GOOGLE ECONOMIC IMPACT
AUSTRALIA 2015

Prepared by AlphaBeta for Google Australia

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strategy x economics

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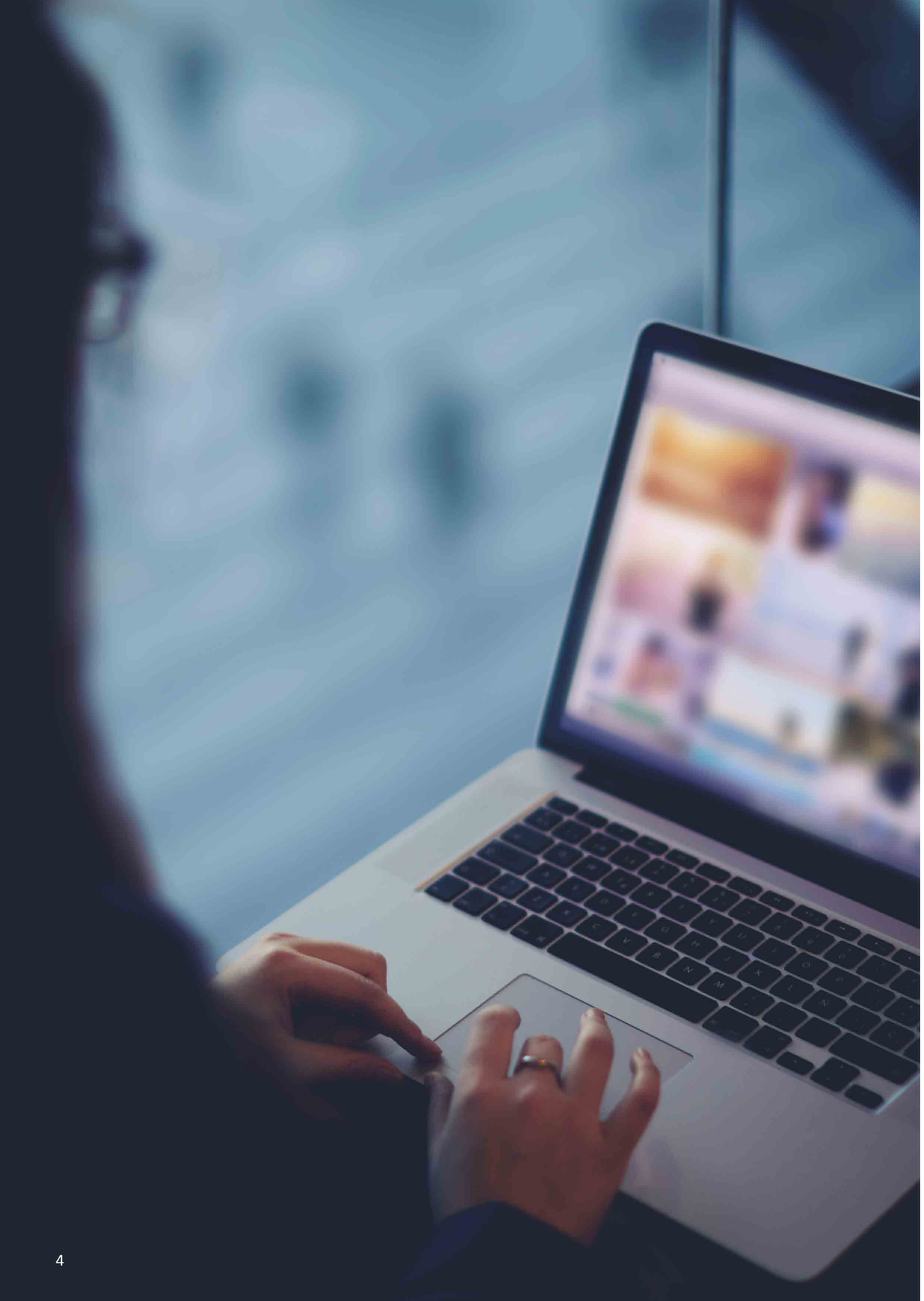


In Australia during 2015:[1]

BUSINESS BENEFITS

Australian business generated

$15.1 billion

using Google platforms

840,000

Australian **businesses connected with consumers** via Google

CONSUMER BENEFITS

Google supported

$14.8 billion

in **consumer benefits**

Google Search saved Australian users on average

31 hours

in time answering questions each year

Google Maps saved Australian users

29 hours

on the roads, on buses and trains, and walking

SOCIETAL BENEFITS

Google supported

- **higher human capital**
- **lower emissions**
- **empowered consumers**
- **more efficient not-for-profits**
- **local innovation**

Nearly

1000

Australian nonprofits benefitted from **free advertising grants** and **online apps** for collaborating, communicating and storing documents

Every night, Google and other resources helped students answer more than

25 million questions

while doing homework

[1]Data in the Exhibit is estimated by AlphaBeta using a range of third party sources. See Appendix for detailed methodology.

1

EXECUTIVE SUMMARY

Google impacts the lives of millions of Australians every day. Google Search helps us harness the immense resources of the internet to assist our work, study and personal lives. Google Maps help us find our destination and make the journey home as quickly as possible. Google advertisements help connect millions of businesses to their customers. YouTube entertains, educates and helps creative people reach a global audience. Gmail and Apps for Work help us communicate and collaborate. And many other Google services help us navigate and succeed in the digital world.

Information is the raw material of the modern digital economy. Just as oil and steel powered the 20th century, now information is the critical resource of the 21st century. Google is a facilitator of the digital economy, helping to organize the world's information and, in the words of its Founders' Letter, "develop services that significantly improve the lives of as many people as possible."

There is much public debate about the role of multi-national corporations in local economies. To inform this debate, we examined the positive economic contribution that Google makes across a broad range of areas. Accordingly, this report describes the total positive economic impact of Google in Australia over the past year as comprised of three components: business benefits, consumer benefits and societal benefits[2]. These are gross benefits (which don't calculate the incremental impact of Google or the activity that Google displaced), some of which can be quantified and others of which can be described in qualitative terms. While each of these benefits are additional, the concepts are distinct so we have resisted the temptation to sum the benefits to a total figure.

Australia's economy has always been affected by our small size and remoteness from major markets. Google is particularly important to Australia because it helps our businesses connect to global markets and overcome the tyranny of distance. As Australia transitions to a knowledge-based services economy, Google is helping to expand access to information and support innovation across the economy.

Google's services make a significant contribution to Australian businesses and producers. Businesses grow their customer base through Google Search and AdWords. Content creators generate advertising revenue for their websites and videos through Google AdSense and YouTube. Approximately 50,000 Australian businesses used Google Apps for Work. These activities support productivity, gross domestic product (GDP) and job creation across the economy.

Google also makes a large contribution to the lives of consumers. Many of these benefits aren't measured within the boundaries of official GDP statistics. For example, when Google helps us search the internet, the answers we find aren't included in measures of our economic growth. Neither is the time we save when we use Google Maps to arrive quickly at our destination. None of the benefits consumers derive from the 60 million YouTube videos Australians watch every day or the 190 million emails sent on Gmail every day are measured in Australia's GDP. But these consumer benefits do have a major impact on our lives and so failing to take into account their value would significantly underestimate the contribution of Google to Australia.

Google also delivers benefits which accrue to Australian society as a whole, rather than to any specific business or consumer. For example, when a child uses Google or YouTube to help with homework, Australia's human capital is growing. When a not-for-profit organization benefits from Google philanthropy or advertisements, Australia's social capital is growing. When Australian content creators upload videos to YouTube that are watched around the world, our cultural capital is growing.

Total benefits supported by Google in Australia

[2] In this report, the past year refers to the year to June 2015.

EXHIBIT

Examples of benefits supported by Google in Australia[3]

	BUSINESS BENEFITS	CONSUMER BENEFITS	SOCIETAL BENEFITS
GOOGLE SEARCH	Businesses use Search and Adwords to advertise their goods and services. 840,000 businesses connect with consumers through Google	>15m individuals use Search to save on average 31 hours per person answering questions each year	Individuals use Search to build their human capital. Nonprofits advertise and collect donors using Ad Grants
YOUTUBE	Content creators use AdSense and YouTube to generate revenue	>9m individuals use Youtube to consume entertainment	Students learn in the classroom and at home using thousands of educational videos
GOOGLE MAPS	Thousands of local businesses are found by consumers on Google Maps	>11m individuals use Maps to save time on the road and public transport	Saving time on the road reduces emissions = removing 125,000 cars from Australian roads
GOOGLE APPS	~50,000 businesses use Apps for Work to collaborate and store docs	Individuals use Gmail to communicate, sending ~190 million emails daily	Non-profits and schools save IT and travel costs by using free doc collaboration and storage
GOOGLE	**$15.1 billion**	**$14.8 billion**	Benefits are large but difficult to quantify

[3]Data in the Exhibit is estimated by AlphaBeta using a range of third party sources. See Appendix for detailed methodology.

Business benefits

In the past year, Google Australia supported $15.1 billion in benefits for business. Although different concepts, this economic activity is broadly equivalent in scale to half the annual output of the agriculture industry and double the size of the airline industry.[4]

These benefits were supported through a number of channels and are often not as widely understood as the benefits to individuals. Businesses earned profit as a result of people finding their products and services through free Search and paid online advertising. Approximately 840,000 Australian businesses connected with consumers through Google.[5] The vast majority of these were small businesses. Content creators, like bloggers, vloggers and writers, earned income by hosting advertisements on their sites. Businesses improved employee productivity and reduced IT and travel costs by using Apps for Work.

Consumer benefits

Millions of Australians use Google on multiple occasions every day in ways that provide clear benefits but are not captured in GDP. These 'consumer benefits' include the time saved by around 15 million Australian Google search users who each gain on average 5 minutes per day when compared with offline research methods.[6] Similarly, Google Maps saved the average Australian 13.5 hours on the road over the year, another 13 hours on public transport and a further 2.5 hours walking.[7] Australian YouTube users enjoyed on average approximately 48 hours of YouTube videos for free in the past year – and more Australians now watch YouTube than the cricket on TV.[8] Australians sent more than 190 million emails each day on their personal Gmail accounts – a figure that is double the number of phone calls made and received each day.[9]

The value of these consumer benefits supported by Google in the past year was approximately $14.8 billion. As policymakers around the world worry about slow economic growth, they should pause to consider the growth of 'consumer benefits' benefits that have been flowing from Google and other technology companies. While there is no doubt that GDP growth around the world has been slow, this doesn't necessarily mean that the rate of human progress has diminished. Part of the rise in our living standards is not being captured in traditional measures of GDP, which fail to take account of the value of free services and fail to measure the improvement in our living standards that may be occurring beyond official productivity statistics.

Societal benefits

Beyond the benefits to businesses and individuals, Google delivers benefits to society that may not accrue directly to a specific company or person. These are often termed "spill-over benefits".

These benefits might not appear in GDP measures today, but they might affect other objectives we care about or will strengthen Australia's economy over time. For example, Google provided approximately $75 million of in-kind advertising placements to nearly 500 Australian not-for-profit organizations. Free provision of Apps for Work to around 900 Australian not-for-profit organizations is estimated to have saved around $25 million in labour productivity and IT costs. Google has also contributed to environmental benefits. Google helped to save over 600,000 tonnes of CO_2 in vehicle emissions, which is the equivalent of taking 125,000 cars off Australian roads, by navigating the quickest route through traffic. Google and its product suite have contributed to higher quality, efficiency and access in our education system, for both young and lifelong learners. This increase in the quality and accessibility of knowledge might not drive increased economic activity in the short term, but is an asset that will deliver returns over the long term.[10]

[4] Output as measured in value added terms. ABS National Accounts industry gross value added in June 2015 (published September 2015).
[5] ABS Catalogue 8166 "Business use of Information Technology" (2013-14), ABS Catalogue 81650 "Counts of Australian businesses" (June 2015) and Statistica
[6] See Section 3 and Appendix A for detailed methodology. Number of users from Nielsen Online Ratings (2015), Surfing Report, Top Ten Brands and Their Engagement, Nielsen Online Ratings
[7] See Section 3 and Appendix A for detailed methodology
[8] Data on YouTube viewership from Nielsen Online Landscape Review. Data on sports viewership on TV from Roy Morgan Research, available here
[9] See Section 3 for methodology
[10] Varian, H (2013), 'The value of the internet now and in the future', The Economist.

2

BUSINESS BENEFITS

HELPING BUSINESSES GROW AND CONTENT CREATORS REACH NEW AUDIENCES

Estimated Business benefits of Google in Australia during 2015:[11]

By **connecting consumers and businesses** and **providing productivity tools**, Google helped businesses earn

$15.1 billion

YouTube video creators earned around

$60 million

in advertising revenue

Around

50,000

Australian businesses used **Apps for Work** to collaborate, store documents and communicate

Around

8,000

Australians earned income from **creating apps for Google Play** as part of an entrepreneurial community

[11]Data in the Exhibit is estimated by AlphaBeta using a range of third party sources. See Appendix for detailed methodology.

Google is foremost a search engine, but it is also an engine of economic growth. Google helps businesses grow by efficiently connecting them with new customers, by providing revenue streams for content-creators and by improving productivity through tools for collaboration and communication.

Businesses across Australia use the internet to connect with their customers and reach out to new customers. This is most apparent in the growing e-commerce industry, with more than 40 per cent of Australians now regularly buying products online.[12] But the internet also supports bricks and mortar businesses because many Australians conduct online research before making offline purchases. Around one in three online Australians use their mobile devices to check prices online while they are shopping in a store.[13] The internet is now the marketplace for both online and offline commerce and Google is an enabling platform in this arena.

Google seeks to maximize the efficiency of advertising by delivering relevant advertising to consumers as they search for a product or service. This helps to direct advertising to interested consumers. These efficiencies allow businesses to invest savings into reaching new customers or improving their product. This is particularly relevant for small businesses (See Exhibit) which don't have the scale to warrant 'brand advertising' and don't have the resources to advertise their products on television, radio or in newspapers. Google enables small businesses to be searched for free by customers looking for their specific product or service. And small businesses can also supplement this with paid advertising delivered through performance-based pricing models.

In these models, businesses only pay when an interested consumer clicks on their ads, i.e. when the advertising is working. These online marketing services have lowered the barriers to advertising for small businesses, enabling them to cost-effectively reach a broad customer base for their products.

Google also supports content creators to generate income by monetizing their content through targeted advertising. Publishers, bloggers, writers and hobbyists are all able to support their activities through advertisements served by Google. This revenue supports the continued availability and quality of content on the internet. Approximately one in four pages carry advertising.[14] In Australia, this means that some 15 billion web pages viewed in the past year were supported, in part, by advertising.[15]

Google also helps content creators reach audiences and generate income through advertising across the internet. Video creators can reach a global audience through YouTube, building their profile and monetizing their content. YouTube has dramatically reduced the barriers to entry and massively expanded the opportunities for creative people to showcase their talent to a broad audience. Not long ago, it was inconceivable that individuals could create content and reach a global audience with basic home equipment.

Search, AdWords, AdSense and YouTube represent ways in which Google helps businesses to boost their revenues. Google products also operate to reduce costs to business, namely through Apps for Work. Apps for Work is a suite of cloud-based products and services that enable communication, document sharing and collaboration, and document storage. These services have been found to improve employee productivity through easier collaboration and quicker switching between applications, and to reduce IT and travel costs.

[12] Roy Morgan, 2015, Online shopping on the rise for most retail categories, Roy Morgan Research.
[13] http://www.telstra.com.au/business-enterprise/download/document/business-enterprise-teg1398_mobility_retail_white_pages_v08_hr_singles.pdf
[14] Varian H (2011) *Economic Value of Google* Presentation
[15] Nielsen Online Ratings (2015), Surfing Report, Top Ten Brands and Their Engagement, Nielsen Online Ratings.

Calculating business benefits

The business benefits supported by Google are calculated by considering the revenues and income of Australian businesses, advertisers and content creators using Google products. These producer benefits are a proxy for the 'gross economic activity' generated by Google i.e. this methodology does not account for activity that may have been displaced by Google or attempt to estimate the incremental impact of Google on the Australian economy beyond what would be the case if Google did not exist but other search engines did. Such hypothetical scenarios required to calculate truly incremental benefits of Google are highly speculative and beyond the scope of this study.

The business benefits derived from Google are calculated as the sum of three components:

- Direct impact: This is the gross income of businesses resulting from their use of Google to connect with their customers and the revenues received through Google by content creators.
- Indirect impact: This is the flow-on economic effect generated as the increased activity in the directly-impacted businesses generates further purchases from their suppliers.
- Induced impact: This is the economic activity generated by the employees of directly and indirectly-impacted businesses who spend their wages in the broader economy.

EXHIBIT

Types of benefits to business

1 Direct impact

Initial economic impact supported by tools of Google

Examples: Gross profits of advertisers from using Adwords or gross revenues received from Google by content creators using AdSense or YouTube

2 Indirect impact

Economic effects produced in the supply chain as a result of demand from the businesses directly impacted

Examples: Businesses that provide services to businesses that generate profits by using AdWords

3 Induced impact

Economic effects produced by consumer spending among those who work at businesses that generate profits by using Google and businesses that provide services to these businesses

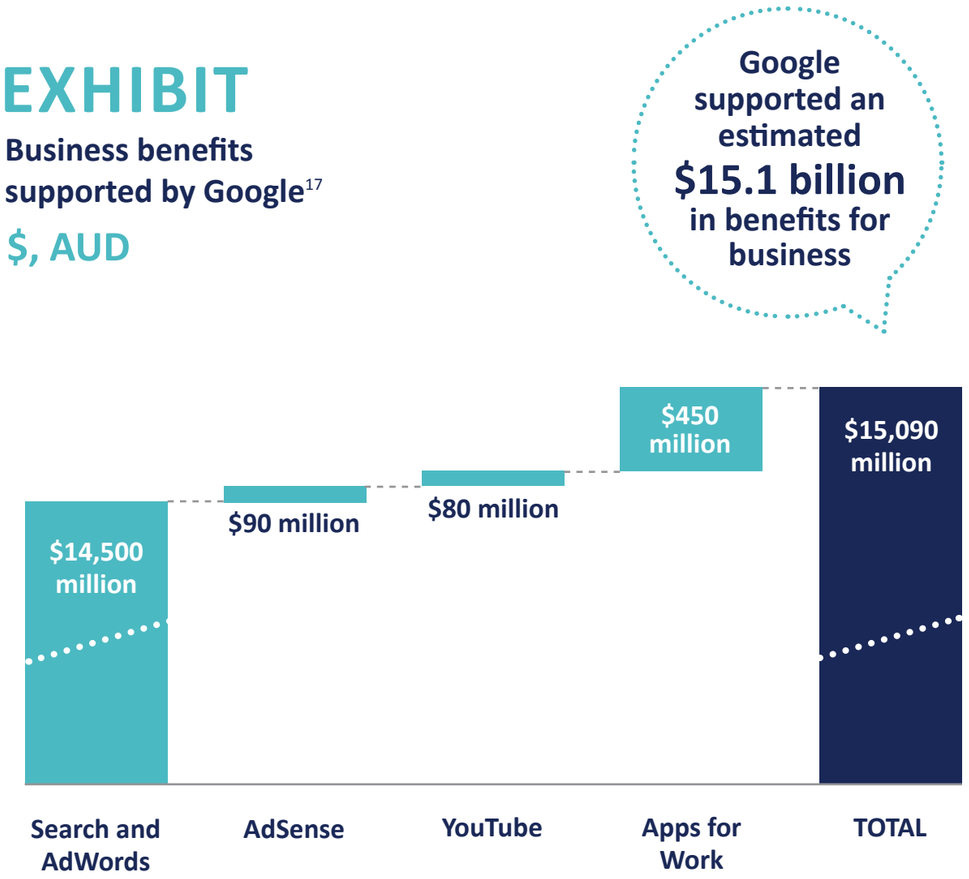
Examples: Retail expenditure by employees of businesses that provide services to businesses that generate profits by using AdWords

The total business benefits derived from Google were approximately $15 billion in 2015. Although a somewhat different concept, this figure is broadly comparable to half the annual output of the agriculture industry and double the output of the airline industry.[16]

EXHIBIT

Business benefits supported by Google[17]

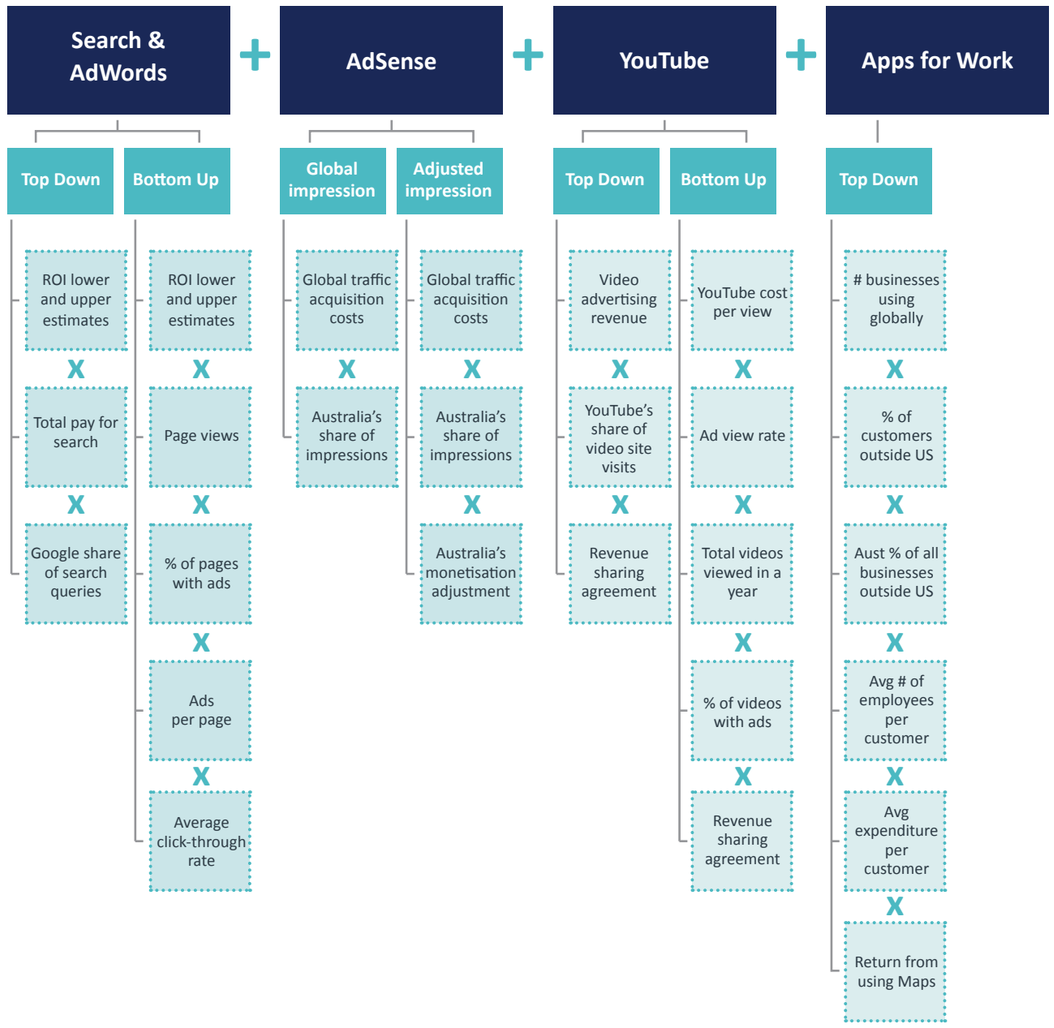
$, AUD



The total business benefits have been calculated as the sum of the business benefits of each Google product and service. Most of the total business surplus is derived from Search and AdWords which delivered $14.5 billion in benefits. AdSense added another $90 million, YouTube $80 million and Apps for work $450 million. The business benefits of each of these services have been calculated separately (see Exhibit). In the case of Search, AdSense and YouTube we used two different methodologies and reported the average of those approaches.

EXHIBIT

Methodology for calculating business benefits



[16] Output as measured in value added terms. ABS National Accounts industry gross value added in June 2015 (published September 2015).
[17] Data in the Exhibit is estimated by AlphaBeta using a range of third party sources. See Appendix for detailed methodology.

Search and AdWords: Driving traffic through paid and unpaid clicks

Google's free and paid search services are associated with $14.5 billion in business benefits in the Australian economy over the past year. These benefits are derived from sales originating in Google searches. Google My Business places a business' information on Search and Maps to help consumers find and understand a business. Each year, around 840,000 businesses connect with consumers through Google.[18]

We estimated the direct business benefits attributable to Google in Australia in two ways. 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 page views in Australia, the proportion of pages with advertisements, the number of advertisements per page and the average click-through rate. In order to get the profits generated by businesses paying for online advertising through Google a return on investment (ROI) range of 3.4 – 8 was applied, and the midpoint was taken. The point estimate is not designed to give false specificity but rather is the midpoint of the estimated range. This ROI was developed from a number of assumptions based on international economic studies.[19] Finally, we applied a conservative multiplier to estimate total business benefits supported by Search and AdWords.

Business benefits of Search

In Australia during 2015:[20]

Free and paid Search were associated with

$14.5 billion
in business benefits

Around

840,000

Australian businesses **connected with consumers** through Google

AdSense: Supporting content creation

Google AdSense supported $91 million in benefits for business in Australia in 2015. These benefits are driven by Australian writers, bloggers and other content creators generating income from hosting ads on their sites.

Advertising revenue supports the continued availability and quality of content on the internet. Approximately one in four pages searched via Google exhibit advertising.[21] In Australia, this means that Australians viewed around 15 billion pages of content in the past year that were made possible, in part, by advertising.

The direct business benefits from Google AdSense are estimated as the total income generated by content creators hosting Google advertisements. We estimated this income using Google's published global traffic acquisition costs and multiplied these by the proportion of Australia's share of AdSense impressions. An alternative method for calculating Australia's share of AdSense payments involves adjusting Australia's share of global impressions based on Australia's share of global advertising payments.[22] We averaged the results of these two methods.

Business benefits of AdSense

In Australia during 2015:[23]

Adsense supported

$90 million
in business benefits

In Australia

15 billion
views of web pages
were made possible, in part, by advertising.

*Data in the Exhibit is estimated by AlphaBeta using a range of third party sources. See Appendix for detailed methodology.

[18] ABS Catalogue 8166 "Business use of Information Technology" (2013-14) and Statistica
[19] Using a large sample of proprietary data, Hal Varian, Google's Chief Economist, estimated that businesses received $2 in profit for every $1 spent on advertising. This finding was published in the American Economic Review in 2009. Businesses also receive free clicks as a result of unpaid 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 assumes 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 assumes their value at 70% of paid clicks. As a results of these assumptions, an ROI of 8 is estimated. This ROI is taken an upper bound. To derive a lower bound, we build on the academic findings detailed in the Google UK Economic Impact Study to set a lower bound of 3.4.
[20] Data in the Exhibit is estimated by AlphaBeta using a range of third party sources. See Appendix for detailed methodology.
[21] Varian H (2011) *Economic value of Google* Presentation
[22] See Appendix A for detailed methodology sources
[23] Data in the Exhibit is estimated by AlphaBeta using a range of third party sources. See Appendix for detailed methodology.

YouTube: Democratising how content is created

YouTube supported $80 million in benefits for business in Australia in 2015. These benefits reflect the income earned by Australians from YouTube advertising displayed on their content. The advent of platforms that host online video such as YouTube, Vimeo and Facebook have driven the growth of online video. The cost and skill requirements for producing video are at historic lows. Some have termed the confluence of easy-to-operate production technologies and free distribution platforms as a new era of "democratization of creativity". As Michael Rosenblum, American television producer and video journalist, has argued:

> *"It doesn't cost anything to make broadcast quality video, all you need is talent. The tools out there are so cheap and easy to use that any nine-year old can operate them…Ten years ago if you wanted to create a TV network you needed to have a billion dollars to invest."*[24]

Individuals have taken advantage of this democratization. Globally, individuals upload 300 hours of video content to YouTube every minute.[25] Content creators hope to use the simplicity and scale of this distribution channel to access large audiences. The democratization of creativity does not mean that income is no longer being generated through video content creation. As Rosenblum has also argued, *"there's a fortune to be made here and the door is wide open. All you need is a camera, even just an iPhone and a good idea."*[26]

Individual Australians have benefitted from this new industry structure (See Exhibit). Derek Muller, from Sydney, produces a science video blog which has enjoyed around 100 million views. Marty and Moog host the world's top DIY automotive show, again with around 100 million views. Once established in their field, YouTube content creators can generate income from a variety of sources outside the platform. YouTube content creators can also generate income within the platform by hosting advertising. Advertising revenue is generated through video views. Australians watched approximately 20 billion videos on YouTube in the past year.[27]

Australian content is not just being consumed within Australia, and is instead also being exported. International viewers account for 86% of views of online Australian content.[28]

We estimated the direct benefits of YouTube to owners of video content in two ways and took an average of these methods. First, the top down method estimated the total video advertising segment in Australia, YouTube's share of that space and the percentage of revenue that YouTube disburses to content creators. Second, the bottom up method estimated YouTube cost per view, the view rate of advertising, the total videos viewed in a year, the proportion of videos with advertising and the percentage of collected revenue that YouTube distributes.[29]

[24] http://www.theguardian.com/media-network/2012/feb/23/democratisation-creativity-production
[25] Statista (2014) "Hours of video uploaded to Youtube every minute: Available at http://www.statista.com/statistics/259477/hours-of-video-uploaded-to-youtube-every-minute/
[26] http://www.theguardian.com/media-network/2012/feb/23/democratisation-creativity-production
[27] Nielsen Online Ratings (2015), Streaming Report, Top Ten Brands and Their Engagement, Nielsen Online Ratings.
[28] BCG (March 2012) "How digital media are invigorating Australia"
[29] See Appendix A for detailed methodology sources

Benefits of YouTube to the Australian content industry

In Australia during 2015:[30]

YouTube supported
$80 million
in business benefits

International viewers
account for
86%
of views of Australian online content

approximately
$60 million
was distributed to individuals and organisations that **own video content**

[30] Data in the Exhibit is estimated by AlphaBeta using a range of third party sources. See Appendix for detailed methodology.

EXHIBIT

Examples of Australian content creators on YouTube

MUSIC

Who: Janice and Sonia Lee
Channel: Jayesslee
Detail: Acoustic versions of pop songs
Subscribers: > 2.0 million
Views: > 200 million

VLOGGER

Who: Natalie Tran
Channel: Communitychannel
Detail: Humourous videos about everyday life
Subscribers: > 1.7 million
Views: > 500 million

SCIENCE

Who: Derek Muller
Channel: Veritasium
Detail: Experiments and discussions about science
Subscribers: > 3.0 million
Views: > 100 million

COOKING

Who: Elise Strachan
Channel: mycupcakeaddiction
Detail: How to decorate cupcakes and cake pops
Subscribers: > 2.2 million
Views: > 100 million

DIY

Who: Marty and Moog
Channel: Mighty Car Mods
Detail: DIY automotive show, teaching viewers how to modify cars
Subscribers: > 1.6 million
Views: > 100 million

BEAUTY

Who: Lauren Curtis
Channel: Lauren Curtis
Detail: Make-up and hair tutorials
Subscribers: > 3.2 million
Views: > 100 million

Apps for Work: Simplifying document collaboration and storage

Google Apps for Work supported $450 million in business benefits in Australia in 2015. These business tools reduced IT and travel costs and improved labour productivity through document collaboration. Australian businesses use Apps for Work to operate professional email, access cloud storage and sharing for their documents, and offer shared calendars and video meetings to employees. An estimated 50,000 businesses[31] have adopted Apps for Work in Australia, including large businesses such as Woolworths and small businesses such as Haydenshapes (which distributes surfboards to 71 countries). Studies have estimated the return on the cost of Apps for Work in higher labour productivity and reduced IT and travel costs at 329% by the third year of use.[32]

The benefits of Apps for Work was calculated using a top down approach. In order to get to a number of users in Australia, we took the published number of global business users, the percentage of Apps for Work customers outside the US, the percentage of businesses globally outside the US that were located in Australia, and the average number of users per customer. In order to get to a benefits figure, we took the number of users, multiplied by the expenditure per user, and multiplied by the annual return on investment.

Business benefits of Apps for Work

In Australia during 2015:[33]

Apps for Work supported

$450 million

in business benefits

50,000

businesses adopted Apps for Work

Woolworths has rolled out Apps for Work to

>25,000 staff

Google Maps: Connecting businesses and consumers

Maps enables consumers to more easily locate and identify businesses, especially goods and services that are niche or less easy to locate. Google's free service "Google My Business" enables businesses to connect directly with consumers when consumers use Search or Maps.

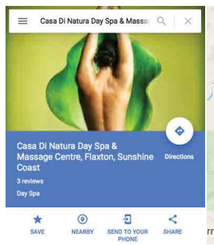
Case Study

Casa di Natura Spa: Helping consumers find an out-of-the-way gem

What: Casa di Natura Spa (luxury day spa)

Where: Sunshine Coast, Queensland

How Google Maps has helped: Sue Broughton's remote location meant she couldn't rely on drop-in traffic so she turned to online marketing to help raise awareness She uses 'Google My Business' to help consumers identify her business as a service provider in the area and help them locate the business. She is now heavily booked and receives clients from across Queensland.



[31] Google website notes that more than 5,000,000 businesses have adopted Apps for Work, with 50% of these businesses outside of the US. Using this figure and the proportion of businesses outside the US that are located in Australia, we can estimate the number of businesses using Apps for Work in Australia.
[32] Erickson, J & Lau, R (2012), The Total Economic Impact of Google Apps: A Cross-Industry Survey and Analysis, A Forrester Total Economic ImpactTM Study Prepared for Google and McCormick, S & Lau, R (2015), The Total Economic Impact of Google Apps: A Cross-Industry Survey and Analyst, The Forrester Research, Inc
[33] Data in the Exhibit is estimated by AlphaBeta using a range of third party sources. See Appendix for detailed methodology.

We started working on maps from my second bedroom in Hunters Hill. Our mission was to create a product that could be accessed by everyone. Up until that point, electronic mapping services were expensive and only owned by companies and the elite.

Our goal was to create Maps that were comprehensive, detailed and easy to use. The breakthrough for us was getting Google to acquire our business back in 2004 - this was Google's second ever acquisition.

After our first meeting at Google HQ, they asked us whether the Maps application could work in a browser, rather than as a downloadable application. We thought it was an exciting challenge and over the next fortnight in Sydney, we feverishly rewrote the application.

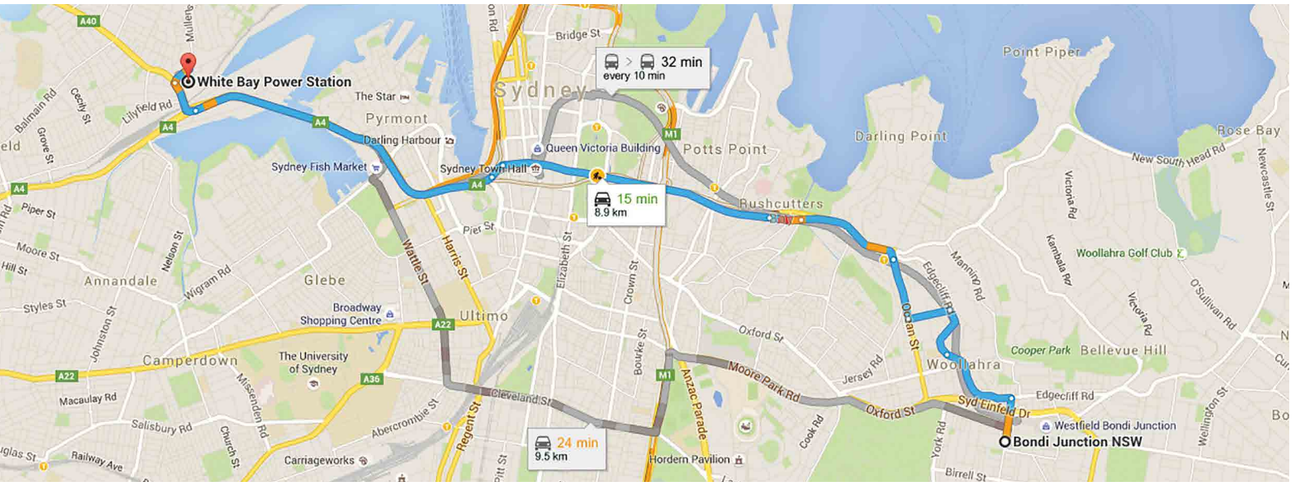
As a young and experimental team, our attitude was "Try hard, fail and go again" and this mantra remained central to our team's approach after we had joined Google.

After joining Google, we worked in a small team that launched the first version of Google Maps in just six months - rolling out new features every couple of months.

We always knew it would be a useful tool but we had no idea the world-wide economic benefit it would create. The travel and tourism industry is completely changed now - individuals are now expert travellers in cities they've never been to before - booking hotels, finding restaurant and navigating public transport systems.

We're proud of the fact that Maps continues to be developed right here in Sydney, for the rest of world.

—Noel Gorden, Co-Founder of Google Maps.



EXHIBIT

Examples of Google benefits to small business[34]

GOOGLE SEARCH

Around **800,000** Australian small businesses connected with consumers through Google

Around **1 in 3** SMEs received orders placed via the internet

Small and medium sized businesses attributed around **$90 billion** in income to the internet

YOUTUBE

Around **1 in 10** small and medium sized businesses use YouTube to further their social media presence

GOOGLE MAPS

SMEs use **Maps** to allow consumers to easily locate and navigate to their premises

GOOGLE APPS

SMEs use Apps for Work to communicate, collaborate, reduce IT costs, reduce travel costs and store documents

[34] Data in the Exhibit is estimated by AlphaBeta using a range of third party sources. See Appendix for detailed methodology.

3

CONSUMER BENEFITS

SAVING TIME AND IMPROVING QUALITY OF LIFE

Estimated consumer benefits of Google in Australia during 2015:[35]

Google supported an estimated

$14.8 billion

in **consumer benefits**

Google Search saved each Australian user

5 minutes per day,

or **31 hours** over the year

Each driver and passenger using **Maps** saved

13.5 hours on the road

Across the economy, this amounts to

$500 million in savings at the petrol pump

Maps saved the average user

13 hours of time on public transport

and **2.5 hours of walking**

More than **9 million** Australians watched **YouTube** each month.

The average Australian on YouTube spent **two full days** watching videos over the year

[35] Data in the Exhibit is estimated by AlphaBeta using a range of third party sources. See Appendix for detailed methodology.

Google doesn't just benefit businesses, its products and services touch many aspects of our personal and social lives. Millions of Australians use Google every day. When someone uses Google Search they are saving time by finding an answer efficiently without, for example, a lengthy trip to the library. When someone uses Google to locate a local shop or navigate to a friend's house, they are saving time by finding the quickest route for their journey. When someone uses YouTube to better understand calculus or to watch an entertaining video, or when someone sends emails via Gmail, they place value on the convenience and diversity of these services.

These consumer benefits don't show up in GDP and typically aren't measured by governments or official statistical agencies. But these benefits are both measureable and significant, which is why they should be considered in any estimate of the total economic value of Google. We estimated the total consumer benefits of Google in Australia as the sum of the consumer surplus generated by Search, Maps, YouTube and Gmail.

Google Search supports individuals rapidly and inexpensively accessing information. Individuals use Search to stay up-to-date on current events, better understand a topic, check the weather, find products and services, read reviews, and compare prices. Last year, the most popular searches globally were a combination of big events like the World Cup, Ebola and Malaysia Airlines disaster and products like Flappy Bird and Frozen.[36]

Google Maps also helps individuals locate businesses and destinations and then navigate and optimize their travel time. Maps helps individuals to find providers of products and services they are interested in, and to quickly locate a new destination, such as a friend's house, restaurant, or national park. Once located, Maps also helps individuals to navigate and optimize their trip, by picking the quickest public transport route or the quickest driving route given traffic conditions. This functionality helps individuals save time on the road and save time waiting on the train platform or at bus stops.

YouTube, which was acquired by Google in 2008, facilitates the provision of free video content to its users. The platform provides its one billion global viewers with a diverse range of content, covering comedy, DIY/how to, music, animation, sports, news, educational and product videos.[37]

For individuals, Gmail represents one of the world's primary providers of free personal email. Email has revolutionized the way we communicate with our friends, family, personal-interest organizations and businesses. We now depend on email to stay in touch with loved ones, plan holidays, and connect with salespeople in businesses. Globally, some 93 billion consumer emails are sent each day on all consumer email platforms.[38] Gmail is one of the leading providers of personal email. In Australia, Gmail provided services to an estimated 6.5 million users.[39]

Calculating consumer benefits

Consumer surplus is usually calculated by observing how customers respond to price changes. For example, if customers reduce their consumption rapidly in response to price increases, that may be an indication that they do not value the product much higher than its current price and are not deriving much consumer surplus from it. The consumer benefits supported by Google are challenging to measure and calculate because individuals typically don't pay for the services, such as Search, YouTube, Maps and Gmail. In the absence of price indicators, there are a number of established methodologies for estimating the consumer benefits of free services.

- **Value of time:** This method estimates benefits by calculating how much time an individual saved by using a good or service.
- **Conjoint analysis:** This method estimates benefits by asking individuals how much they value specific products compared with other goods and services, which are often priced. This method is more reliable than asking individuals how much they value a product because individuals struggle to quantify the value of a good or service in isolation and because individuals struggle to quantify the value of unpriced goods and services.

Where possible, this study uses both these methods, including a first-of-its-kind survey to estimate the value of time saved by using Google Maps for public transport and walking. A detailed description of the methodology is provided in Appendix A.

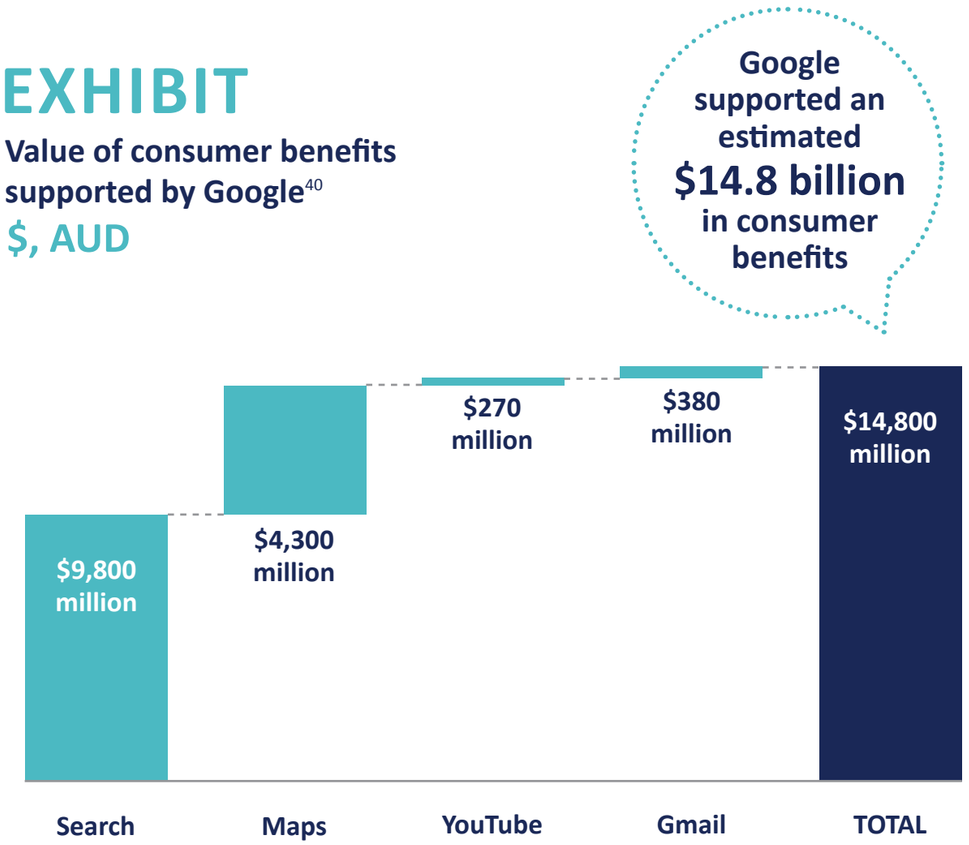
The consumer benefits generated by Google were $14.8 billion in the past year (See Exhibit).

[36] http://techcrunch.com/2014/12/16/these-were-the-10-top-trending-searches-on-Google-in-2014/
[37] https://www.youtube.com/yt/press/statistics.html
[38] http://www.radicati.com/wp/wp-content/uploads/2015/07/Email-Market-2015-2019-Executive-Summary.pdf
[39] Estimated based on Gmail's US share of email accounts, number of personal emails sent per day globally and Australia's share of global internet users. See Covert, A (2014), 'Gmail at 10: How Google dominated e-mail', CNN, Tech. Available from: http://money.cnn.com/2014/04/01/technology/gmail/ [Accessed: 22 October 2015], The Radicati Group (2015), Email Market, 2015-2019, A technology Market Research Firm.

EXHIBIT

Value of consumer benefits supported by Google[40]

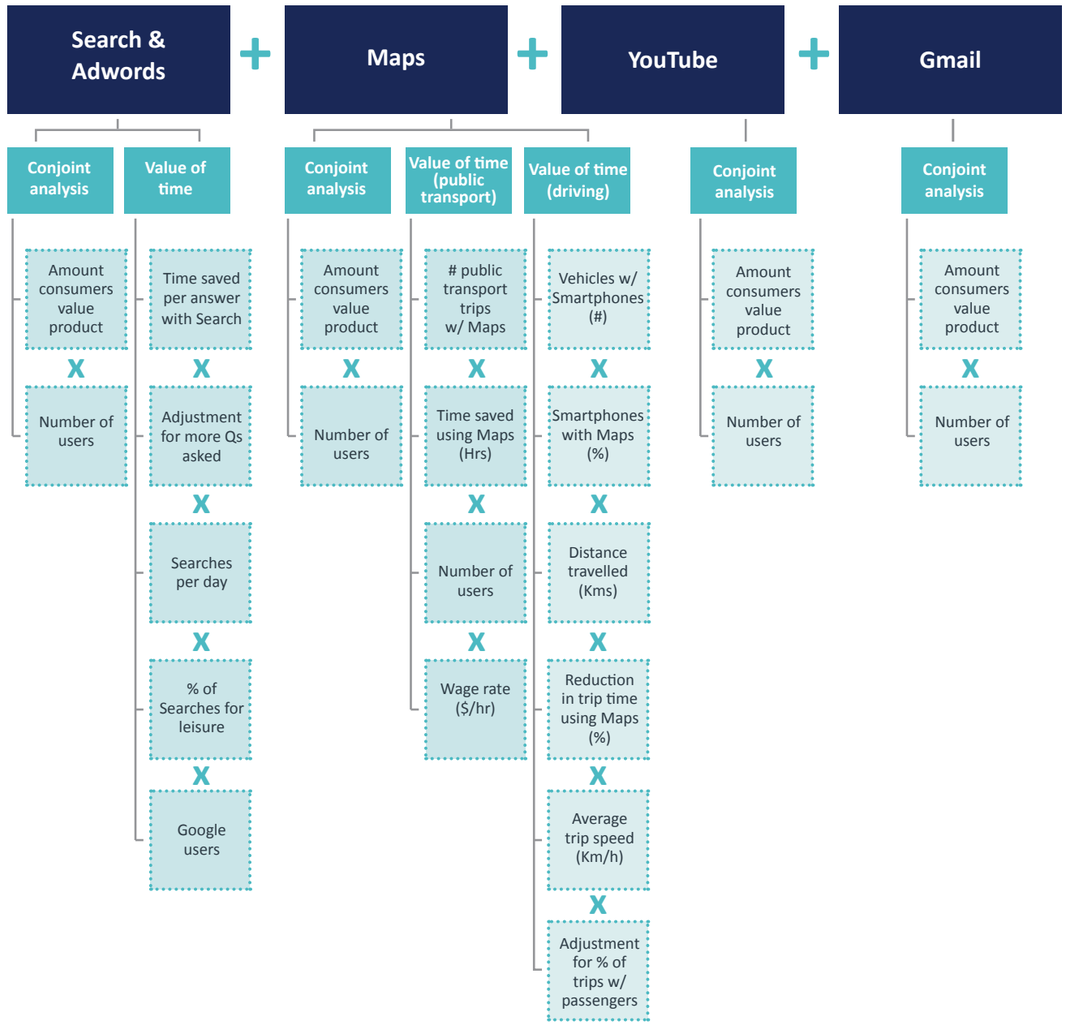
$, AUD



Most of the total business surplus is driven by Search which delivered $9.8 billion, although Maps also significantly contributed $4.3 billion. YouTube added another $270 million and Gmail $380 million. The consumer benefits of each of these services have been calculated separately (see Exhibit). For all the products, we used conjoint analysis. For Search and Maps, we also calculated time saved and reported the average of this analysis with the first approach.

EXHIBIT

Methodology for calculating consumer benefits of Google



[40] Data in the Exhibit is estimated by AlphaBeta using a range of third party sources. See Appendix for detailed methodology.

Globally, policy makers and economists are wringing their hands about declining productivity. Their concern is with good reason: productivity is crucial to growing our economy, incomes and living standards. If productivity grows at 2% per year, we double our standard of living in 35 years. If productivity growth falls to 1% per year, we double our standard of living in 70 years. With free internet-based services like Google, individuals enjoy significant benefits, which likely lift our standard of living. As these consumer benefits indicate, our living standards may have increased but not in ways that appear in official productivity statistics.

Search: Convenient, quick answers

Australians derived significant value from Search, at $9,800 million in the past year. These benefits are generated by individuals being able to quickly and inexpensively answer questions. The value that Search represents to consumers is the value they place on the convenience and breadth of sources and the value generated from the time saved using this online method, versus more traditional offline methods. In Australia, Google's 15.5 million[41] users saved around 5 minutes per day or 31 hours per year.

We estimated the benefits of Search to consumers in two ways and took an average of these methods. First, we used conjoint analysis, where consumers are asked to value Search compared with other goods and services. Second, we calculated the value of time saved compared with offline methods. To calculate this, we applied estimates of time saved from an international study that measured the time taken to conduct a search online versus a search at the library.[42] 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. In 2015, Australia had around 15.5 million Google users, who conducted approximately 2.9 searches per day. Around half of these, or 1.5 searches per day, were conducted for leisure rather than work purposes. We averaged this method of calculation with a method adopted by Hal Varian, Google's Chief Economist, who estimated that people use Google to conduct one search per day.[43]

Consumer benefits of Google Search

In Australia during 2015:[44]

Google Search
supported
$9.8 billion
in consumer benefits

An estimated
15 million
Australians used
Google Search

Google Search saved each Australian user
5 minutes per day or
31 hours
over the year

[41] Neilsen (2015) Online landscape review and Statistica
[42] Chen Y (2010) "A day without a search engine: an experimental study of online and offline Search" University of Michigan. Available: http://yanchen.people.si.umich.edu/papers/VOS_20101115.pdf
[43] Hal Varian's estimate of total time saved uses Chen's 15 minute saving for using online versus offline methods, adjusted for answerability of questions, and adjusted for the fact that we ask more questions now that getting answers is less costly. Assuming 1 search per day, Hal Varian estimates that the average user saves 3.75 minutes per day.

[44] Data in the Exhibit is estimated by AlphaBeta using a range of third party sources. See Appendix for detailed methodology.

Maps: Saving time in the car and on public transport

Google Maps supported $4.3 billion in consumer benefits over the past year. These were the benefits that Australian consumers derived by using Maps to see local businesses and landmarks in an area, locate new destinations, and navigate and optimize their travel. Maps was widely used by Australians over the past year. In fact, Australians viewed some 60 million Google Maps every week.[45]

By helping individuals navigate the quickest route through traffic, Maps saved each of the 11 million drivers and passengers using Maps 13.5 hours on the road over the year. Across the economy, this lower time on the road amounted to around $0.5 billion in savings at the petrol pump. By helping individuals optimize their public transport trips, we found that Maps saved around 9.8 million Australians 13 hours each over the year. For the approximately 5 million people using Maps for walking, these users each saved 2.5 hours in the past year.

We estimated the benefits of Maps to consumers in two ways and took an average of these methods. First, we used conjoint analysis, where consumers are asked to value Maps compared with other goods and services. Second, we used the time saved method and we separately estimated the time saved by using Maps for driving, public transport and walking.[46]

Maps for driving

We estimated the consumer benefits of Maps for driving at $2.2 billion (calculated as the average of the time saved and conjoint analysis methods). We estimated the time saved by calculating the number of vehicles with drivers using Maps, the reduction in trip time using Maps, total kilometres travelled each year using Maps, the average trip speed, and the average national wage rate. In order to reflect time saved for all beneficiaries, we made an adjustment for the average number of passengers in the vehicle.[47]

We found that, by navigating the quickest route live through traffic, each driver and passenger using Maps saved 13.5 hours on the road over the year. Across the economy, this amounts to $0.5 billion in savings at the petrol pump.

Maps for public transport and walking

We estimated the consumer benefits of Maps for public transport at $1.9 billion and walking at $180 million (calculated as the average of the time saved and conjoint analysis methods).

Estimating the benefit of using Google Maps for public transport and walking trips is challenging, because there are no well-established figures on how often we use a tool like Google Maps to help us plan a public transport or walking trip. There also aren't well established figures on how much time a trip optimizer saves an individual.

To calculate the benefits of Google Maps for walking and public transport, we conducted a national survey with 511 respondents, which we weighted to align to key ABS demographic data including age, gender, geography, and employment status. We asked respondents whether, in the last two weeks, they have used Google Maps to plan or navigate their most common public transport or walking trip and any uncommon trips (e.g. a trip to a friend's house for dinner). Across a large sample of trips, we then applied a time saving based on the difference between the optimal trip on Google Maps and the average of the multiple trip options presented by Maps (i.e. a conservative estimate of the time saved by taking the optimal route).

We found that 9.8 million Australians use Google Maps to optimize their public transport trips. In fact, approximately half of adult Australians used Maps to plan or navigate their most common trip (such as their commute to work) and re-checked this trip around 70 times over the year in response to changes in their routine or changed traffic and climatic conditions. Further, around 75% of adult Australians used Maps to navigate or plan an uncommon trip. Applying the proportion of time saved to these usage rates reveals the time saved by using Google Maps for public transport and walking. Using Google Maps saved each user 13 hours over the year on public transport and 2.5 hours of walking.[48]

[45] Estimated by taking the proportion of global Maps users to internet users globally, multiplying by the number of internet users in Australia and multiplying by the number of views per week. See Google websites for Maps views and Google, "How Google Maps APIs can add value to your bottom line", Google Maps for Work

[46] See Appendix A for detailed methodology sources

[47] See Appendix A for detailed sources

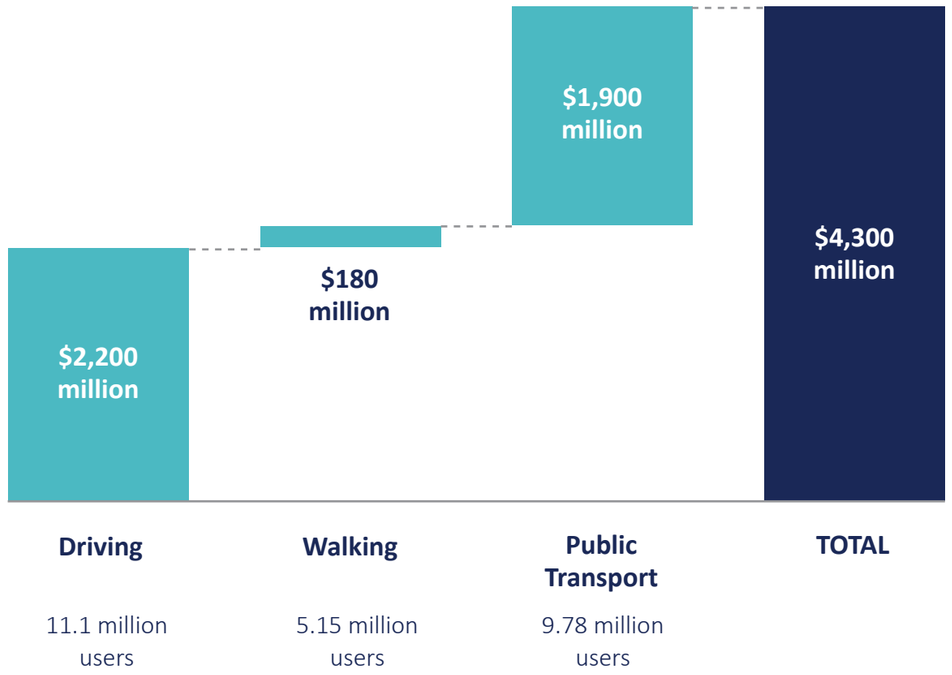
[48] Survey conducted by AlphaBeta in November 2015, with 511 respondents. Weighted to match ABS Australian population by gender, age and geographic location.

EXHIBIT

Consumer benefits supported by Google Maps[49]

$, AUD

Maps supported an estimated $4.3 billion in consumer benefits, largely as a result of time saved



[49] Data in the Exhibit is estimated by AlphaBeta using a range of third party sources. See Appendix for detailed methodology.

Consumer benefits of Maps

In Australia during 2015:[50]

Maps supported
$4.3 billion
in consumer benefits

Australians **viewed**
60 million
Google Maps every week

Each passenger and driver using **Maps** saved
13.5 hours
on the road

Across the economy, this resulted in around
$500 million in savings at the petrol pump

Each **Maps** user saved
13 hours
on public transport

Maps helped its users save
2.5 hours walking

[50] Data in the Exhibit is estimated by AlphaBeta using a range of third party sources. See Appendix for detailed methodology.

YouTube: The rise of new content sources and new creatives

The estimated consumer benefits of YouTube to Australians is $270 million. These benefits represent the value that individuals place on accessing the diversity of free videos on YouTube. Approximately 9 million Australians watched YouTube each month over the past year. This viewership places YouTube higher than the number of people viewing the AFL and cricket on TV in Australia (See Exhibit).[51] As an indication of their interest in the service, the 9.5 million YouTube users spent, on average, nearly two full days over the year watching YouTube.[52]

YouTube has also given rise to a new generation of creatives who post content as an expression of their creativity, in the hope that it will be viewed by many people. Unlike in the past, where videos of our personal lives were shared only with our family and friends, US-based research has found that the majority of people who uploaded videos hoped that the video would "go viral" and would be viewed widely.[53]

We calculated the consumer benefits of YouTube based on conjoint analysis, which asks consumers to value products compared with other products and services. We used results from an international survey of similar countries, applied a growth rate based on increased viewership since the survey, adjusted for YouTube's share of online video viewing in Australia, and multiplied by the number of YouTube users in Australia.[54]

Consumer benefits of YouTube

In Australia during 2015:[55]

Around
9 million
Australians watched **YouTube** each month

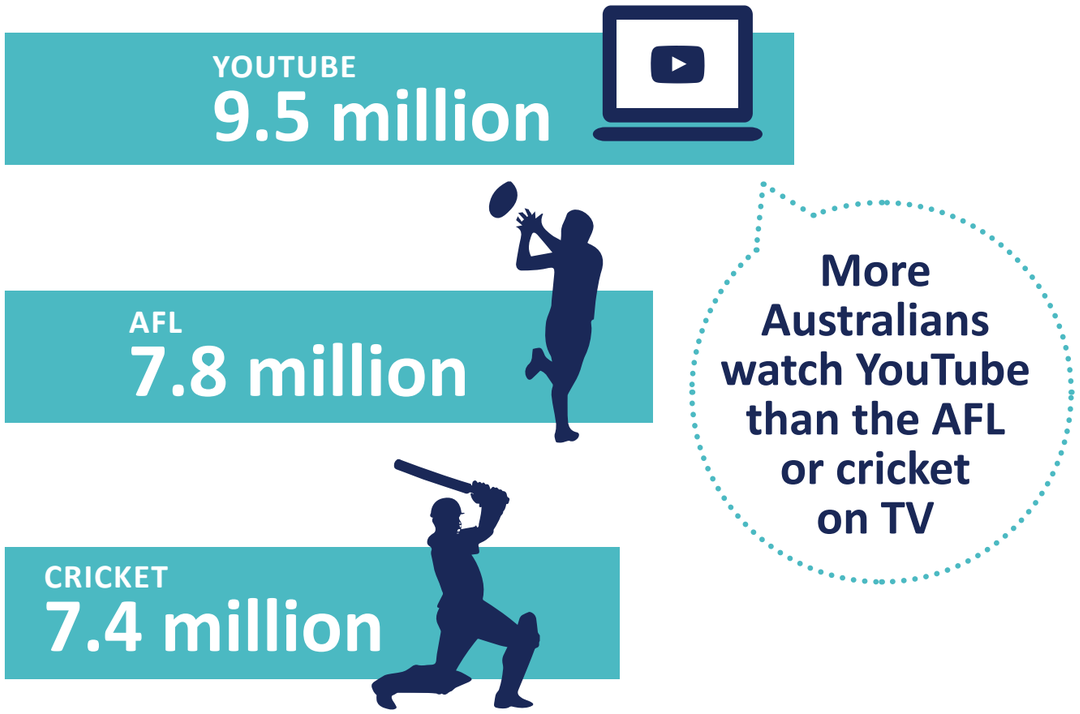
Australians watched approximately
20 billion
videos on **YouTube**

Each Australian YouTuber spent
two full days,
on average, watching videos

YouTube supported
$270 million
in consumer benefits

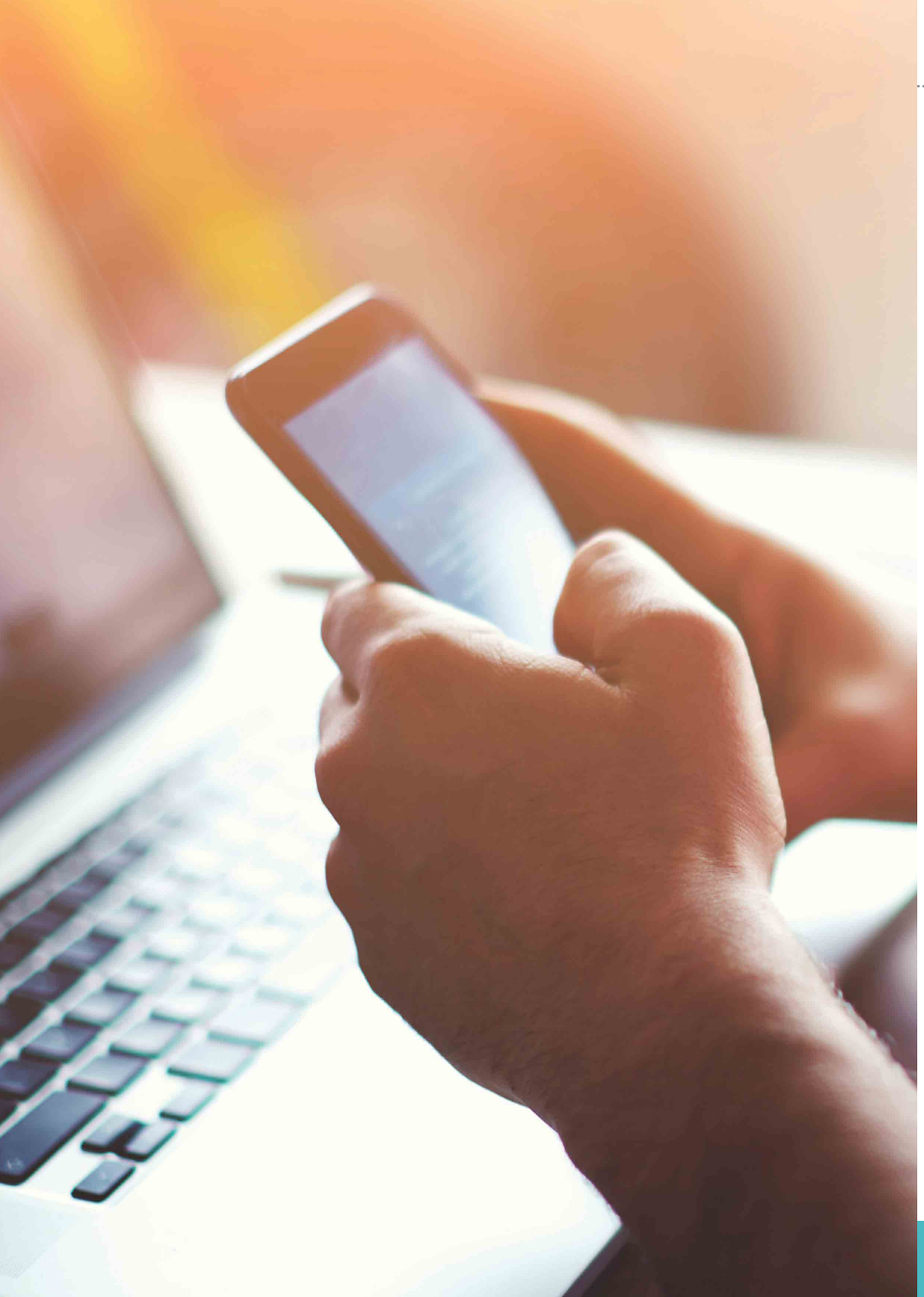
EXHIBIT

YouTube versus sport viewership in Australia[56]
Number of viewers, millions, latest data



[51] Data on YouTube viewership from Nielsen Online Ratings (2015), Streaming Report, Top Ten Brands and Their Engagement. Data on sports viewership on TV from Roy Morgan Research, available here
[52] Nielsen Online Ratings (2015), Streaming Report, Top Ten Brands and Their Engagement
[53] Purcell, K (2013), Online Video 2013, PewResearch Center
[54] See Appendix A for detailed methodology sources
[55] Data in the Exhibit is estimated by AlphaBeta using a range of third party sources. See Appendix for detailed methodology.

[56] Data in the Exhibit is estimated by AlphaBeta using a range of third party sources.



Gmail: Simple, convenient communication

The estimated personal value of Gmail to Australians is $380 million. These benefits are derived from the value that consumers place on the convenience and ease of using Gmail to communicate with friends, family, organizations and businesses in their personal lives. The value is reflected in the traffic and activity on their platform. Each day, Australians send around 190 million emails using Gmail.[57] This figure is double the number of phone calls that individuals make or receive in a day.[58]

We calculated the consumer benefits based on conjoint analysis, which asks consumers to value products relative to other products and services. We used results from an international survey, adjusted for Gmail's share of personal email, and multiplied by the number of users in Australia.

Consumer benefits of Gmail

In Australia during 2015:[59]

Gmail supported

$380 million

in consumer benefits

Australians sent around

190 million

emails per day using Gmail

= double the number of phone calls made and received each day

[57] Estimated using data on global email traffic from Radicati, Australia's proportion of global internet users from Statistica and Neilsen, and proportion of email accounts that are Gmail from CNN
[58] Pew Research Center (2010) "Cell phones and American adults". Available here
[59] Data in the Exhibit is estimated by AlphaBeta using a range of third party sources. See appendix for detailed methodology.

4

SOCIETAL BENEFITS

SUPPORTING EDUCATION, INNOVATION, COMPETITION AND PHILANTHROPY

Estimated societal benefits of Google in Australia during 2015:[60]

Maps saved over

600,000t

in **vehicle emissions each year**

= emissions of 125,000 cars

Google provided approximately

$75 million

in in-kind **advertising placements** to nearly **500** Australian not-for-profit organizations

Free Apps for Work for nearly **900** Australian not-for-profit organizations saved around

$25 million

in labour and IT costs

Around **5,000** Australians schools used **Apps for Schools**, with **1.4 million** student and teacher users

Every night, **Google and other resources** helped students to answer

25 million questions

while doing homework

Around **20,000** students in Australia learnt using **Khan Academy on YouTube**

[60] Data in the Exhibit is estimated by AlphaBeta using a range of third party sources. See Appendix for detailed methodology.

Beyond the benefits to businesses and individuals, Google delivers benefits to society that may not accrue directly to a specific company or person. These are often termed “spill-over benefits”. These benefits might not appear immediately in GDP measures, but they affect other objectives we care about or strengthen Australia’s economy over time. Google and its products support human capital development, more effective not-for-profit organizations, lower environmental impact, local innovation and improved competition.

Access to information is at the heart of Google’s value proposition, so it is not surprising that one of the major benefits of Google to Australia is in the realm of education. Google’s product suite contributes to both higher quality and accessibility in our education system. Search, YouTube, Maps, Google Course Builder and Apps for Schools helped teachers do their job, helped students to learn in more diverse ways in the classroom, and helped students to answer questions that may otherwise have gone unanswered in their homework.

Google and its products also have a number of other societal benefits. In support of not-for-profit organizations, Google provided approximately $75 million of in-kind advertising placements to nearly 500 Australian not-for-profit organizations. Free provision of Apps for Work to around 900 Australian not-for-profit organizations is estimated to have saved around $25 million in labour productivity and IT costs. Google Maps helped to save over 600,000 tonnes of CO2, which is the equivalent emissions of 125,000 cars. Google also contributed to higher competition and local innovation around its physical footprint in Sydney.

Calculating societal benefits

Societal benefits are less easy to calculate than benefits to business or consumers, because they reflect benefits that only show up in indicators over the longer term or comprise benefits that are difficult to quantify like charitable activity or innovation. While these benefits are often not conducive to comprehensive quantitative measurement, they are important contributions to Australia that can be observed and described. For example, benefits to not-for-profit organizations can be described in terms of the value of Adwords grants that these organizations received and the estimated labour and IT savings that were generated by using other Google free services. For environmental impact, we report the emissions reductions generated by using Google Maps to save time on the road.

Human capital development

Google improves access to information and lowers the barriers to learning. Google products deliver a substantial and complex contribution to human capital development in Australia. Human capital development refers to the development of knowledge and skills within individuals. Developing human capital within our society matters because businesses need to access high quality talent, especially in a knowledge economy, and labour productivity is a key driver of continued economic growth. Human capital development requires:

- High quality information and learning resources.
- Resources that can be accessed by as many institutions and individuals as possible, which requires both convenient and simple distribution channels and inexpensive access.
- Teachers who are capable of delivering or using the resources.

Google contributes to both the quality and accessibility of information in our education system, for both young and lifelong learners (See Exhibit). To support quality, Google products provide access to a diverse range of sources, and some of its products enable use of more effective teaching and learning methods. To support accessibility, most Google resources were freely available online to those with internet access.

The benefits of Google for improving resource quality and accessibility can be categorized as the benefits for educators, for students in the classroom, and for students at home or learning for life. This increase in the quality and accessibility of knowledge and skills might not drive increased economic activity in the short term, but is an asset that will deliver returns over the long term.

EXHIBIT

Impact of Google on education quality and access

	QUALITY	ACCESS
SUPPORTING TEACHERS AND SCHOOLS 	**Google Educator Groups:** Meetups and online activities for educators passionate about education and tech to learn together e.g 3 groups operating in Australia.	**Apps for School:** Free sites, email, calendars, document sharing/storage and online meetings. In Australia, 5000 schools use Apps for School, with 1.4 million teacher and student users. **Google Course Builder:** Open source platform that enables educators to build and deliver free online courses at scale e.g. Uni of Adelaide free MOOC on delivering digital technologies curriculum.
LEARNING IN THE CLASSROOM 	**Maps:** Use of Google Maps and Google Earth in classroom found to improve students' spatial thinking, data collection, and geographical knowledge. **YouTube:** Use video to provide different learning experiences that are cognitive, experiential and nurturing e.g. virtual field trips, demos.	**Apps for School:** Free student collaboration and document sharing. **Maps, Search, YouTube:** Are free resources, available to students at schools with internet access (99% of students). **Expeditions pioneer program:** Provides classrooms (at no cost) with an immersive virtual reality journey to hard-to-reach destinations.
LEARNING AT HOME OR FOR LIFE 	**Search:** Enables students and lifelong learners to answer questions from a large variety of sources. 75% of Australian students use internet at home for school work. **YouTube:** Thousands of educational videos available free online, including through YouTube EDU. Digital learning studies found short videos maximise viewer engagement.	**Maps, Search, YouTube:** Free resources available to anyone with internet access (96% of households with children <15, 83% of all households). **Search:** Enables students and lifelong learners to answer questions conveniently and quickly. Online search methods take 1/3rd of the time of offline search, which encourages more searching. **Cultural Institute:** Individuals can explore exhibits and collections from museums and archives

Google for schools and teachers

Google operates tools that helps educators to do their job more easily and access ongoing, inexpensive professional development. These tools include Apps for Schools, Google Course Builder and Google's Local Educator Groups.

Apps for Schools, which is provided free to Australian schools, offers sites, email, calendars and document sharing and storage. Approximately 5000 Australian schools use Apps for Schools, with some 1.4 million student and teacher users.[61]

Google Course Builder enables educators to build and deliver open online professional development courses at scale. Recently, the University of Adelaide Computer Science Research Group collaborated with Google to launch an open course to provide content and lesson plans to support the new Digital Technologies curriculum. Since its creation in early 2014, around 4000 teachers have enrolled in the course.[62]

Google's Local Educator Groups (which are currently operating in Melbourne, Adelaide and the Gold Coast) enable teachers who are passionate about technology and education to share ideas online and in face-to-face meetups.

Google for students in the classroom

Google also provides tools that are used to support learning in classroom. Computer use and internet access is now widespread in Australian schools, with some 99% of students reporting internet access at schools.[63] In the classroom, Search, Maps and YouTube have been used to improve student learning.

The use of Google Maps and Google Earth in the classroom have been found to improve students' spatial thinking, geographic knowledge and capacity to collect relevant data.[64] In the relevant subjects, academic performance has been found to improve with the use of Google Maps and Earth compared with hard copy and 2D materials. This was especially true for older students in secondary and tertiary education.

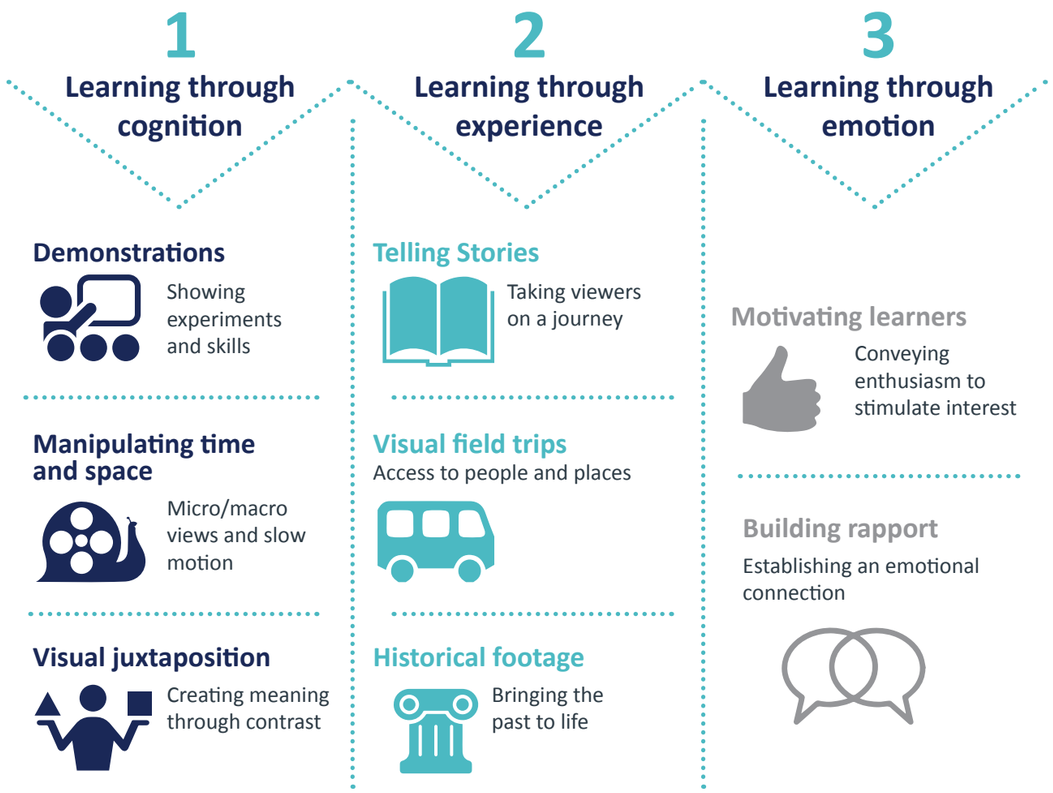
Likewise, YouTube has been used to promote different learning experiences and drive different learning outcomes. Academics have studied how video promotes learning in different ways including by learning through cognition, experience and emotion (See Exhibit).[65]

While video has been available for around half a century in classrooms, the advent of online video has provided opportunities to access more specialized and diverse videos of varying length. International studies have found that the YouTube format of shorter videos, of 2 – 6 minutes in length, optimized student engagement.[66] To support the use of YouTube for educational purposes, YouTube operates YouTube EDU, which groups videos with educational content and has launched YouTube for Schools. Schools and other educational institutions can control what students watch in the classroom using YouTube for Schools.

[61] Internal Google Australia statistics
[62] Internal Google Australia statistics
[63] Thomson, S & De Bortolli, L (2009), Preparing Australian Students for the Digital World: Results from the PISA 2009 Digital Reading Literacy Assessment, Programme for International Student Assessment
[64] Oxera (2013), What is the Economic Impact of Geo Services, Oxera, Prepared for Google.
[65] Snelson, C. (2008). YouTube and Beyond: Integrating Web-Based Video into Online Education. In K. McFerrin, R. Weber, R. Carlsen & D. Willis (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference 2008* (pp. 732-737). Chesapeake, VA: Association for the Advancement of Computing in Education (AACE).
[66] Guo et al "How video production affects student engagement: An empirical study of MOOC videos" MIT. Available https://groups.csail.mit.edu/uid/other-pubs/las2014-pguo-engagement.pdf

EXHIBIT

Three ways that YouTube supports learning



Source: Adapted from: Hansch et al (2015) "The role of video in online learning: Findings from the field and critical reflections" TopMOOC Research Project.

Google at home and for lifelong learning

Google also provides tools that were used to support learning at home and for life. Search, YouTube and Maps are available to any individual with internet access. According to the ABS, some 96% of Australians households with children under 15 have internet access. Around 75% of students frequently use the internet to help with homework during the week.[67] Over the past 25 years, students have shifted from answering questions using offline sources to online sources, such as Search and YouTube (See Exhibit). As this shift has occurred, the ease and convenience of finding answers has increased the number of questions that students now answer each day. In 1990, students answered around 3.5 million questions per day using offline resources like library books and tutors. In 2015, students answered approximately 25 million questions per day using offline and online resources such as Search and YouTube.[68]

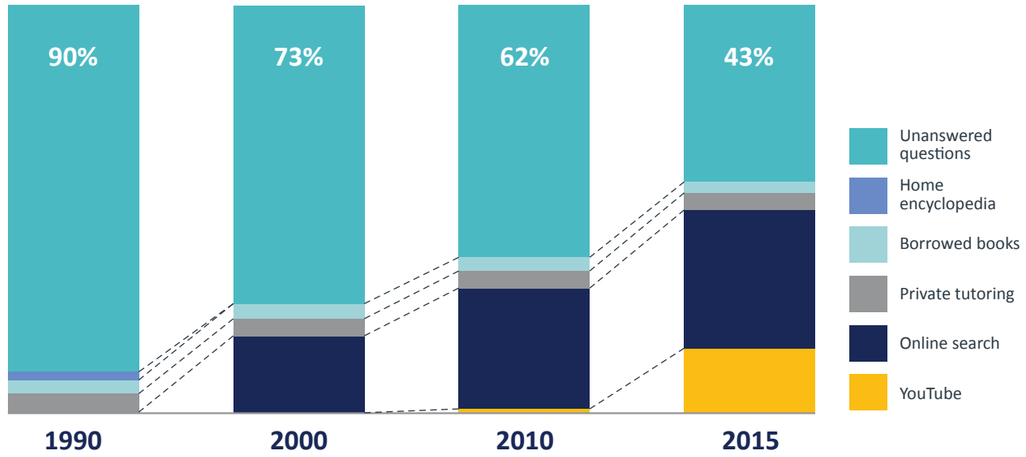
The convenience and inexpensive nature of Search and YouTube also promote learning into adulthood. In a nationwide survey in the US, the majority of adults reported that they used YouTube to watch educational videos. [69]

EXHIBIT

Students learning at home using offline and online resources

% unanswered questions

Using Google, students have fewer unanswered questions while doing homework



Source: Team analysis, Nielsen, World Bank, ABS, US Census, YouTube, NSLA

[67] Thomson, S & De Bortolli, L (2009), Preparing Australian Students for the Digital World: Results from the PISA 2009 Digital Reading Literacy Assessment, Programme for International Student Assessment

[68] Calculated based on data on library book circulation and loans, encyclopaedia sales, private tuition revenue, number of Searches for educational purposes, number of YouTube videos for educational purposes. Assumed students ask 8 questions per night (2 per subject, 4 subjects). Figure calculated per student based on actual students numbers. Data sourced from Nielsen, World Bank, ABS, US Census, YouTube and the NSLA.

[69] Pew Center Omnibus survey

Supporting not-for-profits

Google also supports not-for-profit organizations to increase awareness of their cause and operate more efficiently. Google provides not-for-profit organizations with a number of in-kind benefits, including free Ad Grants and Apps for Work products at no cost.

Advertising through Google enabled not-for-profit organizations to broaden their reach and awareness of their cause, which helped not-for-profit organizations to attract donors. In the past year, Google provided more than $75 million of in-kind advertising placements to nearly 500 Australian not-for-profit organizations.

One such beneficiary was the Fred Hollows Foundation, who used their Ad Grants to drive traffic to their website to encourage donations. The Foundation reported that around 15% of their online donations were sourced by donors clicking on the free advertising provided for the Foundation.[70]

Apps for Non-profits provided not-for-profit organizations with free access to the Apps for Work suite of products. These products are designed to improve labour productivity through easier communication and document collaboration and reduce switching costs between applications. The products are also designed to reduce IT costs by using cloud-based software.

In the past year, nearly 900 Australian not-for-profit organizations enjoyed free access to the Apps for Work suite of products. This access was estimated to have saved around $25 million in improved labour productivity, reduced travel, and reduced IT and telephone costs. We estimated this benefit by taking the approximate savings generated by Apps for Work in a prior study and applying this to the estimated number of not-for-profit users in Australia.[71]

In addition to supporting not-for-profit organizations through its product suite, the organization and its employees also make direct contributions and donations. As an example, Google Australia's Impact Challenge provided $3.5 million to support high-performing technology solutions to combating disadvantage. The company also matches direct giving by its employees.

Lower environmental impact

Some of Google's products enable users to reduce their environmental footprint. By navigating the most direct route, calibrated to live traffic conditions, Maps helps to reduce travel time and therefore reduce congestion. This impacts the number of cars on the road and the emissions that these vehicles produced. In the past year, Maps helped to save over 600,000 tonnes of CO_2 in vehicle emissions, which is the equivalent emissions to 125,000 cars.

We estimated the emissions reductions by calculating the number of vehicles with drivers using Maps, the reduction in trip time using Maps, the total kilometers travelled each year, the average rate of fuel consumption, and the emissions intensity of light vehicles.

Increased local innovation

The physical locations of Google offices globally have spurred innovation in their local entrepreneurial and engineering communities. Google has a large and growing presence in Sydney, which it is hoping to increase through a targeted re-development investment.

Clusters have always been an important part of economic development. Anchor firms play a key role in cluster development.[72] Anchor firms are large (often global) technology firms that develop the cluster in three main ways. [73]

- First, anchor firms act as a source of demand within the cluster, as a large buyer of many goods and services from related firms. This helps to build the presence of supporting industries and improve the viability of firms within the cluster.
- Second, anchor firm's operations and employee alumni create spin-outs, or new firms to support the cluster. Sometimes the spin-out competes with the anchor company, and this creates greater depth and competition in the local industry. In other cases, the spin-out may offer complementary or support services, which builds out the capacity of the sector.
- Third, anchor firms attract other major companies, by reducing the cost and some of the barriers for subsequent firms to enter the local market.

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APPENDIX – METHODOLOGY

Summary

This report describes the total economic impact of Google in Australia over the past year as comprised of three components: business benefits, consumer benefits and societal benefits.[1] These are gross benefits, some of which can be quantified and others of which can be described in qualitative terms. While each of these benefits are additional, the concepts are distinct so we have resisted the temptation to sum the benefits to a total figure.

To estimate the business benefits, we calculated the activity generated by businesses that use Google services to drive sales and income (direct impact), by businesses that supply to these users (indirect impact) and by employees spending (induced impact). Services that businesses and individuals use to generate income include Search and AdWords, AdSense, YouTube and Apps for Work.

Estimating the consumer benefits supported by Google was more challenging. This is because individuals typically do not pay for the Google services that they use, including Search, Maps, Gmail and YouTube. There are a number of established methodologies for estimating the benefits of free services, including value of time (how much time did an individual save by using a Google product?) and conjoint analysis (how much does an individual value Google products relative to other goods and services?). This study uses both of these methods, including a first-of-its-kind survey to estimate value of time saved by using Google Maps for public transport.

Finally, Google supports benefits for the broader society. We used a combination of quantitative and qualitative analysis to create a snapshot of these broader benefits.

Business benefits

The business benefits supported by Google are calculated by considering the increased revenues and income of Australian businesses, advertisers and content creators using Google products. These producer benefits are a proxy for the 'gross economic activity' generated by Google i.e. this methodology does not account for activity that may have been displaced by Google or attempt to estimate the incremental impact of Google on the Australian economy beyond what would be the case if Google did not exist but other search engines did. Such hypothetical scenarios required to calculate truly incremental benefits of Google are highly speculative and beyond the scope of this study.

The business benefits derived from Google are calculated as the sum of three components:

- Direct impact: This is the gross income of businesses resulting from their use of Google to connect with their customers and the revenues received through Google by content creators.
- Indirect impact: This is the flow-on economic effect generated when the increased activity in the directly-impacted businesses generates further purchases from their suppliers.
- Induced impact: This is the economic activity generated by the employees of directly and indirectly-impacted businesses who spend their wages in the broader economy.

The study uses a conservative multiplier to estimate the indirect and induced impact.

Google Search and AdWords

The business benefits of Search and Adwords are estimated using an average of 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 page views in Australia, the proportion of pages with advertisements, the number of advertisements per page and the average click-through rate.

In order to estimate the income generated by businesses paying for online advertising through Google a return on investment (ROI) range of 3.4 – 8 was applied, and the midpoint was taken. This ROI was developed from a number of assumptions:

- Using a large sample of proprietary data, Hal Varian, Google's Chief Economist, estimated that businesses received $2 in surplus for every $1 spent on advertising. This finding was published in the American Economic Review in 2009.
- Businesses also receive free clicks as a result of unpaid 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 assumes 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 assumes their value at 70 per cent of paid clicks.
- As a results of these assumptions, an ROI of 8 is estimated. This ROI is taken an upper bound. To derive a lower bound, we build on the academic findings detailed in the Google UK Economic Impact Study to set a lower bound of 3.4.

While we report a point estimate, this figure should not be interpreted as falsely specific but is instead the midpoint of a broader range of estimates.

Table: Inputs and sources for calculating business benefits of Search and AdWords

Estimation	Metric	Source
Top-down approach	Online search advertising market size	• PwC (2014) IAB Online Advertising Expenditure Report
	Google's share of general searches	• Statista (2015) Worldwide market share of leading search engines
	Return on investment of advertising on Adwords	• Hal Varian (2011) The economic impact of Google Presentation • Deloitte (2015) Google's economic impact, United Kingdom, 2014
Bottom-up approach	Google Search page views	• Nielsen (2015) Nielsen Online Landscape Review
	Percentage of pages that display advertisements	• Hal Varian (2011) The economic impact of Google Presentation
	Number of advertisements per page	
	Average CTR (click-through rate by users) of Google advertisements	• The Search Agency (2014) State of Paid Search Report
	Average CPC (cost-per-click to advertisers)	

[1] In this report, the past year refers to the year to June 2015.

AdSense

The direct business benefits from Google AdSense are estimated as the total income generated by content creators hosting Google advertisements. We estimated this income using Google's published global traffic acquisition costs and multiplied these by Australia's share of global AdSense impressions. An alternative method for calculating Australia's share of AdSense payments involves adjusting Australia's share of global impressions based on Australia's share of global advertising payments. We averaged the results of these two methods.

Table: Inputs and sources for calculating business benefits of AdSense

Estimation	Metric	Source
Global impression share	Global traffic acquisition costs related to AdSense, converted to AUD	• Google Inc Form 10-K for *financial period ended 31 December 2014*
	Australia's share of global impressions on AdSense	• Google DoubleClick (2013) *What's trending in display for publishers?*
Adjusted impression share	Global traffic acquisition costs related to AdSense, converted to AUD	• Google Inc *Form 10-K for financial period ended 31 December 2014*
	Australia's share of global impressions on AdSense	• Google DoubleClick (2013) *What's trending in display for publishers?*
	Monetisation adjustment (ratio of Australia's share of global ad impressions to Australia's share of global display ad spending)	• IAB Online advertising expenditure reports, by country • Google DoubleClick (2013) *What's trending in display for publishers?*

YouTube

We estimated the direct benefits of YouTube to owners of video content in two ways and took an average of these methods. First, the top down method estimated the total video advertising market in Australia, YouTube's share of that market and the percentage of revenue that YouTube disburses to content creators. Second, the bottom up method estimated YouTube cost per view, the view rate of advertising, the total videos viewed in a year, the proportion of videos with advertising and the percentage of collected revenue that YouTube distributes to content creators.

Table: Inputs and sources for calculating business benefits of YouTube

Estimation	Metric	Source
Top down	Total video advertising segment	• IAB Online advertising expenditure reports
	YouTube share of video streaming	• Statista *"Market share of leading internet video portals"*
	YouTube revenue sharing agreement	• Google product forums *"YouTube Monetization"*
Bottom up	YouTube cost per view	• Danny Gray (2012) *Beyond Google Search. Press Play for Display, Video and Social*
	Ad view rate	• Danny Gray (2012) *Beyond Google Search. Press Play for Display, Video and Social*
	Total videos with ads viewed annually	• Nielsen *Online Landscape Review, 2015*
	YouTube revenue sharing agreement	• Google product forums *"YouTube Monetization"*

Consumer benefits

Consumer surplus is usually calculated by observing how customers respond to price changes. For example, if customers reduce their consumption rapidly in response to price increases, that may indicate that they do not value the product much higher than its current price and are not deriving much consumer surplus from it. The consumer benefits supported by Google are challenging to measure and calculate because individuals typically don't pay for the services, such as Search, YouTube, Maps and Gmail. In the absence of price indicators, there are a number of established methodologies for estimating the consumer benefits of free services.

- Value of time: This method estimates benefits by calculating how much time an individual saved by using a good or service.
- Conjoint analysis: This method estimates benefits by asking individuals how much they value specific products compared with other goods and services, which are often priced. This method is more reliable than asking individuals how much they value a product because individuals struggle to quantify value of a good or service in isolation and because individuals struggle to quantify the value of unpriced goods and services.

Where possible, this study uses both these methods, including a first-of-its-kind survey to estimate the value of time saved by using Google Maps for public transport and walking.

Google Search

We estimated the benefits of Search to consumers in two ways and took an average of these methods. First, we used conjoint analysis, where consumers are asked to value Search compared with other goods and services. Second, we calculated the value of time saved compared with offline methods. To calculate this, we applied time saving estimates from an international study that measured the time taken to conduct a search online versus a search at the library. 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. We use two methods to calculate time saved. One of our methods employs Google Chief Economist Hal Varian's assumption that people conduct one search per day for leisure and applies this assumption to the number of Google users in Australia. The alternative method uses actual Australian data on searches using Google. In 2015, Australia had around 15.5 million Google users, who conducted approximately 2.9 searches per day. Around 50 per cent of these, or 1.5 searches per day, were conducted for leisure rather than work purposes.

Table: Inputs and sources for calculating consumer benefits of Search

Estimation	Metric	Source
Conjoint value of Google Search	Amount that consumers value product relative to other products	• McKinsey (2011), *The Web's €100 billion surplus* • McKinsey (2014), *The mobile Internet's consumer dividend*
	Number of Google Search users	• Nielsen (2015) *Nielsen Online Landscape Review*
Value of time saved using Google Search – Method 1	Time to answer with Search compared to alternate methods	• Yan Chen (2013) *A day without a Search engine: an experimental study of online and offline search*
	Number of questions answered by search per user	
	Number of Google Search users	• Nielsen (2015) *Nielsen Online Landscape Review*
	Wage rate	• Australian Bureau of Statistics (2015) 6302.0 – *average Weekly Earnings*
Value of time saved using Google Search – Method 2	Time to answer with Search compared to alternate methods	• Yan Chen (2013) *A day without a Search engine: an experimental study of online and offline search*
	Number of page views per user	• Nielsen (2015) *Nielsen Online Landscape Review*
	Number of pages per search	• Average of figures reported on multiple websites and forums
	Number of Google Search users	• Nielsen (2015) *Nielsen Online Landscape Review*
	Wage rate	• Australian Bureau of Statistics (2015) 6302.0 – *Average Weekly Earnings*

Google Maps overall

We estimated the benefits of Maps to consumers in two ways and took an average of these methods. First, we used conjoint analysis, where consumers are asked to value Maps compared with other goods and services. Second, we used the time saved method and we separately estimated the time saved by using Maps for driving, public transport and walking.

Table: Inputs and sources for calculating consumer benefits of Maps (Summary)

Estimation	Metric	Source
Conjoint value of Google Maps	Amount that consumers value product relative to other products	• McKinsey (2011), *The Web's €100 billion surplus* • McKinsey (2014), *The mobile Internet's consumer dividend*
	Number of relevant consumers with vehicles and smartphones	• Australian Bureau of Statistics (2015) *9309.0 – Motor Vehicle Census* • Oztam & Nielsen (2015) *Australia Multi-screen report, Q2 2015*
Value of time saved using Google Maps	Time saved while driving	• The difference between the time saved using Google Maps and the times saved using GPS devices • See Table on Google Maps for driving for details
	Time saved while walking	• See Table on Google Maps for walking for details
	Time saved on public transport trips	
	Wage rate	• Australian Bureau of Statistics (2015) *6302.0 – Average Weekly Earnings*

Google Maps for driving

We estimated the time saved by calculating the number of vehicles with drivers using Maps, the reduction in trip time using Maps, total kilometers travelled each year using Maps, the average trip speed, and the average national wage rate. In order to reflect time saved for all beneficiaries, we made an adjustment for the average number of passengers in the vehicle.

Table: Inputs and sources for calculating consumer benefits of Maps for driving

Estimation	Metric	Source
Time saved using Google Maps whilst driving	Time saved using a GPS device	• TNO (2007) Independent research by Dutch research institute
	Number of consumers with vehicles and smartphones	• Australian Bureau of Statistics (2015) 9309.0 – *Motor Vehicle Census* • Oztam & Nielsen (2015) *Australia Multi-screen report, Q2 2015*
	Proportion of smartphone owners that use Google Maps	• Telstra (2010) Smartphone Index Fact Sheet • Kantar World Panel *Smartphone OS market share Australia* data • ASYMCO (2015) *Where are Maps going?*
	Distances travelled by all cars in a year	• Australian Bureau of Statistics (2014) *9208.0 – Survey of Motor Vehicle Use*
	Trip speed	• Bureau of Transport Statistics, Transport for NSW *(2014) Annual Report*
	Average passenger to driver ratio	

Google Maps for walking and public transport

Estimating the benefit of using Google Maps for public transport and walking trips was challenging, because there are not well established figures on how often we use a tool like Google Maps to help us plan a public transport or walking trip. There also are not well established figures on how much time a trip optimizer saves an individual.

To calculate the benefits of Google Maps for walking and public transport, we conducted a national survey with 511 respondents, which we weighted to align to key ABS demographic data including age, gender, geography, and employment status. We asked respondents whether, in the past two weeks, they have used Google Maps to plan or navigate their most common public transport or walking trip and any uncommon trips (e.g. a trip to a friend's house for dinner). Across a large sample of trips, we then applied a time saving based on the difference between the optimal trip on Google Maps and the average of the multiple trip options presented by Maps (i.e. a conservative estimate of the time saved by taking the optimal route).

Table: Inputs and sources for calculating consumer benefits of Maps for public transport and walking

Estimation	Metric	Source
Time saved using Google Maps for walking trips	Time travelled walking with assistance from Google Maps	• AlphaBeta national survey, weighted for key ABS demographics including age, gender, geography and employment status • Sample size = 511
	Number of people who use Google Maps for walking trips	
	Percentage reduction in walking trip duration through using Google Maps	• AlphaBeta analysis based on 75 sample trips
Time saved using Google Maps for public transport trips	Time travelled via public transport with assistance from Google Maps	• AlphaBeta national survey, weighted for key ABS demographics including age, gender, geography and employment status • Sample size = 511
	Number of people who use Google Maps for public transport travel	
	Percentage reduction in public transport trip duration through using Google Maps	• AlphaBeta analysis based on 75 sample trips

YouTube

We calculated the consumer benefits based on conjoint analysis, which asks consumers to value products relative to other products and services. We used results from an international survey of similar countries, adjusted for Gmail's share of personal email, and multiplied by the number of users in Australia.

Table: Inputs and sources for calculating consumer benefits of YouTube

Estimation	Metric	Source
Conjoint value of YouTube	Amount that consumers value product relative to other products	• McKinsey (2011), *The Web's €100 billion surplus* • McKinsey (2014), *The mobile Internet's consumer dividend*
	Number of Youtube users	• Nielsen (2015) Nielsen *Online Landscape Review*

Gmail

We calculated the consumer benefits of YouTube based on conjoint analysis, which asks consumers to value products compared with other products and services. We used results from an international survey of similar countries, applied a growth rate based on increased viewership since the survey, adjusted for YouTube's share of online video viewing in Australia, and multiplied by the number of YouTube users in Australia.

Table:Inputs and sources for calculating consumer benefits of Gmail

Estimation	Metric	Source
Conjoint value of Gmail	Amount that consumers value product relative to other products	• McKinsey (2011), *The Web's €100 billion surplus* • McKinsey (2014), *The mobile Internet's consumer dividend*
	Number of Gmail users in Australia	• Techcrunch (2015) *Gmail Now Has 900M Active Users, 75% On Mobile* • The Radicati Group (2014) *Email Statistics Report, 2014-2018* • Nielsen (2015) *Nielsen Online Landscape Review*

Societal benefits

Societal benefits are less easy to calculate than benefits to business or consumers, because they comprise benefits that only show up in indicators over the longer term or benefits that are difficult to quantify like charitable activity or innovation. While these benefits are often not conducive to comprehensive quantitative measurement, they are important contributions to Australia that can be observed and described.

We provide detail on how each of the societal benefits were estimated in the relevant sub-section in Section 4.

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