customers and consumers benefit from Google's digital infrastructure investments in a number of ways. These include the flexibility with which this technology can be deployed, the range of sophisticated applications that customers can make use of, enhanced quality of service, and the many requirements around data security that are managed within the Google Cloud ecosystem. The expansion in Google's digital infrastructure will also add to competitive pressures on other digital service providers, which will in turn translate into pressures on prices and improved quality of service. To the extent that Google's digital network infrastructure enables business customers to deploy advanced ICT technologies, there will also be an additional impetus on business productivity and innovation. Household consumers also benefit from the augmentation of Australia's digital infrastructure from reduced latency, increased bandwidth and greater resilience.

Taking a broader perspective, the addition of flexible digital infrastructure capacity will strengthen the adaptability and resilience of the digital economy in Australia, an outcome that is especially valuable in today's uncertain and risky world.

<sup>19</sup> See ACCC report here: <https://www.accc.gov.au/consumers/internet-landline-services/broadband-performance-data>  
<sup>20</sup> See, for example, Brynjolfsson (2020) and Varian (2010, chapter 14).

The ABS has estimated the number of households in Australia to be just over 10 million. See here: <https://www.abs.gov.au/statistics/people/population/household-and-family-projections-australia/latest-release>

# Google's R&D investment

In this section we discuss the implications for Australia of Google's planned R&D investments in research partnerships and a Google Research Hub. The broader importance of this investment arises because R&D and the new technologies and innovations it spurs is essential for raising productivity. Productivity, in turn, is a central determinant of a country's standard of living.

## 5.1 Research partnerships and Google Research Hub

Google's investment in digital infrastructure and the capability to develop and support it is supplemented by a significant investment in R&D, representing around 20% of the total \$1b commitment:

- Google will invest in partnerships with CSIRO, industry partners and other public and non-profit organisations, to bring Google's broad and deep capability to bear in addressing in pressing Australian economic, environmental and social problems; and
- Google Australia has committed to establish a Google Research Hub based in Australia.

Google's partnership efforts seek to apply Google capabilities to issues of national importance. Areas currently being explored span energy, natural hazard management and food waste. Google is already partnering with the CSIRO to help map the incidence of the Crown of Thorns starfish on the Great Barrier using machine learning. Google has for some time partnered with Australian Universities on Quantum research but will substantially increase these investments in the coming years.

Google Research Hubs are at the core of Google's worldwide research activities. Google maintains significant computer science, AI, and machine learning research capabilities across the globe, including at its research hubs in Bangalore, Zurich, New York and Accra. The R&D undertaken at Google's Research Hubs has four dimensions:

- basic and fundamental applied research; this is the primary focus of Google's research hubs, has no immediate commercial benefit and is comparable to academic research;
- new product innovation; focused on demonstration versions and prototypes of new products and services;
- critical product contributions; work is characterized by deep, essential contributions to products. Progress is measured against product metrics, although research publications are often a side effect.
- infrastructure; such projects create reusable components that enhance the work of (product and research) teams that adopt them, multiplying everyone's impact.

The quality and scope of the research conducted in these hubs easily matches and exceeds that of well-known universities. Google's AI research output, for instance, is ranked first in the United States, and exceeded that of the next two institutions combined (Stanford University, and the Massachusetts Institute of Technology).<sup>22</sup> Most of the research produced by Google Research Hubs is published and free to access by the scientific research community. To that extent, it is what economists term a 'public good' in the sense of being non-excludable (all those who want access can obtain it) and non-rivalrous (use of the good by one user does not reduce its availability to others), with implications we discuss below.

## 5.2 R&D spillovers

R&D and the innovations it generates are crucial to a country's standard of living. R&D, resulting in new goods, new processes and new knowledge, is a central source of technological change and of improvements in productivity.<sup>23</sup> Productivity is simply the ratio of outputs to inputs. Labour productivity, for example, measures the output per worker or per hour worked, and is an indication of how efficiently labour is used to produce a given level of output. An economy that raises its productivity is able to produce more or better goods and services with the same resources, making the average consumer better off. Over the long run, increasing per capita incomes cannot be sustained without increasing productivity. Taken over many years, even small changes in productivity have a large effect on economic growth and a country's standard of living.

To understand why R&D is so closely tied to economy-wide improvements in productivity, it is important to see that R&D and the innovations it generates result in 'spillovers' that benefit parties other than the innovator. An innovating business may itself profit from an innovation, but the existence of spillovers generates 'social' returns to R&D that extend far beyond those captured by the original innovator in most industries (Hall et al. 2010, Jones and Summers 2020). The innovative investments made by one firm will thus not only raise the investing firm's productivity, but also raise the productivity of other firms:

<sup>22</sup> <https://chuvpilo.medium.com/ai-research-rankings-2020-can-the-united-states-stay-ahead-of-china-61cf14b1216>; accessed 20 August 2021

<sup>23</sup> The OECD (1993) defines R&D as "creative work undertaken on a systematic basis in order to increase the stock of knowledge and the use of this stock of knowledge to devise new applications".

- 'User' spillovers are those that benefit other firms (but also to consumers), for instance if more advanced computing capabilities increase the productivity of firms that deploy these technologies.
- 'Knowledge' or 'imitative' spillovers occur when an R&D project produces knowledge that can be useful to another firm. Knowledge spillovers occur because patent protections may not work all that well, innovations cannot be kept secret, and because new products can be reverse engineered and imitated. Knowledge spillovers are key to growth and development because they result in the diffusion and further creation of knowledge. In the case of research that is freely available, the knowledge spillovers can be very large, as any one user's access to the research does not reduce access by others.
- 'Intertemporal' spillovers occur when a particular advance or innovation lays the foundation for future advances. For example, technologies such as computers and mobile phones serve as platforms for enormous arrays of future innovations, but basic research which is intended to advance understanding and introduce new ideas also represents a central source for intertemporal spillovers.

### 5.3 The social return to R&D

The social returns of R&D and innovations as a result of spillovers then accrue to all types of agents across society, including to the imitators who earn additional profits, and to consumers who benefit from price reductions and improvements in quality.

A great deal of research has been done to estimate the returns to society from R&D and innovations. The precise estimates depend on many factors, including how R&D is measured, whether spillovers are assessed at the firm, industry or country level and others. However, the overarching conclusion is that society benefits a great deal from R&D, and that the social returns to innovation generally far exceed the private return captured by the innovator.

Jones and Summers (2020), for example calculate a baseline average social return to innovative investments from a macroeconomic perspective. Taking this baseline, \$1 of R&D investment today produces, on average, \$13.3 in future benefits, corresponding to an internal rate of return of 67 per cent. There are some considerations that may reduce this social rate of return – for instance if there are large delays in reaping the benefits of R&D, or if the gains from innovation are embodied in new forms of capital. Conversely, there are other factors that raise the social rate of return on R&D even higher, for instance, because national accounting measures do not properly reflect improvements in quality and overstate inflation (a claim that has been well documented, including in Australia), or because health benefits accruing as a result of innovations are not accounted for. Thus, Jones and Summers (2020) conclude:

"Overall, we find that the average social returns to innovation investments appear very large. If formal R&D and new venture creation drive the bulk of productivity gains, then the social returns to these investments appear enormous. If a much broader set of investments, including capital embodiment, are needed to fulfill these productivity gains, then the social returns to these broader activities still appear large. Even under very conservative assumptions, it is difficult to find an average return below \$4 per \$1 spent. Accounting for health benefits, inflation bias, or international spillovers can bring the social returns to over \$20 per \$1 spent, with internal rates of return approaching 100%."

### 5.4 Implications of Google's R&D investment for Australia

High social rates of return to R&D imply that Google's investment in research will flow through the economy and benefit Australians broadly. One of the factors that will determine the size of these benefits is the delay between an investment in R&D and the time the innovation is brought to the market. Here, most studies suggest that these delays between up-front costs in R&D and market payoffs are relatively short and in the range of three to six years, although the lags until basic research pay off tend to be around 20 years (Jones and Summers 2020). Given the nature of the digital economy, where many innovations concern information which is intrinsically hard to appropriate, delays are likely to be shorter. Information is expensive to produce and inexpensive to reproduce, and the low costs of imitation, transmission, and distribution of ICTs are likely to erode the value of property rights in intellectual property (Nordhaus 2005).

To estimate the return to Australia from Google's program of R&D investment, we have therefore conservatively assumed a delay of five years until other businesses and consumers benefit from innovations. In reality, many new products and services may come to market more quickly, but given the broad focus of the research partnerships and Google Research Hubs (including on basic research), a five-year lag was deemed more appropriate. A five-year lag implies an average social benefit-cost ratio of 10.4 (Jones and Summers 2020), so that Google's expenditures on research partnerships and an Australian Research Hub would correspond to a combined social benefit to Australia of around \$1,509 million in NPV terms

### 5.5 Summary

Google plans to invest almost 20% of the \$1b commitment in a program of R&D in Australia, including in research partnerships with industry and Australian research institutions, and a Google Research Hub.

R&D and the resulting new technologies and innovations give rise to spillovers as new knowledge diffuses throughout the economy, and businesses and consumers benefit from cost reductions and improvements in quality. The corresponding social rate of return to R&D investment easily exceeds \$10 per \$1 spent on R&D. Accordingly, we estimate that the social benefit to Australia of Google's R&D investment exceeds \$1.5 billion in NPV terms.

“

Overall, we find that the average social returns to innovation investments appear very large. If formal R&D and new venture creation drive the bulk of productivity gains, then the social returns to these investments appear enormous.

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# Appendix A.

## Analysis of direct and flow-on impacts

### A.1 Specification of the digital economy

The economic impacts of Google's proposed investments, as measured in the Australian national accounts, were assessed by constructing modified IO tables that include the 'Digital Economy' as a separate ANZSIC industry.<sup>24</sup> The modified IO table was derived from the most recent – 2018-19 – IO tables published by the Australian Bureau of Statistics (ABS).<sup>25</sup> The IO tables were used to estimate the direct impacts on the Digital Economy and flow-on impacts through other industries.

In brief, a share of the ANZSIC industries that contribute to digital activity was reallocated to the Digital Economy, subject to the constraint of holding total economic activity constant. The 2018-19 industry-by-industry flow table with direct allocation of imports was first aggregated to the 19 ANZSIC industries from which a concordance between the Digital Economy and the ANZSIC industries that contributed to digital activity, as defined by the ABS, was constructed (ABS 2019). A set of assumptions were then made to reallocate the table.

First, 7.5 per cent of the value added in the economy was allocated to the Digital Economy. Second, the shares of the ANZSIC industries' contribution to the value added of the Digital Economy were specified. These were:

- Manufacturing – 14 percent;
- Wholesale Trade, Retail Trade – 10 percent;
- Information, Media and Telecommunications – 22 per cent;
- Professional, Scientific and Technical Services – 33 per cent; and
- Other Services – 7 per cent.

Employment in Digital Economy was allocated in the same proportions.

The rows of the industry-by-industry flow table were then reallocated to create the supply of intermediate inputs of the Digital Economy to other industries (and the reduced contribution of the ANZSIC industries). The columns of the flow table were then reallocated in order:

- to create the intermediate inputs used by the digital economy; and
- to break down the value added in the Digital Economy into compensation of employees, gross operating surplus, taxes and imports.

The supply of the Digital Economy to itself was then calculated to bring the flows table back into balance.

The requirements table, in which input supply, input use and the component of value added were then calculated by dividing the columns by total industry production.

The 'Digital Economy' sector is summarised in Table A-1. In 2018-19, the Digital Economy sector purchased intermediate inputs with a value of around \$147 billion from other industries (including itself), paid compensation of around \$86 billion to its workforce, earned a gross operating surplus and mixed income of around \$46 million, with Australian production of around \$308 billion. The value added generated by the Digital Economy is estimated at around \$137 billion or 44.5 per cent of Australian production.

TABLE A-1.

Structure of the digital economy in the modified IO table

	Digital Economy (\$ millions)	Share of Australian production (Per cent)
Total Intermediate Use	\$146,960	47.7%
Compensation of employees	\$86,253	28.0%
Gross operating surplus and mixed income	\$46,437	15.1%
Taxes less subsidies on products	\$1,555	0.5%
Other taxes less subsidies on production	\$4,291	1.4%
Complementary imports	\$0	0.0%
Competing imports	\$22,554	7.3%
Australian production	\$308,051	100.0%
Value Added	\$136,982	44.5%

Notes: # In the national accounts, the gross operating surplus is the portion of income derived from production that is earned by the capital factor. In the above table, the GOS also includes 'Mixed Income', which refers to the capital and owner returns of non-incorporated enterprises.

<sup>24</sup> The conceptual framework for the economic impact modelling was developed by Dr Stephen Beare. The modelling was undertaken by Sabine Schnitger. The model outputs were checked (quality-assured) by Dr Stephen Beare and Joe Branigan.

<sup>25</sup> 5209.0.55.001 Australian National Accounts: Input-Output Tables, 2018-19.

A.2 Derivation of input-output multipliers

We note that the input-output methodology is underpinned by various strong assumptions; these assumptions result in the impacts of an investment being overstated if they are breached (Bess and Ambargis, 2011). The key assumptions and limitations that apply to IO analysis are that:

- inputs are used in fixed proportions to one another to generate an output;
- all firms within an industry are characterised by a common production process;
- prices are fixed; and
- there are no supply constraints.

The multipliers used here were derived from the modified 2018-19 industry-by-industry flow input-output tables published by the ABS. Two types of multipliers have been derived in this analysis:

- 'Type IA' multipliers refer to the 'initial' or 'first-round' effects arising from an increase in demand generated by an investment. Type IA multipliers capture the immediate subsequent impacts on income, employment or value added on all industries whose output is required for Google's investment.

- 'Type IB' multipliers refer to the combined initial and subsequent 'industrial support' effects. Industrial support effects capture the subsequently induced effects across industries that occur after the first-round effects have played out. These subsequent effects reflect the fact that the initial output effect from an investment will induce additional output in other industries, which will in turn lead to further rounds of effects and so on.

A.3 Australia-wide multipliers

The Type IA and Type IB multipliers for value added, income, and employment are calculated from the appropriate inversions of the requirements table.<sup>26</sup> In the case of value added and income, the multipliers can be used to calculate the value of the flow-on effect directly from the direct value added and income estimates. In the case of employment, we need the change in FTE employment, calculated here as the number of FTE employees per \$ million in production.

Table A-2 below shows the Australia-wide multipliers for the digital economy derived in the manner described above.

TABLE A-2  
Digital industry multipliers – Australia

National accounts aggregate	Multipliers	
	Type IA	Type IB
Value added	0.55	2.03
Income	0.42	1.78
Employment	0.41	1.76

26 Based on similar work completed by GSA, the multipliers derived in the model are within the reasonable range of multipliers estimated for these industries in the Australian economy.

A.4 State/Territory multipliers

It is not possible to maintain the level of consistency that exists in national input output tables at a state level. Comprehensive data on industry composition, household consumption and the flow of goods and services to and from states is not available.

A.4.1 Adjusting the State/Territory industry composition and trade

A standard approach that can be reproduced across different geographical definitions in a consistent manner is to use employment by industry data to form what are known as location quotients (LQs). Employment-based LQs are ratios that indicate the percentage of people employed in a particular industry at a state level, relative to the percentage of people employed in that industry in the national economy. Employment-based LQs are then used to proportionally adjust the contribution of an industry to the use of intermediate inputs in a state. The consequent shortfall in intermediate inputs is made up by increasing 'imports' from outside the state or region across all industries.

The use of employment LQs has a critical limitation. Input-output tables do not explicitly account for fixed capital, human or physical, although the returns to these assets are implicitly reflected in wages and operating surpluses (profits).

A raw LQ is simply the percentage of FTE employment in a given industry and region, divided by the percentage of FTE employment in a given industry at the national level. This may be written for the *i*th industry and the *j*th region as:

$$LQ_{ij} = \frac{\text{employment}_{ij}}{\sum_i \text{employment}_{ij}} \div \frac{\sum_i \sum_j \text{employment}_{ij}}{\sum_j \sum_i \text{employment}_{ij}}$$

The LQ has a natural interpretation for an industry within a state:

- if the LQ is less than one, the goods and services from that industry will tend to be imported into the region to meet demand; while
- if the LQ is greater than one, the goods and services from that industry will tend to be exported into the region to meet demand elsewhere.

Given that goods and services and labour requirements are the same in all states, the relationship will tend to be proportional so long as the actual size of the labour force does not represent a constraint.

A.4.2 State/Territory multipliers

Table A-3 shows the state multipliers for the digital economy.

Released under the Freedom of Information Act 1982 by the Department of Infrastructure, Transport, Regional Development, Communications and the Arts

TABLE A-3

Digital industry multipliers – Australian states and territories

National accounts aggregate	Multipliers	
	Type IA	Type IB
<b>NSW</b>		
Employment	0.43	1.83
Income	0.44	1.86
Value added	0.57	2.11
<b>Victoria</b>		
Employment	0.42	1.80
Income	0.43	1.82
Value added	0.53	2.03
<b>Queensland</b>		
Employment	0.39	1.72
Income	0.40	1.72
Value added	0.56	2.01
<b>South Australia</b>		
Employment	0.40	1.71
Income	0.40	1.71
Value added	0.51	1.92
<b>Western Australia</b>		
Employment	0.38	1.74
Income	0.40	1.76
Value added	0.63	2.24
<b>Tasmania</b>		
Employment	0.39	1.76
Income	0.36	1.67
Value added	0.49	1.94
<b>Northern Territory</b>		
Employment	0.32	1.49
Income	0.33	1.50
Value added	0.44	1.67
<b>ACT</b>		
Employment	0.37	0.37
Income	0.39	0.39
Value added	0.43	0.43

Released under the Freedom of Information Act 1982 by the Department of Infrastructure, Transport, Regional Development, Communications and the Arts