

GOOGLE ECONOMIC AND SOCIAL IMPACT NEW ZEALAND

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strategy x economics

Important Notice on Contents – Estimations and Reporting

This report has been prepared by AlphaBeta for Google. All information in this report is derived or estimated by AlphaBeta analysis using both proprietary and publicly available information. Google has not supplied any additional data, nor does it endorse any estimates made in the report. Where information has been obtained from third party sources and proprietary research, this is clearly referenced in the footnotes.

The benefits estimated in this report are based on the latest available annual figures, thus of 2015. Unless otherwise stated these estimates refer to annual benefits.

The amounts in this report are estimated in both New Zealand dollars and US dollars. The conversion is based on the average exchange rate in 2015, sourced from X-Rates.com, which was 1 USD = 1.43 NZD.

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Google's estimated economic and societal impact

In New Zealand during 2015: *^



BUSINESS BENEFITS

Google supports

NZ\$1.0 – 3.0 billion

in direct benefits to businesses in New Zealand



More than **45%** of local **YouTube** content views originate from overseas



CONSUMER BENEFITS

Google supports over

NZ\$2.0 billion

in benefits to consumers in New Zealand



On average, more than **3.5 million** Google Search users are saving over



30 minutes a day looking for answers

Each New Zealander views an average of over

300 hours

of **YouTube** a year



Google Maps reduces driving times by **8%**



and public transport travel times by **13%** in Auckland on average



Overall, in New Zealand, each driver saves close to **4 hours** and each commuter shaves off roughly **2 hours** a year travelling to their destinations

SOCIETAL BENEFITS

Google spearheaded the **Innovation Partnership** in 2013, together with other organisations, to promote digital innovation across the three sectors

Business



Government



Education



The initiative aims to drive productivity and efficiency by leveraging the Internet and digital tools

Google Maps saves between

14,500 – 19,500 tonnes of CO₂

from vehicle emissions each year, equivalent to between

3,000 – 4,000 passenger cars



*Data in the Exhibit is estimated by AlphaBeta using a range of original and third party sources. See Appendix for detailed methodology.
^ Google's economic and social impact in New Zealand is sized across three separate segments - Business benefits (e.g. higher advertising revenue and labour productivity), consumer benefits (e.g. increased time savings and access to information), and societal benefits (e.g. greater levels of innovation and philanthropy).

EXECUTIVE SUMMARY

The digital economy has the potential to play a major part in spurring future productivity and growth in New Zealand. However, a large portion of the digital economy goes unmeasured in today's economic indicators. This report aims to shed some light on this "hidden" economic activity and describes the contribution Google is making to New Zealand's 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 organise the world's information and making it universally accessible and useful to everyone. As a result, Google's services benefit the lives of millions of New Zealanders every day. Quantifying the extent of these benefits can be difficult given that many of Google's products are provided free of charge and therefore go unmeasured. AlphaBeta has used third-party data and consumer surveys to assess the benefits that Google provides to businesses, consumers, and the larger New Zealand society. The analysis shows that in 2015, Google's products supported between NZ\$1.0 - 3.0 billion in business benefits for New Zealand companies, and greater than NZ\$2.0 billion in benefits to New Zealand consumers. Its other projects and products provide an expanding range of societal benefits that, while difficult to measure, are also significant.

New Zealand has always been under the shadow

of the "double tyranny" of size and distance; it has a relatively small population of around 4.6 million in 2015 and is in a remote location, situated more than 1,600 km southeast of Australia, its nearest neighbour.¹ New Zealand relies on international trade, with exports making up 30% of the nation's Gross Domestic Product (GDP).² These elements make New Zealand particularly vulnerable to the global macroeconomic environment. Despite a strong current economic performance, the New Zealand economy is still subject to external shocks, such as a global fall in commodity prices, or a decrease in trading volumes due to slower growth in its trading partners. Traditionally, New Zealand has been reliant on relatively low value-added exports, such as agriculture products, to drive its economy.³ As a result, there have been growing efforts towards moving up the value chain. One such trend is the pursuit of so-called "weightless exports" which refer to services that can be exported electronically, such as electronic games and mobile apps, as distance and supply chain challenges matter less for these products.⁴

Not only is the digital economy a major potential driver of future innovation and growth for New Zealand, it can also help overcome the "double tyranny" by enabling even Small and Medium Enterprises (SMEs) to promote their products to new markets, increase their productivity through digital tools, and create new services linked to the digital economy. Through technology and online digital platforms, even SMEs can operate across geographic regions and remain competitive. This new business model has been termed the "micro multinational", referring to SMEs which have a global mind set and rely heavily on technology to

expand overseas.⁵ In short, the digital economy can help take New Zealand to the world, and the world to New Zealand.

The government has realised that local businesses, especially SMEs, drive economic growth and has committed to six key areas in the Business Growth Agenda (BGA) to ensure that companies can remain competitive, increase their exports to the world, and continue to hire locals.⁶ One target of the BGA for New Zealand by 2025 is to be "more internationally connected to reduce the impacts of distance, and seen as a real hub of talent and ideas for the Asia-Pacific region".⁷ The New Zealand government has also acknowledged the importance of the digital economy in helping these SMEs succeed and therefore strengthen New Zealand's future development. It has therefore placed significant emphasis on enhancing digital innovation in order to spur productivity in the country. It has rolled out measures to support businesses, especially SMEs, individuals, and the public sector to transform their operations by leveraging digital tools.⁸ Initiatives include the Digital Economy Work Programme, Innovative New Zealand plan, and the Government ICT Strategy 2015.⁹ For instance, the government is engaged in supplying the physical infrastructure needed for the digital push - it is in the midst of investing NZ\$2 billion into three projects that strive to deliver fast and better Internet to all New Zealanders. The Ultra-Fast

Broadband (UFB) Initiative is currently ongoing, with about 90% of businesses, schools and hospitals connected to UFB in 2015. Another component is the Rural Broadband Initiative, which aims to allow rural areas to have improved connections so that the locals there will not be left behind in the digital economy.¹⁰

Digital products, such as those provided by Google, can help New Zealand reap the benefits from this investment in backbone infrastructure. Google's products such as AdWords¹¹ and AdSense¹² provide new avenues for New Zealand businesses to engage with consumers abroad, while products such as YouTube help New Zealand exert "soft power" through cultural exports. On the flipside of bringing New Zealand to the world, products like Google Search, Google Maps, YouTube, and Gmail help bring the world to New Zealand consumers. These services provide free easily accessible information and entertainment. They allow New Zealanders to educate themselves, share ideas and overcome the physical distance between them and the rest of the world. For example, Google has worked with the Department of Conservation and Air New Zealand to launch digital images for 7 "Great Walks" on Google Maps, enabling any online user to virtually step on these trails or prepare himself or herself for the actual hike in New Zealand.¹³ International visitors to some of the Great Walks have increased by more than a quarter since its introduction.¹⁴

¹ Simmons (2002) Growing Pains: New Zealand Qualitative Evidence on Hurdles to Exporting Growth New Zealand Treasury Working Paper 02/10.

² Information obtained from New Zealand Now, Economic overview - <https://www.newzealandnow.govt.nz/investing-in-nz/opportunities-outlook/economic-overview>

³ Information obtained from New Zealand Trade & Enterprise, 2017 - <https://www.nzte.govt.nz/en/invest/statistics/> and Stuff, September 5, 2007 - <http://www.stuff.co.nz/business/44031/NZ-needs-to-shift-to-weightless-economy>

⁴ Reported by Stuff, September 5, 2007 - <http://www.stuff.co.nz/business/44031/NZ-needs-to-shift-to-weightless-economy>

⁵ Information obtained from HSBC, October 3, 2016 - <http://www.business.hsbc.com.sg/en-gb/sg/article/going-big-staying-small-rise-micro-multinationals>

⁶ Information obtained from The Business Growth Agenda, Towards 2025, Ministry of Business, Innovation & Employment - <http://www.mbie.govt.nz/info-services/business/business-growth-agenda>

⁷ Ministry of Business, Innovation & Employment (2015). *The Business Growth Agenda, Towards 2025*.

⁸ Information from Ministry of Business, Innovation & Employment, Digital Economy - <http://www.mbie.govt.nz/info-services/science-innovation/digital-economy>

⁹ Information from Innovative New Zealand, Budget 2016 - <https://national.org.nz/files/documents/budget-2016-innovative-new-zealand.pdf>

¹⁰ Information from Fast broadband, New Zealand's Internet upgrade, Ministry of Business, Innovation & Employment - <http://www.mbie.govt.nz/info-services/sectors-industries/technology-communications/fast-broadband>

¹¹ Google AdWords is Google's online advertising service that allows businesses to place information on Google Search results based on keywords as well as Google Display Network partner websites.

¹² AdSense is a Google service that allows publishers and content creators within the Google Display Network to display AdWords ads on their websites and monetise on them.

¹³ Reported by Stuff, November 5, 2015 - <http://www.stuff.co.nz/travel/destinations/nz/73503987/new-zealands-great-walks-launch-on-google-maps>

¹⁴ Information from Statistics New Zealand, International Visitor Survey: Place visited (RTO) - <http://nzdotstat.stats.govt.nz/wbos/Index.aspx?DataSetCode=TA-BLECODE7573#>

Google can therefore support New Zealand in increasing its global digital footprint relative to its physical size.

The way we measure the economic impact and contributions of such products and services is subject to much discussion. There has been ongoing debate among politicians, economists, and the general public about the usefulness of official economic measures, such as GDP, in tracking economic progress and development. For instance, Nobel laureate Joseph Stiglitz has noted that better indicators are needed to capture well-being and sustainability.¹⁵ As the global landscape rapidly shifts into the digital era, the larger question will be whether these traditional economic measures account for the benefits that have been brought about by technology and the digital economy.

Economists have broadly agreed that the digital economy has improved living standards through at least three channels that are not captured in official statistics. First, technology has brought about unmeasured quality improvements in the lives of people around the world – in the past for instance, students had to visit public libraries to obtain answers to their homework; now, they can simply use Google Search at the comfort of their homes to get solutions quickly. Second, technological changes have resulted in the provision of free online services which can substitute for products that were previously purchased by consumers. For example, Google Maps has replaced the need to purchase GPS devices to a large extent. From a GDP standpoint, this actually results in a negative impact as a free good or service is not ascribed value, whereas the purchased item it replaced was previously included in GDP measures. Finally, the digital era has improved the quality of leisure, which is not included in GDP estimates. This ranges from entertainment options available on online video platforms like YouTube to enhanced navigation which can save consumers time as they

try to get to different destinations.

This report aims to address these limitations and highlights the total positive economic impact of Google in New Zealand during 2015 as comprised of three components: business benefits, consumer benefits and societal benefits (Exhibit 1). These are gross direct benefits (which exclude second order impacts such as any activity that may be displaced, or induced economic benefits in the supply chain or through spending), some of which can be quantified and others which can be described in qualitative terms.¹⁶ These benefits are not to be confused with GDP contributions, but while not fully captured by traditional economic measures, they can stimulate GDP and job creation across the economy through several channels. The analysis is confined to sizing the benefits of Google’s core products and does not include an estimation of the broader economic impact of Google’s Android operating system, nor the products of Alphabet, which is the parent company of Google.

EXHIBIT 1

Google’s total economic impact in New Zealand was analysed across three separate segments



The business benefits of Google are measured in terms of net advertising benefits¹⁷ as well as improvements in labour productivity while consumer benefits include time saved, information received, a wider range of available choices due to greater access to knowledge, and convenience from using Google’s products. The benefits to society tend to be much more diffuse and harder to estimate. Due to these essential differences, this report does not aggregate the benefits together into one figure but instead reports each of the

benefits separately.¹⁸ This report concludes that Google is playing a key role in facilitating New Zealand’s digital economy today. This report estimates Google’s total contribution to the New Zealand economy at between NZ\$1.0 - 3.0 billion in business benefits and greater than NZ\$2.0 billion in consumer benefits (Exhibit 2). On top of that, Google provides large societal benefits, such as spurring local innovation and supporting not-for-profits.

¹⁵ Reported by The Guardian, September 13, 2009 - <https://www.theguardian.com/commentisfree/2009/sep/13/economics-economic-growth-and-recession-global-economy>

¹⁶ For more details on the definitions of the benefits estimated in this report and how they are calculated please refer to Box 1, Box 6 and the Appendix.

¹⁷ Net advertising benefits refers to the increase in revenues and sales that can be directly attributed to advertising minus the related advertising expenditure.

¹⁸ The Appendix provides a detailed breakdown of the methodologies employed for the different benefit groups.

EXHIBIT 2

Examples of benefits supported by Google in New Zealand

	BUSINESS BENEFITS	CONSUMER BENEFITS	SOCIETAL BENEFITS
<p>GOOGLE SEARCH & ADWORDS</p> 	<ul style="list-style-type: none"> AdWords supports more than NZ\$2.9 billion in revenue uplift for businesses in New Zealand 	<ul style="list-style-type: none"> Google Search helps users save more than 30 minutes a day 	<ul style="list-style-type: none"> Google Cultural Institute partners with museums to showcase around 2,000 artifacts and artworks online on its Google Arts & Culture platform
<p>GOOGLE MAPS</p> 	<ul style="list-style-type: none"> 'Google My Business' integration in Google Maps allows customers to find detailed information about local companies 	<ul style="list-style-type: none"> Over 2.5 million New Zealand drivers are spending over 4 hours less stuck on the roads each while more than 1.0 million commuters save over 2 hours on average on their public transport time 	<ul style="list-style-type: none"> Google.org has launched Google Public Alerts in New Zealand in 2015 Google provides Ad Grants (up to NZ\$14,300 worth of value per organisation every month) in New Zealand, benefitting non-profit organisations like Kiwis for kiwi
<p>YOUTUBE & ADSENSE</p> 	<ul style="list-style-type: none"> New Zealand businesses who are advertising earn between NZ\$20 - \$100 million through displaying advertisements on websites and videos using YouTube or AdSense 	<ul style="list-style-type: none"> Users spend on average more than 50 minutes a day watching YouTube 	<ul style="list-style-type: none"> Google has partnered with local online sites like NetSafe and Sticks'n Stones to start the Web Ranger Programme in New Zealand from 2013. The programme encourages teenagers to be advocates for a safe and secure online community
<p>G SUITE</p> 	<ul style="list-style-type: none"> More than 1,000 businesses use G Suite to collaborate and store docs 	<ul style="list-style-type: none"> New Zealanders value Gmail at over NZ\$195 a year per user 	<ul style="list-style-type: none"> Google Maps saved between 14,500 – 19,500 t of CO₂ emissions in 2015, equivalent to 3,000 – 4,000 cars
<p>GOOGLE</p> 	<p>NZ\$1.0 – 3.0 billion</p>	<p>>NZ\$2.0 billion</p>	<p>Benefits are significant but difficult to quantify</p>

Data in the Exhibit is estimated by AlphaBeta using a range of original and third party sources. See Appendix for detailed methodology. Source: AlphaBeta analysis

Business benefits

Google aids local businesses in finding their potential customers through marketing services such as Google Search and AdWords and allows content creators to generate revenues from their websites and videos through Google AdSense and YouTube. By providing a range of affordable advertising channels, Google has essentially created a new option of low-cost advertising that lets SMEs attract customers not only in their own city or country but all over the world, with just a few simple steps. This has helped level the playing field for over 200,000 SMEs in New Zealand (representing about 97% of enterprises in New Zealand), allowing them to better compete with bigger businesses and thrive despite the global economic slowdown.¹⁹ Local SMEs are no longer constrained by natural obstacles like the small domestic market or the isolated geographical location of New Zealand if they can successfully leverage digital tools to interact with consumers in an increasingly connected digital era. For instance, they can export services and products to customers in countries faraway, such as Canada, without having to establish brick and mortar retail stores or advertise in traditional print media (e.g. newspapers) in those locations. Hence, Google supports these New Zealand micro multinational firms in removing natural barriers to scale (e.g. the traditional need to have large capital funds to expand abroad) and helps them better compete with global players.²⁰

Google's products have helped New Zealand businesses generate between an estimated NZ\$1.0 - 3.0 billion of benefits annually.²¹ Google Search and AdWords supported between NZ\$1.0 - 2.9 billion in net advertising benefits for New Zealand businesses alone. In New Zealand, businesses who are

advertising using YouTube or AdSense earned over NZ\$100 million in benefits. Over 1,000 New Zealand companies are estimated to be using G Suite to interact, store documents and communicate, adding over NZ\$6.5 million of business benefits to their operations.^{22, 23}

Consumer benefits

The benefits that Google's products provide to New Zealand consumers are not captured by official GDP statistics and hence risk being overlooked. For example, when we use Google Search to help us search the Internet to complete our homework, the solutions we find aren't included in measures of our economic growth. Neither is the time we save when we activate Google Maps to find the quickest route to a new destination or the freedom of choice we have when we turn to Google's services to seek options to make an informed decision (e.g. which insurance provider to purchase from). Furthermore, none of the benefits consumers derive from free online activities such as the millions of emails sent and received on Gmail every day are measured in New Zealand's GDP.²⁴ But these consumer benefits do have a major impact on our lives and so failing to consider their value would significantly underestimate the contribution of Google to New Zealanders of all demographics.^{25 26}

Quantifying these benefits, we estimate that Google is supporting over NZ\$2.0 billion in annual benefits to New Zealand consumers. Google Search saved each New Zealander more than 5 days per year, supporting annual consumer benefits of more than NZ\$750 million. Analysis of our consumer survey data reveals that over 1 million New Zealand commuters are using Google Maps to help them navigate their public transport routes and more than 2.5 million New Zealand drivers

¹⁹ Conservative estimate derived from reporting by NZ Herald, May 8, 2013 - http://www.nzherald.co.nz/business/news/article.cfm?c_id=3&objectid=10882310 and Stuff, June 25, 2014 - <http://www.stuff.co.nz/business/small-business/10198006/SMEs-still-backbone-of-NZ-business>

²⁰ A micro multinational firm typically has a turnover of between NZ\$72 – 358 million. Information obtained from HSBC, October 3, 2016 - <http://www.business.hsbc.com.sg/en-gb/sg/article/going-big-staying-small-rise-micro-multinationals>

²¹ The range in calculated business benefits reflects different estimation methodologies. See Box 1 and the Appendix for further details on the methodology.

²² Number of firms using G Suite is estimated based on Google Admin installs and Android smartphone penetration.

²³ G Suite is formerly known as Google Apps for Work.

²⁴ Gmail traffic is estimated based on data from the AlphaBeta consumer survey, and reporting by techcrunch.com, March 28, 2015 - <http://techcrunch.com/2015/05/28/gmail-now-has-900m-active-users-75-on-mobile/?ncid=rss> and the Email Statistics Report, 2014-2018 by The Radicati Group - <http://www.radicati.com/wp-content/uploads/2014/01/Email-Statistics-Report-2014-2018-Executive-Summary.pdf>

²⁵ AlphaBeta's consumer survey of over 400 respondents in New Zealand shows that a large majority of New Zealand online population aged 50 years and above utilise Google products and services such as Google Maps and Search.

²⁶ The AlphaBeta consumer survey is representative of the online population in New Zealand.

make use of Maps to reach their destinations. In addition, estimates of time savings from Google Maps navigation show that each of them saved a projected 2 hours on buses and trains and close to 4 hours while driving over the year on average.²⁷ The survey also reveals that over 2.5 million New Zealanders watch more than 50 minutes on average of videos on YouTube.com each day.²⁸

Societal benefits

Apart from the benefits to businesses and individuals, Google provides benefits to the broader New Zealand society that may not accrue directly to a specific company or individual. In economics, these are often labelled as “spill-over benefits”. These benefits might not appear in GDP measures today, but they affect other objectives we care about and will strengthen New Zealand’s economy over time.

Google’s main project supporting digital innovation in New Zealand is the Innovation Partnership. Spearheaded by Google in 2013, the Innovation Partnership is a network of organisations that aims to promote digital innovation in New Zealand across three sectors – business, education, and government.²⁹ The initiative strives to drive productivity and efficiency by assisting different parties to fully leverage the Internet and various digital tools.³⁰ It also funds research studies in the digital and technology space. This project complements the policies of the New Zealand

government to embrace the digital economy such as investing in UFB to ensure that New Zealanders get faster and better Internet connections.³¹

Computer science has increasingly grown in prominence as expertise in this subject is highly valued in today’s digital era. However, for a long time, there has not been an online computer science textbook that is readily available for users to refer to.³² Hence, Google supported a project in 2012 by computer science professor Tim Bell at Canterbury University to produce an interactive computer science field guide for high school students.³³ This project is open source and is constantly being revised to remain up to date, providing both students and teachers with essential knowledge.

Google Maps cuts down average trip times and contributes to conserving the environment in New Zealand. On average in 2015, Google Maps helped drivers save roughly 7% of time spent on the roads by navigating them to the most direct route, taking into account live traffic conditions.³⁴ This, in turn, helped to reduce travel time and congestion. By optimising the trips between destinations for more than 2.5 million Maps users, Google Maps helped to save between 14,500 - 19,500 tonnes of CO₂ e from vehicle emissions in 2015. The amount of emissions saved is equivalent to the emissions of 3,000 - 4,000 passenger cars. Thus, Google Maps helps to reduce the carbon footprint of New Zealanders and allows them to do their part to tackle climate change.

²⁷ Number of commuters is based on data from the AlphaBeta consumer survey. See Box 7 for further information on the approach for estimating time savings from Google Maps.

²⁸ YouTube user number is based on data from the AlphaBeta consumer survey and Internet population data. Average length of YouTube usage based on data from the AlphaBeta consumer survey.

²⁹ Information obtained from Innovation Partnership, A vision for a digital New Zealand - <http://www.innovationpartnership.co.nz/>

³⁰ Reported by Crown Fibre Holdings, June 11, 2013 - <http://www.crownfibre.govt.nz/2013/06/googles-innovation-partnership-and-ultra-fast-broadband/>

³¹ Information obtained from Fast broadband, New Zealand’s Internet upgrade, Ministry of Business, Innovation & Employment - <http://www.mbie.govt.nz/info-services/sectors-industries/technology-communications/fast-broadband>

³² Reported by Crown Fibre Holdings, June 11, 2013 - <http://www.crownfibre.govt.nz/2013/06/googles-innovation-partnership-and-ultra-fast-broadband/>

³³ Information obtained from Computer Science Field Guide, About - <http://csfieldguide.org.nz/en/about.html>

³⁴ Time savings obtained from AlphaBeta Google Maps Study in key cities in New Zealand (Auckland, Christchurch, and Wellington).



BUSINESS BENEFITS

HELPING BUSINESSES
AND CONTENT
CREATORS SUCCEED
LOCALLY AND
OVERSEAS

Estimated benefits to businesses from Google

In New Zealand during 2015:¹



Google supports

**NZ\$1.0 – 3.0
billion** in direct benefits

to businesses in New Zealand
and potentially an additional

NZ\$1.5 billion
in average indirect and
induced impacts²



AdSense or YouTube

earns businesses in
New Zealand over

**NZ\$100
million**



in net advertising benefits through
allowing them to display ads on
websites and videos

Google Search

users make more than

10 billion queries;



over

40%

of searches are
made on a mobile

More than

45%

of local New Zealand
YouTube content
views originate from
overseas



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

² For a detailed explanation of direct benefits, and indirect and induced impact, see Box 1.

BUSINESS BENEFITS

By connecting businesses directly to consumers anywhere, Google plays a significant role in developing New Zealand's digital economy. AlphaBeta estimates that in 2015, Google contributed an economic impact of between NZ\$1.0 - 3.0 billion in business benefits to the digital economy (Exhibit 3). While these benefits are not equivalent to GDP contributions, they directly

boost firms' revenues and economic activity. If broader indirect and induced effects are included, this adds an extra NZ\$1.5 billion of economic impact. See Box 1 for further explanation of our methodology for calculating these benefits and the Appendix for specific assumptions. The business benefits of each of these services have been calculated separately (Exhibit 4).

EXHIBIT 3

Value of business benefits supported by Google New Zealand, 2015
NZ \$ billions*

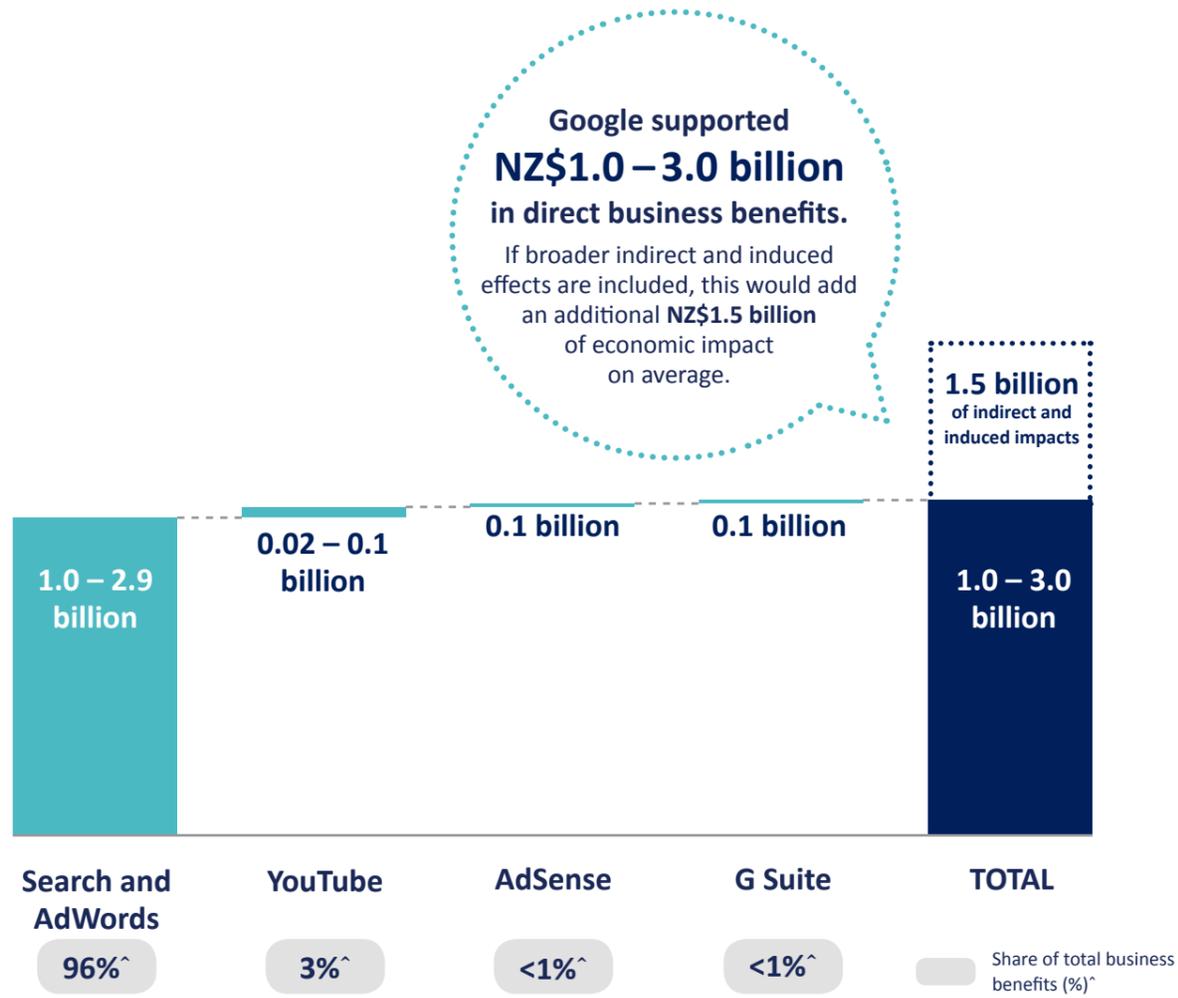
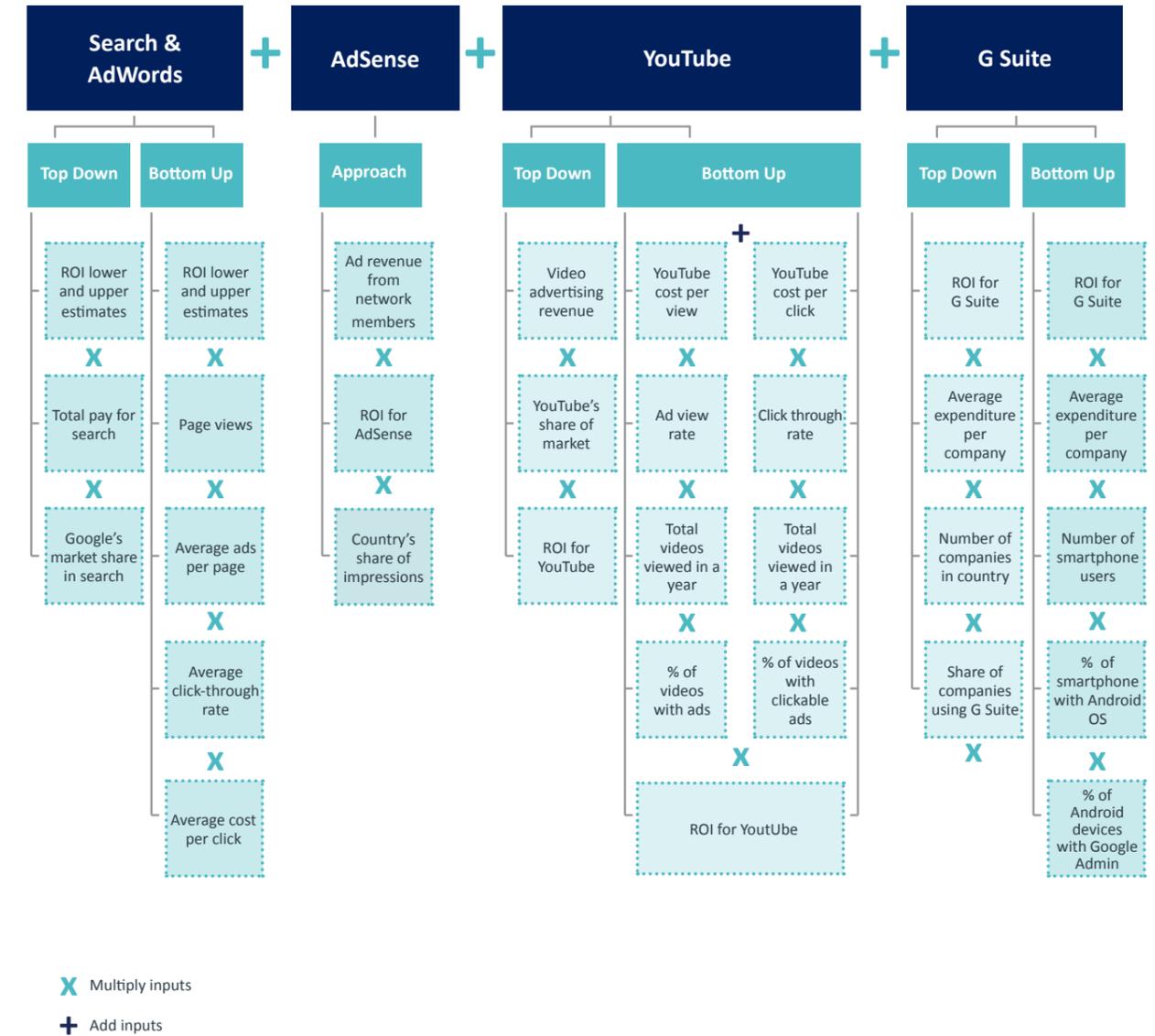


EXHIBIT 4

Methodology for calculating business benefits



*Rounded to nearest NZ\$100 million with exception of YouTube, AdSense, and G Suite. May not sum due to rounding.
[^]Based on range of averages. May not sum to 100% due to rounding.
 Source: Data in exhibit is estimated by AlphaBeta using a range of original and third party sources. See Appendix for detailed methodology.



BUSINESS BENEFITS

Online advertising platforms, such as Google, are crucial for SMEs that lack the networks and resources to fund expensive marketing campaigns using traditional media (such as television, radio, or newspapers), or tap into distribution channels controlled by heavy-weight industry players. Google provides an affordable and viable option of matching SMEs with potential customers. Whether it be through free organic search or by efficiently targeting consumers through AdWords marketing, businesses can earn up to 8 times their advertising expenditure in net benefits.³⁵ This makes online search advertising a strong marketing channel for New Zealand SMEs with great potential to increase their exports, scale up, and expand overseas.

Similarly, YouTube provides aspiring New Zealand artists and media content creators a platform to monetise and make a living from their passions. Thus, even when the global economy is slowing down, New Zealanders can explore alternative occupations in the digital economy such as YouTube creators or App developers; jobs that are increasingly in demand as the digital economy develops.

Furthermore, G Suite (a suite of cloud-based products and services that enable interaction and document sharing amongst colleagues, and storage of documents online) is driving up the labour productivity of New Zealand workers through greater ease of collaboration and sharing of ideas.

Box 4 and 5 summarise the business benefits that Google has created for New Zealand's enterprises through two broad channels – bringing New Zealand to the world (e.g. expanding New Zealand's reach abroad) and bringing the world to New Zealand (e.g. tourism).

³⁵ Based on estimates by Varian (2009), Jansen & Spink (2009), and Deloitte Google's Economic Impact UK (2015). See Appendix for underlying assumptions.

BOX 1

Calculating business benefits

The business benefits supported by Google are calculated by considering the revenues and net advertising benefits of New Zealand businesses and advertisers using Google's products.³⁶ These benefits are a proxy for the "gross economic activity" generated by Google, meaning the gross revenue, income or savings generated by businesses through the use of Google products. This gross economic activity does not measure the flow-on economic effects generated, such as further purchases from their suppliers or the economic activity generated by the employees of these businesses who spend their wages in the broader economy. Gross economic activity also does not account for activity that may have been displaced by Google and the methodology does not attempt to estimate the incremental impact of Google on the New Zealand economy beyond what would be the case if Google didn't exist but other companies like it did. The hypothetical scenarios required to calculate truly incremental benefits or "net economic activity" generated by Google are highly speculative and beyond the scope of this study.

The benefits estimated here are restricted to those generated from firms using Google's products directly aimed at businesses. To provide objective and conservative estimates and avoid double counting, the business benefits estimated here do not account for how Google's consumer products support the productivity of workers (except for G Suite). For example, the search capabilities of Google Search and Google Maps save employees time when doing research. Workers can acquire new skills through the wealth of educational content on YouTube.

The total business benefits have been calculated

as the sum of the benefits of each Google product and service aimed at businesses. Most of the total business benefits are derived from Search and AdWords, which delivered between NZ\$1.0 - 2.9 billion in net advertising benefits for New Zealand businesses.³⁷ AdSense added more than NZ\$8.5 million and YouTube provided over NZ\$100 million of benefits to businesses advertising in New Zealand. The business benefits of each of these services have been calculated separately. For the calculation of business benefits of each product, we employed a top down and bottom up approach (except for AdSense). To reflect both approaches we report our estimates as ranges, rather than point estimates. See the Appendix for further details.

Google supported between an estimated NZ\$1.0 - 3.0 billion in direct business benefits. If the broader indirect and induced effects were included, this would add an additional NZ\$1.5 billion of economic impact on average. Indirect effects refer to the economic impact produced in the supply chain due to the demand from the businesses directly impacted, such as the impact on businesses that provide services to businesses that generate profits by using AdWords. The induced effects refer to the economic impact produced by consumer spending among those who work at businesses that generate revenues by using Google and businesses that provide services to these businesses. Due to limited data availability and uncertainties about data quality, we report only direct effects in our main results in this report. Potential additional impact through indirect and induced effects is estimated by applying a very conservative multiplier of 1.7 to direct effects, in line with existing academic literature.³⁸

³⁶ Net advertising benefits refers to the increase in revenues and sales that can be directly attributed to advertising minus the related advertising expenditure.

³⁷ The range in calculated business benefits reflects different estimation methodologies. See the Appendix for further details on the methodology.

³⁸ We use a conservative multiplier of 1.7. From public sources, we derive a large range of values. The wine industry in New Zealand has output multipliers of between 1.83 to 2.76 while the quarrying industry has an output multiplier of 1.75. In a PwC report, a range of output multipliers by sector was reported; ranging from 1.4 to 3.0. Information obtained from PwC (2011). Valuing the role of Construction in the New Zealand economy, PricewaterhouseCoopers; NZIER (2009). Economic impact of the New Zealand wine industry, NZIER; NZIER (2008). Economic analysis of the Quarrying and Aggregate Production Industry, NZIER.

Search and AdWords: Driving revenue and profits for SMEs

New Zealanders keyed in an estimated more than 10 billion search queries on Google in 2015.³⁹ Amongst them were potential customers for New Zealand businesses, searching for places to shop, eat or travel to. Businesses can connect to these customers by optimising their ranking in Google's search results for free, or can pay for adverts listed on top of search results for specific keywords. Google also provides "Google My Business" for free. This service places SMEs' details on Search, Google Maps, and Google+, to help consumers be exposed to these retailers and find them. Google's free and paid search services were associated with NZ\$1.0 - 2.9 billion in net advertising benefits for various types of businesses online in the New Zealand economy in 2015.⁴⁰ These benefits are derived from

sales assisted by Google searches. Box 2 highlights one local SME that has benefitted from AdWords.

To arrive at these numbers, two estimates were used to establish a range for the total benefits. A top down approach estimated the total size of the online search advertising market revenue and the proportion of this space that Google represents. A bottom up approach estimated the number of Google Search page views in New Zealand, the proportion of pages with advertisements, the number of advertisements per page and the average click-through rate. To estimate the gross profits generated by businesses paying for online advertising through Google, a return on investment (ROI) ratio was applied.⁴¹ The ROI ratios used are a range of returns estimated in international economic studies. See Appendix for further information.

Estimated benefits to businesses from Google Search and AdWords in New Zealand during 2015:*



Free and paid Search support between **NZ\$1.0 – 2.9 billion** in net advertising benefits to businesses in New Zealand through increased sales



Users make over **10 billion searches** annually



More than **40%** of usage is on mobile



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

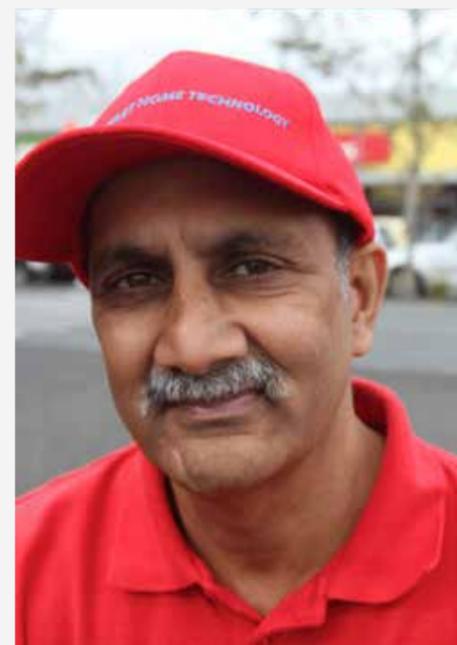
³⁹ Estimates based on data from AlphaBeta consumer survey.

⁴⁰ Net advertising benefits refers to the increase in revenues and sales that can be directly attributed to advertising minus the related advertising expenditure.

⁴¹ ROI reflects the net advertising benefits that businesses receive from online advertising (i.e. total additional revenue generated as a result of advertising minus online advertising cost).

BOX 2

How Google AdWords helps New Zealand SMEs expand in New Zealand



One New Zealand business that has benefitted from online exposure and marketing tools is Smart Home Technology, a company providing integrated digital TV solutions established by Sunny Naidoo in 2011. In the initial stages after Smart Home Technology was set up, Mr. Naidoo faced difficulties in marketing his services via traditional methods such as leaflets and only managed to have a few clients.⁴² He then decided to try Google AdWords campaigns to increase his company's online presence and attract new customers. The campaigns have been successful in achieving his goals. Currently, he has over 2,500 loyal customers in his database and his company is thriving after 5 years in business.⁴³ Hence, Google AdWords enables local SMEs, like Smart Home Technology, to reach out to potential customers in an effective and cost-saving way.

⁴² Information obtained from YouTube, October 23, 2014 - https://www.youtube.com/watch?v=L_YFIRYs5Y

⁴³ Reported by Times Live, May 3, 2015 - <http://www.times.co.nz/front-page-feature/heart-attack-fires-up-new-enterprise.html> (Accessed December 14, 2016. Link has since been suspended.)

Estimated benefits to businesses from Google AdSense

In New Zealand during 2015:*

In New Zealand, businesses who are advertising using AdSense earn more than

NZ\$8.5 million

in net advertising benefits



In New Zealand, there are over

3,000

publishers using AdSense

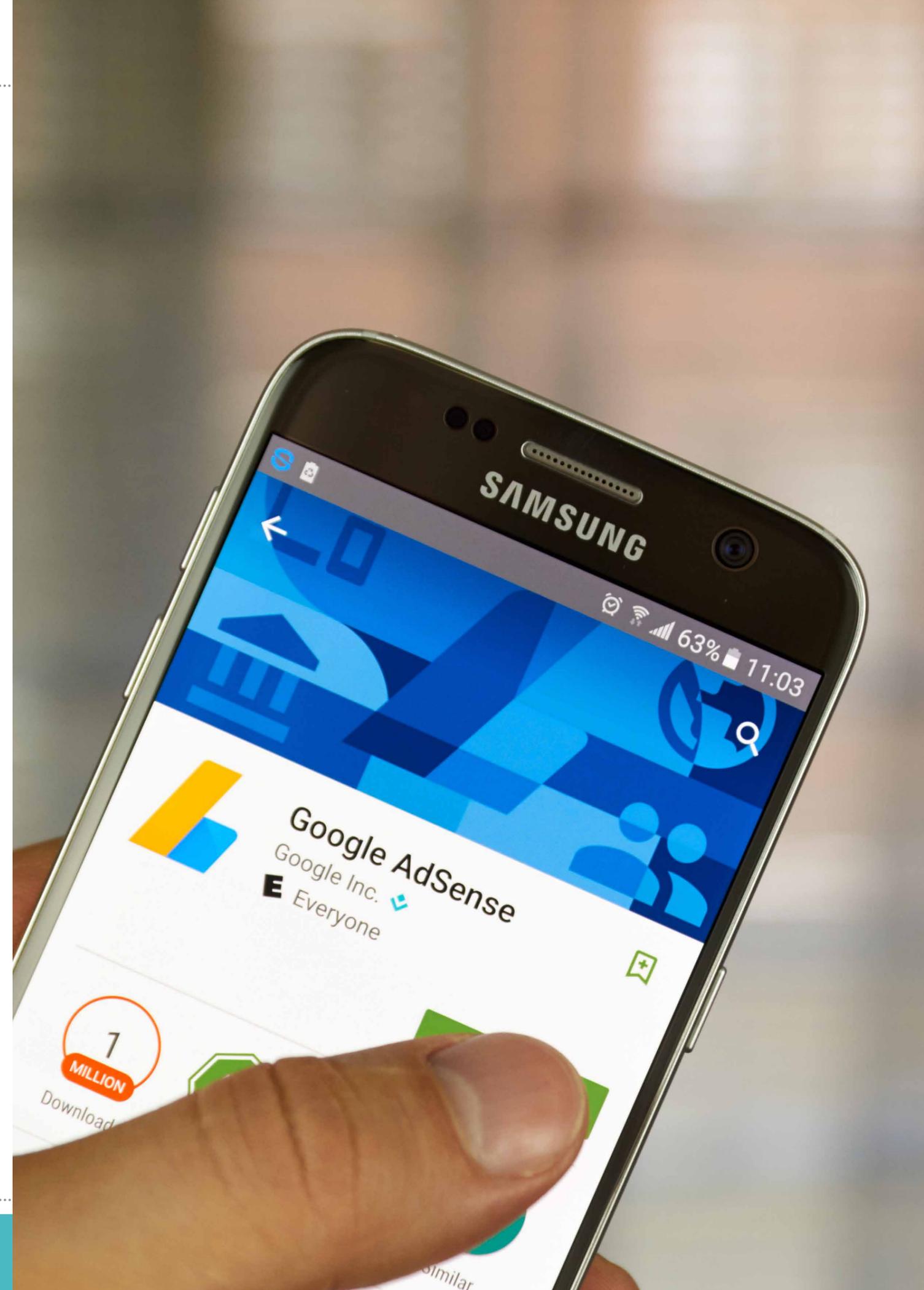


AdSense: Enabling local content creators to pursue their passion

Google AdSense contributed more than NZ\$8.5 million in benefits for businesses in New Zealand in 2015. These benefits are accrued by advertisers displaying their advertisements on websites (e.g. blogs) using AdSense.

Furthermore, through hosting advertisements on their websites via Google AdSense, New Zealand online content creators can pursue their passion, transform them into careers, and derive income. It also enables local websites to fund their own operations through advertising revenues. These revenues, in turn, support the continued availability and quality of New Zealand content on the Internet.

The business benefits from Google AdSense is estimated as the gross profits generated by advertisers. To compute the net advertising benefits, an ROI ratio of 0.24 (i.e., every dollar of advertising expenditure leads to \$1.24 of revenue) was applied to New Zealand's advertising revenue obtained from Google's annual report, after considering New Zealand's share of global impressions on AdSense.^{44 45}



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

⁴⁴ ROI ratio based on Gupta et al. (2015), Do display ads influence search? Attribution and dynamics in online advertising, International Journal of Research in Marketing.

⁴⁵ An ROI ratio of 0.24 implies that for every \$100 spent by advertisers online, they receive a net benefit (after advertising costs) of \$24.

YouTube: Creating new jobs and exporting New Zealand's culture

Over 2.5 million New Zealanders consume more than 50 minutes of videos on YouTube a day because of the diverse range of content available for free on the platform.⁴⁶ Furthermore, there is a growing global population that watches New Zealand cultural content such as pop music and vlogs by New Zealand YouTube creators. In 2015, more than 45% of local New Zealand YouTube content views originated from overseas.⁴⁷ This global rise of consumption of YouTube, with over 1 billion viewers worldwide, has given rise to a new generation of New Zealanders choosing careers in the video industry.⁴⁸ In New Zealand, the number of hours of video content uploaded onto YouTube has grown 80% year on year, demonstrating that New Zealanders are increasingly capable of producing their own content.⁴⁹

YouTube provides New Zealand artists a platform and tools to broadcast their talents and creativity to the entire world. For instance, New Zealand teenager, Jamie Curry, has her own YouTube channel "Jamie's World" which has over 1 million subscribers. As her videos attract more fans (both locally and abroad), Jamie started pursuing her online career full time, producing content, and engaging with her viewers.⁵⁰ YouTube also enables New Zealand to explore alternative forms of exports such as cultural exports in this evolving digital age.

In order to continue offering a broad availability of content, YouTube enables its creators to monetise their craft by incorporating advertisements into their videos and on their channels' pages. It is estimated that advertisers in New Zealand received between NZ\$20 - 100 million in net advertising benefits through YouTube video ads in 2015.

Furthermore, YouTube is emerging to be an effective marketing channel for businesses in New Zealand, especially for specific age and demographic groups. According to a recent study by Glasshouse Consulting and NZ On Air, New Zealanders' media consumption habits are evolving rapidly as New Zealand transits into the digital era.⁵¹ New Zealanders, especially the younger generation, are switching from traditional media (e.g. TV and radio) to online video sharing sites (e.g. YouTube, Facebook) at a significant pace. For example, the percentage of New Zealanders who are listening to music on YouTube has risen from 38% in 2014 to 47% in 2016. In the same period, TV viewers dropped from 95% to 86% of the New Zealand audience. The study also highlights the main audiences of online video sites include those between 15 to 34 years old, students, double income couples without kids, families with UFB connections, and smartphone users.⁵² Thus, YouTube is a viable and cost-saving option for advertisers targeting consumers from these demographics.

The estimate of business benefits of YouTube to advertisers uses two methods to establish a range for the total benefits. First, the top down method uses the total online video advertising spend in New Zealand and YouTube's share of that space. Second, the bottom up method employs estimates for YouTube's ads' cost per view, the view rate of advertising, the total videos viewed in a year and the proportion of videos with advertising. Each estimate is then multiplied with upper and lower bound ROI ratios (0.91 – 1.79)⁵³ to find out the full economic impact YouTube has on New Zealand.⁵⁴

Box 3 gives other examples of successful New Zealand YouTube creators.

⁴⁶ YouTube user number is based on data from the AlphaBeta consumer survey and Internet population data. Average length of YouTube usage based on data from the AlphaBeta consumer survey.

⁴⁷ This number is estimated using web traffic data from SocialBlade.com.

⁴⁸ Number of worldwide YouTube users reported by YouTube - www.youtube.com/yt/press/statistics.html

⁴⁹ Google New Zealand Blog - <https://newzealand.googleblog.com/2016/06/new-zealands-youtube-greats-gather-in.html>

⁵⁰ Reported by Stuff, March 19, 2015 - <http://www.stuff.co.nz/entertainment/67435984/kiwi-internet-sensation-jamie-curry-up-for-award>

⁵¹ Glasshouse Consulting (2016) Where are the audiences? Glasshouse Consulting Ltd.

⁵² Glasshouse Consulting (2016) Where are the audiences? Glasshouse Consulting Ltd.

⁵³ That is, every dollar of advertising expenditure leads to between \$1.91 and \$2.79 of revenue for businesses.

⁵⁴ YouTube ROI ratio derived from *Business Insider Singapore* - <http://www.businessinsider.sg/youtube-ads-have-better-roi-than-tv-according-to-google-2016-4/?r=US&IR=T#mL3ZFqo0vlab2xq2.97> and *A Year in TV 2014 Annual Review, Think Box* - <http://www.asiconferences.com/wp-content/uploads/2015/08/A-Year-in-TV-2014-Thinkbox.pdf>

Estimated benefits to businesses from YouTube in New Zealand during 2015:*



YouTube supports between **NZ\$20 – 100 million** in net advertising benefits for businesses advertising in New Zealand



More than **30%** of YouTube videos are viewed on **mobile devices**



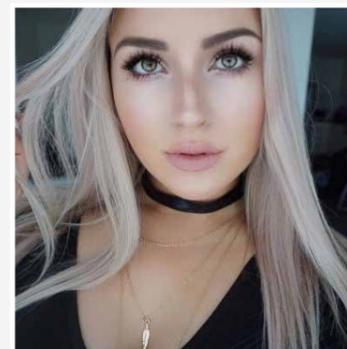
over **45%** of local New Zealand YouTube content views originate from overseas



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

BOX 3

Examples of New Zealand content creators on YouTube⁵⁵



Channel: Shaaanxo
Detail: How-to
Subscribers: > 2 million
Views: > 276 million



Channel: Wacky Wednesday
Detail: Education
Subscribers: > 1 million
Views: > 274 million



Channel: Rainbow Learning
Detail: Entertainment
Subscribers: > 510 thousand
Views: > 351 million

⁵⁵ Views and subscriber numbers (latest figures available) from SocialBlade.com.



BUSINESS BENEFITS

G Suite: Enhancing collaboration; driving productivity

G Suite supported more than NZ\$6.5 million in business benefits in New Zealand in 2015. These online office solutions reduced operational (e.g. less physical storage space needed as Google's cloud platform acts as a low-cost and effective offsite data server) and travel costs and enhanced labour productivity through increased communication and collaboration amongst colleagues.⁵⁶

With the rapid improvements in cloud computing and cloud-based services (such as Windows Azure, G Suite, Google Cloud Platform, and Amazon Web Services) brought by technology firms since 2008, many companies, especially SMEs, can afford and adopt these services in their operations.⁵⁷

Various studies have considered the benefits of cloud services. A study of 1,300 American and British organisations by the Manchester Business School, showed that businesses enjoyed a diverse range of benefits from using cloud services. 66% of companies surveyed indicated that they had benefitted from a reduction in information

technology (IT) costs, 51% of SMEs could divert more manpower to new IT projects, and 58% of SMEs agreed that the cloud helped them to level the playing field against larger competitors.⁵⁸ Another survey of different companies across industries by Computer Economics concluded that cloud computing saves on average over 15% in IT spending through reduction in hardware and IT personnel costs.⁵⁹ Therefore, cloud services, in general, have benefitted companies regardless of size or industry.

Furthermore, it has been estimated that G Suite has brought about substantial benefits to organisations using it. According to a 2015 Forrester Consulting report, which studied several companies across geographical regions with years of experience using G Suite, G Suite has benefitted companies through at least four channels – increasing collaboration efficiency, reducing travel costs, reducing IT costs, and reducing telephone and conferencing costs.⁶⁰ For instance, G Suite has allowed employees to collaborate and share files in real-time; this has helped to streamline business processes, leading to time savings of up to 2 hours per employee per week across the organisation.⁶¹ Companies

are also increasingly using Google Hangouts for conferencing services; reducing the need for telephone lines and other specialised conferencing systems.⁶² G Suite has also benefitted companies, especially SMEs, which require employees to work remotely. A 2010 survey of American SMEs by Microsoft revealed that 66% of SMEs indicated they required their employees to be productive remotely.⁶³ G Suite meets these needs and enables these employees to use cloud-based programs to collaborate any time anywhere on almost any device with Internet connectivity. Using G Suite, teams in different locations can work together on projects at the same time and communicate via web conferencing services from all over the globe.⁶⁴

The benefits of G Suite were calculated using two approaches. The top down approach took the

number of businesses in New Zealand and the share of New Zealand businesses using G Suite.⁶⁵ For the bottom up approach, we used the active downloads for the Google Admin App on Android (assuming each business using G Suite had one account on average). These estimates were then multiplied by the average expenditure on G Suite per company. An estimated more than 1,000 businesses have adopted G Suite in New Zealand.⁶⁶ It is important to stress that this is likely a significant underestimate of the number of businesses using G Suite as it excludes businesses using these tools but which have not installed the Admin App on their phone. To get to a benefits figure, we took the average of the two approaches and multiplied by the annual ROI ratio. A recent study has estimated that G Suite offers a ROI ratio of 3.04.⁶⁷

Estimated benefits to businesses from G Suite

In New Zealand during 2015:*



In New Zealand, more than **1,000** businesses are utilising **G Suite** in their operations



G Suite supports over **NZ\$6.5 million** of business benefits for companies all over New Zealand



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

⁶² Forrester Consulting (2015) The Total Economic Impact of Google Apps for Work Forrester Research Inc.

⁶³ Microsoft (2010) Microsoft U.S. SMB Cloud Computing Research Summary. Fall 2010 Microsoft Corp.

⁶⁴ Reported by American Express, October 3, 2011 - <https://www.americanexpress.com/us/small-business/openforum/articles/6-ways-cloud-computing-helps-businesses-save-time-and-money/>

⁶⁵ Share of businesses using G Suite is based on reporting by Computer World, February 16, 2016 - <http://cw.com.hk/news/5-hk-companies-use-either-office-365-or-google-apps-email>. Number of businesses is estimated from reporting by Stuff, June 25, 2014 - <http://www.stuff.co.nz/business/small-business/10198006/SMEs-still-backbone-of-NZ-business>. In our analysis, Gmail acts a proxy for G Suite.

⁶⁶ Number of firms using G Suite is estimated based on Google Admin installs and Android smartphone penetration.

⁶⁷ Forrester Consulting (2015) *The Total Economic Impact of Google G Suite* Forrester Research Inc. This implies that every dollar of expenditure leads to \$4.04 of business benefits (in terms of reduced costs or higher revenue).

BOX 4

Bringing New Zealand to the world – How Google can facilitate New Zealand exports

Google has been working with NZ businesses since 2007 when its first Auckland Office opened.⁶⁸ New Zealand businesses use Google's products to alleviate the "double tyranny" of size and distance through two main channels – by facilitating New Zealand's exports to the rest of the world through Google's online channels and by enticing international visitors to New Zealand (See Box 5). Essentially, Google brings New Zealand to the world, and the world to New Zealand.

New Zealand is small, relatively isolated from the rest of the world, and highly dependent on exports to drive its growth.⁶⁹ As such, New Zealand's SMEs (there are over 460,000 of them) need extra assistance and resources to succeed and expand in New Zealand and abroad.⁷⁰ Google helps SMEs overcome this "double tyranny" by enabling them to connect easily to potential customers around the world. Google can increase the online consumer base of retailers in New Zealand and provide new avenues of exports and revenue for these SMEs.

An example of a New Zealand SME that has benefitted from this online exposure and has successfully ventured abroad is Kanikani Kids. This company with 3 employees was established in 2007 in Otaki and sells handmade contemporary Maori kids costumes.

Over the years, as Kanikani Kids costumes increased in popularity, Leigh Rau, the owner, realised that she needed an online presence. She started using AdWords to increase sales and reach more customers. With AdWords, Leigh could target specific customers searching for keywords such as kakahu or piupiu (Maori for costume and skirt respectively) to bring traffic to her site. Since using AdWords, Kanikani Kids receives 50% of its online traffic from AdWords and serves customers across New Zealand. Leigh highlights "We get a steady flow of inquiries from customers all over New Zealand, from the North Island right down to Invercargill.". In addition, the campaign attracted new fans from abroad. Expats from Singapore, India, Russia, and England are all finding Kanikani Kids via AdWords, driving up sales and revenue for the New Zealand SME.⁷¹

Google's products also help streamline SMEs' operations and increase labour productivity by automating some processes and enhancing collaboration. Hakanoa Handmade, a Grey Lynn-based artisanal ginger beer producer, is benefiting from a range of these products. Hakanoa Handmade's employees were spending excessive time processing orders and sharing sales information manually, preventing focus on business growth. By leveraging these digital tools, the firm has experienced immediate sales growth, lower

costs, and significant time savings. "We were able to contact half of our clients in a matter of days using Gmail and by sharing our sales information on Google Drive, a job that would have previously taken me a year." - mentioned Rebekah Hay, founder and managing director of the SME. In addition to higher sales volumes, Hakanoa Handmade has also managed to cut administration costs by receiving and processing its orders online.⁷²

Other than raising the online profiles of SMEs and helping them reach new audiences, Google's products also increase the diversity of New Zealand's exports. New Zealand increasingly exports digital content via platforms such as YouTube. For instance, Shannon Harris or commonly known as Shaaanxo, is a successful full-time New Zealand YouTube creator. She has the most subscribed channel in New Zealand with over 2 million fans around the world and the 23 year old online star does mostly beauty tutorials in the How-to category.⁷³ Through YouTube, she can connect with the global online population and promote local products via endorsements.⁷⁴

Through these various channels, Google has supported New Zealand and New Zealanders in reaching beyond geographical boundaries, to the world.



Kanikani Kids



Hakanoa Handmade

⁶⁸ Information obtained from Innovation Partnership, A vision for a digital New Zealand - <http://www.innovationpartnership.co.nz/>

⁶⁹ Information obtained from New Zealand Now, Economic overview - <https://www.newzealandnow.govt.nz/investing-in-nz/opportunities-outlook/economic-overview>

⁷⁰ Reported by Stuff, June 25, 2014 - <http://www.stuff.co.nz/business/small-business/10198006/SMEs-still-backbone-of-NZ-business>

⁷¹ Google Small Business Success Stories - <https://www.google.co.nz/ads/stories/kanikani-kids.html>

⁷² Reported by Bizedge, September 14, 2015 - <https://bizedge.co.nz/story/cloud-proves-immediate-benefit-kiwi-artisanal-company/>

⁷³ Reported by Stuff, February 6, 2016 - <http://www.stuff.co.nz/life-style/beauty/76175588/Beauty-vlogging-entrepreneurs-earning-big-bucks-from-home>

⁷⁴ Reported by thestyleinsider, June 10, 2013 - <http://www.thestyleinsider.co.nz/meet-nzs-hottest-youtube-star-shaaanxo/>

BOX 5

Bringing the world to New Zealand – How Google can help drive New Zealand tourism



Google can also help to bring people from all over the globe to New Zealand. Tourism is New Zealand's second largest export, making up 15% of total exports.⁷⁵ New Zealand is experiencing a tourism boom. In 2015, roughly 3.5 million tourists visited New Zealand.⁷⁶ There has also been a 19% year on year increase in online interest from foreigners looking to travel to New Zealand which presents a great opportunity for local companies to tap into

this interest and reach out to tourists using digital tools.⁷⁷ According to Stephanie Davis, country director of Google New Zealand, "People are raising their hands saying, 'I'm interested in coming to New Zealand'. But today, overwhelmingly, those clicks are going to non-New Zealand companies. You have really great travel companies here on the ground that provide travel packages for Kiwis travelling places, and also things and activities

to do once tourists are here on the ground. But what about reaching them in those markets before they get here?"⁷⁸ Hence, there is great growth potential for the tourism industry in New Zealand.

Google Maps, for example, has helped facilitate tourism interest in New Zealand. The country boasts amazing natural landscapes, such as 9 walking tracks across the country called the "Great Walks", attractive to outdoor oriented travellers.⁷⁹ To allow a greater audience to view the spectacular views from these tracks, Google worked with the Department of Conservation to capture 360 degree images of these trails.⁸⁰ Google has since launched images for 7 "Great Walks" on Google Maps, enabling online users to virtually step on these trails or prepare themselves for their actual hike in New Zealand.⁸¹ This free advertising of the "Great Walks" to potential visitors all over the world stands to benefit local economies as tourists spend on accommodation, gifts, and food. In addition, the Google Cultural Institute's online curated collections of New Zealand artwork also allow the global population to find out about New Zealand heritage and culture, potentially attracting visitors to New Zealand.⁸²

New Zealand retailers and businesses in the tourism industry can leverage marketing tools (e.g. AdWords, YouTube, Google Trends) to discover new untapped markets and cater their offerings to appeal to the global audience.⁸³ For instance, businesses in New Zealand can find out which groups of people are interested in visiting New Zealand, what are they interested

in and which are the best platforms to engage them. According to Davis, "We (Google) process billions of queries every day. So, we can see things like, are people more or less interested in visiting New Zealand than they were last year? Where is that interest coming from? What types of devices are they searching on and what does that mean in terms of the outcome?"⁸⁴ Based on Google Trends statistics, travellers in the US account for 33% of search queries on Google Search; most people (constituting 58% of these searches) are looking for tour package holidays in New Zealand; and among potential visitors from Asia, more than 33% of searches are carried out on mobile devices.⁸⁵

New Zealand SME, The Road Trip, has managed to utilise Google advertising tools to increase brand awareness and revenues over the years. The Road Trip is a luxury tour operator (e.g. providing private chauffeured skiing tours) and most of its clientele are foreign tourists.⁸⁶ Chris Cameron, the company's founder, realised that he needed to go digital to reach out to his target markets. Thus, he turned to Google advertising products such as AdWords to advertise his tours to specific countries and online users. Three years on, these advertising campaigns have resulted in a 260% increase in his turnover, allowing the SME to become a million-dollar business employing ten people.⁸⁷

⁷⁵ Information obtained from New Zealand Now, Economic overview - <https://www.newzealandnow.govt.nz/investing-in-nz/opportunities-outlook/economic-overview>

⁷⁶ Reported by News.com.au, February 2, 2017 - <http://www.news.com.au/travel/world-travel/pacific/options-like-tourist-tax-being-explored-as-nzs-tourism-boom-faces-backlash/news-story/b265bfbcf34e221f5f801f8117f9e377>

⁷⁷ Reported by NZ Herald, March 14, 2016 - http://www.nzherald.co.nz/business/news/article.cfm?c_id=3&objectid=11604986 and Otago Daily Times, February 14, 2017 - <https://www.odt.co.nz/business/tourist-boom-continues-visitor-record-set>

⁷⁸ Reported by NZ Herald, February 25, 2017 - http://m.nzherald.co.nz/business/news/article.cfm?c_id=3&objectid=11805374

⁷⁹ Information obtained from the Department of Conservation - <http://www.doc.govt.nz/parks-and-recreation/things-to-do/walking-and-tramping/great-walks/map/>

⁸⁰ Google Maps - <https://maps.googleblog.com/2015/11/take-walk-on-wild-side-with-street-view.html>

⁸¹ Reported by Stuff, November 5, 2015 - <http://www.stuff.co.nz/travel/destinations/nz/73503987/new-zealands-great-walks-launch-on-google-maps>

⁸² Google Arts & Culture - <https://www.google.com/culturalinstitute/beta/search?q=New Zealand>

⁸³ Reported by NZ Herald, February 25, 2017 - http://m.nzherald.co.nz/business/news/article.cfm?c_id=3&objectid=11805374

⁸⁴ Reported by NZ Herald, February 25, 2017 - http://m.nzherald.co.nz/business/news/article.cfm?c_id=3&objectid=11805374

⁸⁵ Information obtained from Google Trends statistics using search terms such as "Package holidays in New Zealand" - <https://trends.google.com.sg/trends/explore?date=today%2012-m&q=package%20holidays%20in%20New%20Zealand>

⁸⁶ Information obtained from The Road Trip, 2017 - <http://www.theroadtrip.co.nz/new-zealand-tour-operators/>

⁸⁷ Interview with Chris Cameron, founder of The Road Trip.

CONSUMER BENEFITS

SAVING TIME AND IMPROVING QUALITY OF LIFE

Estimated benefits to consumers from Google

In New Zealand during 2015:*



Google supports over

**NZ\$2.0
billion**

in benefits to
consumers in
New Zealand



Google Search saves
New Zealand users more than



**5 days
a year**



New Zealand users interact with more than **75 Gmails**
on average each day; valuing the service at over

NZ\$195 a year on average



Google Maps reduces
driving time on average by

8% in Auckland,

6% in Christchurch, &

6% in Wellington



New Zealand **YouTube**
users spend on average
more than

50 minutes

a day consuming
videos



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

To assess the economic impact of Google more accurately, we must look beyond traditional national accounting methods, understand the unmeasured economy, and ask New Zealanders a specific question: what economic benefits do Google’s products and services bring to you? This report estimates that Google supports more than NZ\$2.0 billion of consumer benefits per year.

Using information from our consumer survey amongst the New Zealand online population and third party information, we estimate the impact of Google’s products in New Zealand. In 2015, it has been estimated that more than 3.5 million people made queries on Google Search in New Zealand.⁸⁸ Over 1 million and 2.5 million New Zealanders relied on Google Maps to navigate their public transport and driving routes respectively and more than 1.5 million New Zealanders engaged with one another using Gmail.⁸⁹ Over 2.5 million New Zealanders consumed content on YouTube, with more than 30% of these videos watched on mobile devices.⁹⁰

The consumer benefits supported by Google come in the form of convenience, unparalleled access to information compared to the past, more well-informed decisions, and time saved in the daily lives of New Zealanders. Essentially, Google is making information easily accessible for everyone, ensuring that if one has a device connected to the Internet, he or she will not be left behind in the digital economy. These benefits can often be complex and difficult to measure, mostly because they do not show up in regularly compiled national accounts. However, they can be estimated and any economic assessment of the impact that Google creates would be incomplete without considering these benefits. See Box 8 for an overview of the consumer benefits that Google provides in New Zealand.

Calculating consumer benefits

This report estimates the consumer benefits of Google in New Zealand generated by Search, Maps, YouTube, and Gmail. The report uses two methodologies to size the consumer benefits: a “Willingness to Pay” (WTP) approach, supported by a “Value of Time” (VOT) approach as a secondary verification of the estimates for Google Search and Google Maps. Each of these techniques comes with advantages and disadvantages, which we discuss in more detail in Box 6.

The analysis utilises unique and first-of-its-kind data gathered by AlphaBeta, as well as publicly sourced data. A consumer survey with over 400 respondents was conducted amongst the New Zealand online population, and thousands of driving and public transport trips were simulated on Google Maps in major cities (Auckland, Christchurch, and Wellington). A detailed description of the methodology and the data is provided in Appendix.

⁸⁸ Google Search user number is based on data from the AlphaBeta consumer survey and Internet population data.

⁸⁹ Number of drivers is based on data from the AlphaBeta consumer survey. The estimates relating to Gmail are computed by AlphaBeta based on data from the AlphaBeta consumer survey and on reporting by techcrunch.com, March 28, 2015 - <http://techcrunch.com/2015/05/28/gmail-now-has-900m-active-users-75-on-mobile/?ncid=rss> and the *Email Statistics Report, 2014-2018* by The Radicati Group - <http://www.radicati.com/wp/wp-content/uploads/2014/01/Email-Statistics-Report-2014-2018-Executive-Summary.pdf>

⁹⁰ YouTube user number is based on data from the AlphaBeta consumer survey and Internet population data.

BOX 6

Calculating consumer benefits

In economic terms, the benefits a product or service provides to consumers is measured through consumer surplus. Consumer surplus is usually calculated by observing how customers adjust consumption levels in response to price changes. This poses a problem when trying to estimate the consumer benefits supported by Google. For one, services, such as Google Search, Maps, YouTube, and Gmail are free to users and no behavioural changes can be observed in response to changes in price. Further, exact consumption levels of the services are hard to observe. There are several alternative methodologies for estimating the consumer benefits of free services. This report employs a “Willingness to Pay” (WTP) approach, supported by a “Value of Time” (VOT) approach for secondary verification, to paint a holistic picture of consumer benefits and provide robust estimates:

- **Willingness to Pay (WTP).** This method estimates consumer benefits by eliciting how much individuals are prepared to pay for specific products and services. The most straightforward way of obtaining this information is simply to ask consumers. However, this method has drawbacks. For example, individuals often struggle to quantify the value a product or service holds to them. This uncertainty is increased when the product or service in question is free. Further, individuals are prone to overestimate their willingness to pay, especially in hypothetical scenarios. Framing can amplify these uncertainties and potential biases. However, measures can be taken to improve the robustness of estimates. In AlphaBeta’s consumer survey, participants were confronted with the following scenario: they were offered a monthly cash discount

on their Internet or mobile phone bill if they were willing to permanently forgo their preferred free online search, maps, video, or email service. This meant rather than a willingness to pay, a willingness to accept was elicited, which recent research has shown to be less prone to biases induced by framing.⁹¹ To deal with potential uncertainty about the nominal size of their valuations, subjects were provided with a “discount menu” from which they could choose a valuation, as well as an outside option for them to provide their own valuation.

- **Value of Time (VOT).** This method estimates consumer benefits by calculating how much time an individual is saving by using a good or service. To place a value on an individual’s time, wages are commonly used as a measure of opportunity cost. While there is common consensus amongst economists that leisure time is valued more highly than time spent working, it is relatively robust estimate of the marginal value of leisure time. However, this means that our estimates of VOT are deliberately conservative as a higher value associated with leisure would increase the benefits estimated in this report. To be further conservative, the analysis only calculated the VOT for the share of the population currently employed. This conservative approach, combined with the fact that time savings are only one aspect of the benefits that Google’s products bring to consumers, means that this approach likely underestimates the value derived by consumers from Google’s products. As such, the WTP approach is preferred and we use the VOT approach as a secondary verification of the results for selected products.

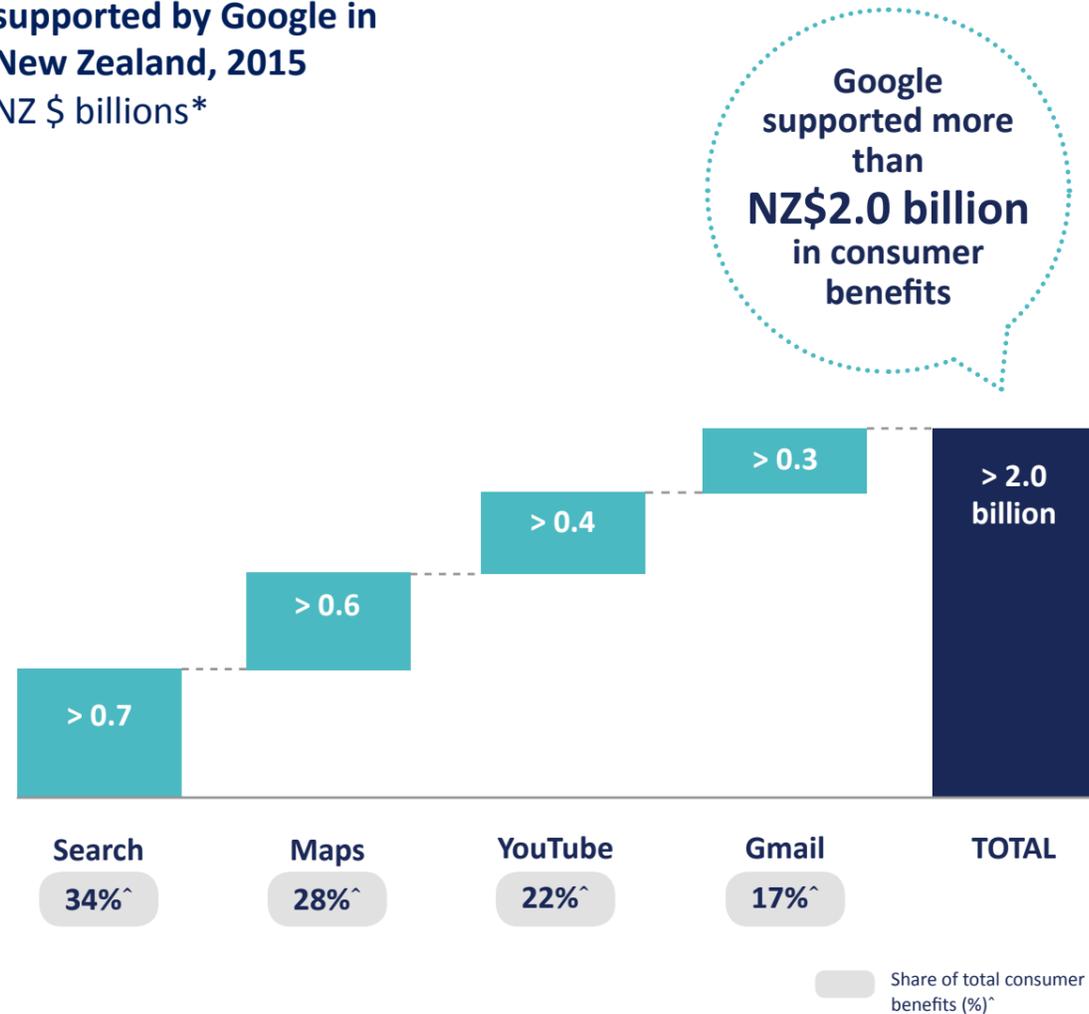
⁹¹ Yang et al. (2013), *Framing Influences Willingness to Pay but Not Willingness to Accept*, Journal of Marketing Research.

The estimated consumer benefits supported by Google's products are significant, totalling more than NZ\$2.0 billion annually (Exhibit 5). The largest contributor of consumer benefits in New Zealand is Google Search, with over NZ\$750 million supported by the online search engine. Maps

provides over NZ\$600 million in consumer benefits, while YouTube brings in more than NZ\$450 million worth of benefits. In addition, Gmail supports over NZ\$350 million. The consumer benefits of each of these services have been calculated separately (Exhibit 6).

EXHIBIT 5

Value of consumer benefits supported by Google in New Zealand, 2015
NZ \$ billions*



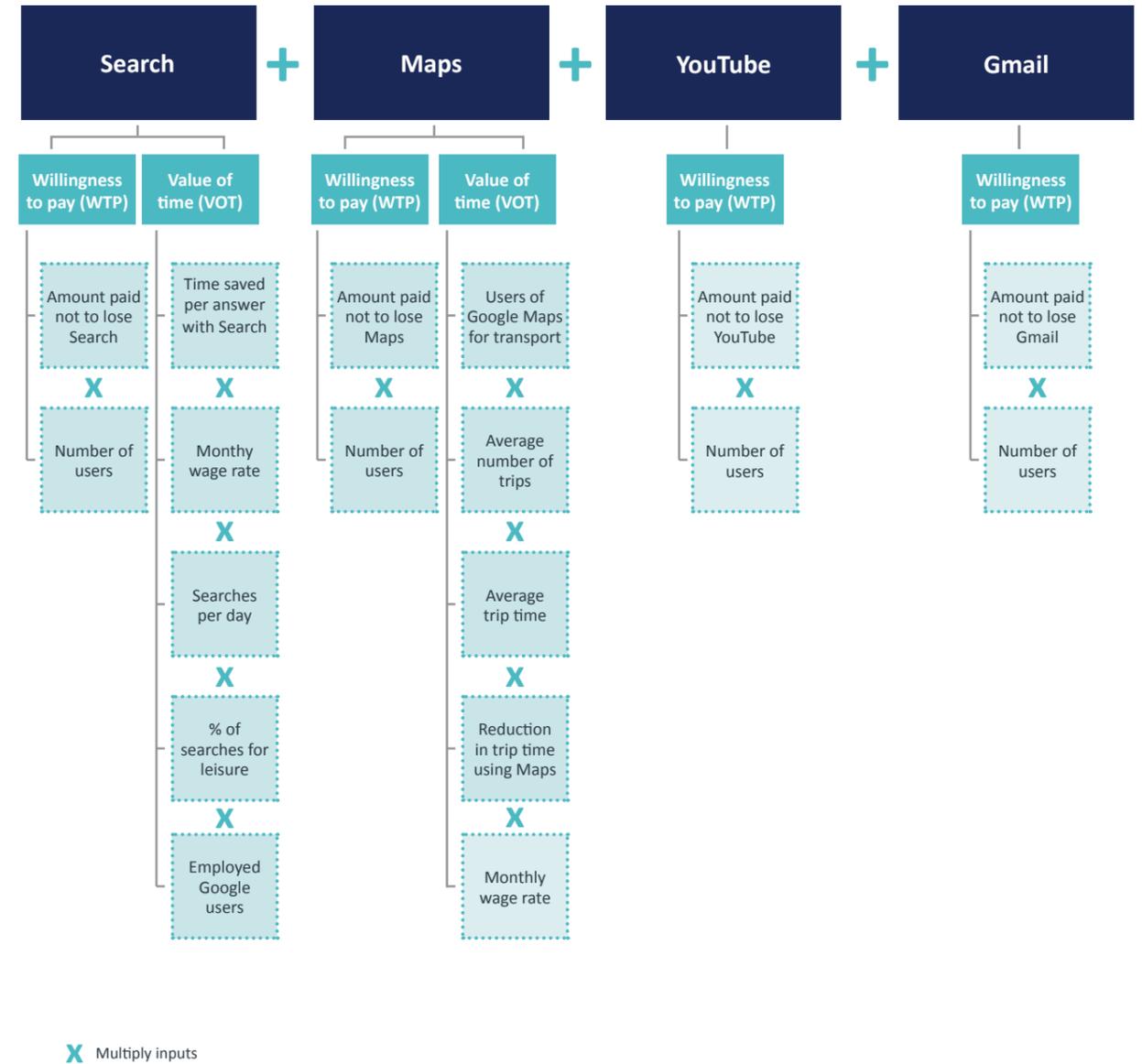
*Rounded to nearest US\$100 million

[^]May not sum to 100% due to rounding

SOURCE: Data in exhibit is estimated by AlphaBeta using a range of original and third party sources. See Appendix for detailed methodology

EXHIBIT 6

Methodology for calculating consumer benefits of Google



SOURCE: Data in exhibit is estimated by AlphaBeta using a range of original and third party sources. See Appendix for detailed methodology



CONSUMER BENEFITS

Google Search: Getting answers; saving time

New Zealand consumers derived over NZ\$750 million in consumer benefits in 2015 from Google Search. These benefits are generated by individuals being able to answer questions and find solutions quickly and inexpensively. In 2015, New Zealanders asked a range of queries on Google Search; such as “how to make pancakes?” and “where is Gallipoli?”. Through Google Search, they could acquire knowledge as well as to satisfy their inner curiosity.⁹²

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. We estimate that in New Zealand, Google Search saved consumers over 30 minutes a day on average, which accumulates to more than 5 days per user in 2015.⁹³

For instance, if there wasn't Google Search in 2015, a New Zealander would need to travel down to the public library and spend about 21 minutes searching for an answer amongst troves of books

for work-related queries (e.g. providing some specific information to a client) or leisure-related queries (e.g. finding a recipe to cook for dinner). This is in comparison to just 7 minutes or less online with Google Search, if that same individual could use the search engine.⁹⁴ Hence, the associated time savings enable New Zealanders, especially the working population, to be more labour productive (i.e. more output in the same given time) and have more time to pursue other interests or even exercise. A study by University of Cambridge scientists has revealed that individuals who were engaged in 20 minutes walks every day were 16% to 30% less likely to die prematurely than people who were sedentary.⁹⁵ Hence, the time saved from Google Search can potentially go a long way.

The benefits of Google Search to New Zealand consumers were primarily estimated using a willingness to pay approach. This method employed data from a consumer survey amongst New Zealand Internet users, conducted by AlphaBeta. The survey found that more than 3.5 million New Zealanders preferred Google Search to any other search engine (of course, many of these users also use other sites to search online).⁹⁶ The data also revealed Google Search users would rather pay over NZ\$190 a year

on average than have to use an alternative search engine. This valuation was then scaled up to the entire Google Search user base.

As a secondary verification of the results, we calculated the 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.⁹⁷ This study found that a search that takes 21 minutes in the library takes only 7 minutes online.

We accounted for the fact that people now ask more questions, due to the ease of online search, by using original data from the AlphaBeta consumer survey. In 2015, New Zealand had over 3.5 million Google Search users, who conducted over 5 searches per day.⁹⁸ Over two-thirds of these or more than 65% of searches per day, were conducted for leisure rather than work purposes. We only used searches made for leisure in our calculation as the benefits of time saved at work are captured implicitly in people's incomes and firms' profits.

Estimated benefits to consumers from Google Search

In New Zealand during 2015:*



Google Search supports more than **NZ\$750 million** in benefits to consumers in New Zealand



Google Search users in New Zealand are saving over **30 mins a day** and more than **5 days** over the year



More than **3.5 million** Google Search users make over **5 searches** on average per day



Over **65%** of searches are made for leisure



⁹² Google New Zealand Blog - <https://newzealand.googleblog.com/2015/12/the-year-in-search-moments-that-defined.html>

⁹³ See Appendix for details on Methodology.

⁹⁴ Chen et al. (2014), *A day without a search engine: an experimental study of online and offline search*, Experimental Economics.

⁹⁵ Ekelund, U., H. A. Ward, T. Norat, J. Luan, A. M. May, E. Weiderpass, S. J. Sharp, et al. 2015. "Physical activity and all-cause mortality across levels of overall and abdominal adiposity in European men and women: the European Prospective Investigation into Cancer and Nutrition Study (EPIC)123456." *The American Journal of Clinical Nutrition* 101 (3): 613-621.

⁹⁶ Google Search user number is based on data from the AlphaBeta consumer survey and Internet population data.

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

⁹⁷ Chen et al. (2014), *A day without a search engine: an experimental study of online and offline search*, Experimental Economics.

⁹⁸ Number of searches are based on data from the AlphaBeta consumer survey.



CONSUMER BENEFITS

Maps: Optimising trips on roads and public transport

Google Maps supported more than NZ\$600 million in consumer benefits for New Zealand in 2015. New Zealand consumers value the product at over NZ\$170 a year on average, but currently receive this product free of charge.

Google Maps provides a variety of benefits to New Zealand users. New Zealand consumers are using Maps to find local businesses and landmarks in an area, locate new destinations, and navigate and optimise their travel. New Zealanders also use Maps in their preparation for their overseas holidays as they plan their preferred itineraries and view images of attractions.

One component of the benefits of Google Maps is that it saves users time through navigation services. With the time saved, consumers can participate in other productive activities. Based on our analysis of thousands of standard trips and survey data (see Box 7 for further details), we estimate that New Zealanders saved more than NZ\$50 million in time-

related gains by optimising their driving and public transport trips. By efficiently planning their driving journeys by using Google Maps, New Zealand drivers shave 8% off their time spent on the roads in Auckland on average. Similarly, drivers enjoy time savings of 6% on average in both Christchurch and Wellington. Public transport commuters also benefit from Google Maps: Maps reduces public transport travel times in Auckland by 13%, Christchurch by 9% and in Wellington by 12% on average.

Combining this data on estimated time savings for different journeys, with data on consumer usage of Google Maps from AlphaBeta's consumer survey, we estimate that Google Maps has allowed more than 2.5 million drivers to save 4 hours a year on average and over 1 million public transport users to save 2 hours on average in 2015.

Note that the time saved from improved navigation is but one of the many benefits Google Maps provides for its users, which explains why the estimated consumer benefits are much larger than the estimated savings linked to time.

Estimated benefits to consumers from Maps

In New Zealand during 2015:*



Google Maps supports greater than **NZ\$600 million** in benefits to consumers in New Zealand



More than **3.5 million** Users in New Zealand



Google Maps reduces driving time on average by

8% in Auckland,
6% in Christchurch, &
6% in Wellington



Overall, drivers save close to **4 hours** a year driving

Google Maps reduces public transport time on average by

13% in Auckland,
9% in Christchurch, &
12% in Wellington



Overall, commuters shave off close to **2 hours** a year on trains and buses



Consumers value **Google Maps** at more than

NZ\$170 a year on average

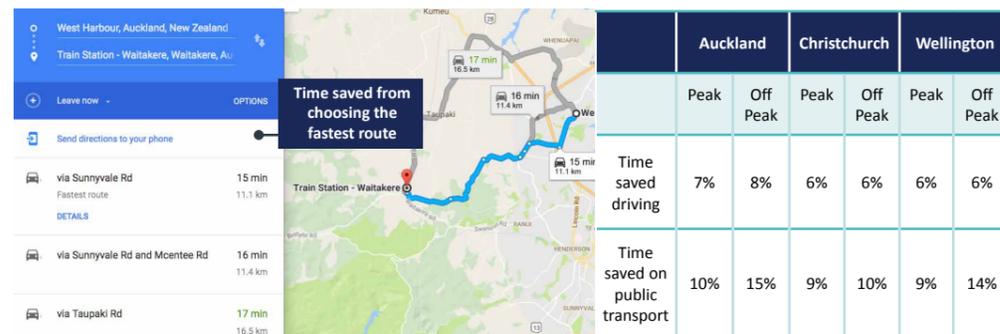


*Data in exhibit is estimated by AlphaBeta using a range of original and third party sources. See Appendix for detailed methodology

BOX 7

Calculating time saved from using Google Maps

To calculate the time savings from using Google Maps, an AlphaBeta algorithm generated 8,668 driving and 8,478 public transport trips across popular routes in Auckland, Christchurch, and Wellington. Across this vast sample of trips, a time saving was computed based on the difference between the optimal trip on Google Maps and the average of the multiple trip options presented (i.e., a conservative estimate of the time saved by taking the optimal route).



Methodology

- The analysis partitions into areas of importance for traffic flow and using a web crawler generates thousands of unique trips
- The time saved from Google Maps is then calculated by comparing the time difference for different modes of transport between the fastest and average routes.

Key Insights

- **70%** of Google Maps users in New Zealand are using Google Maps for driving, and saving approximately **4 hours** per year
- **30%** of Google Maps users in New Zealand are using Google Maps for public transport, and saving approximately **2 hours** per year

The analysis combined this data with responses about travel and Google Maps usage habits for over 400 New Zealand consumers. On average, respondents stated that they had used Google Maps to help them plan or navigate their route on 2 driving and 1 public transport trips in the last two weeks. They also indicated that on average these trips had taken more than 35 minutes for driving and over 25 minutes for public transport. These usage and travel duration data were then combined with the algorithm’s results on trip time savings to find an overall saving of time arising from usage of Google Maps.





CONSUMER BENEFITS

YouTube: Emergence of fresh content for everyone; by everyone

YouTube supported more than NZ\$450 million of consumer benefits to New Zealand users in 2015. These benefits represent the value that individuals place on being able to easily access the vast collection of free videos on YouTube. Our survey indicates that New Zealanders spent more than 50 minutes on average on YouTube.com each day in 2015.⁹⁹

These benefits come in the various forms; learning new skills from watching YouTube tutorials such how to tie a tie, relaxing from consuming entertainment content like variety shows, and gaining new knowledge through informative videos. The vast wealth of local and internationally produced content means, on average, New Zealand YouTube users would rather have access to YouTube than receive more than NZ\$180 in annual discount on their Internet bills (according to our consumer survey). This implies they should be willing to pay up to this amount per year for access to YouTube, but instead, the service is provided to them for free. To put this benefit into perspective, NZ\$180 is enough to cover a year subscription of Netflix in New Zealand.¹⁰⁰

More New Zealanders are consuming content on YouTube; watch time on YouTube has increased 55% year on year in New Zealand.¹⁰¹

For instance, New Zealanders love to watch sports, especially rugby and cricket on TV.¹⁰² As the nation

progressively embraces the digital era, more New Zealand consumers are shifting from their primary mode of media consumption, TV, to online channels such as YouTube.¹⁰³

More than 2.5 million New Zealanders accessed YouTube in 2015 – this exceeded the viewership of rugby on TV. A Roy Morgan Research study estimated that 1.5 million New Zealanders

watched the Rugby World Cup on TV in 2015.¹⁰⁴ Furthermore, it has been estimated that more New Zealanders aged 14 to 34 view videos on YouTube than watch shows on any subscription TV station in an average week.¹⁰⁵ Hence, YouTube has increasingly become an integral part in the lives of New Zealanders.

Estimated benefits to consumers from YouTube

In New Zealand during 2015:*



YouTube supports over **NZ\$450 million** in benefits to consumers in New Zealand



YouTube is the favourite platform for online video for over **2.5 million** New Zealanders



YouTube valued at more than **NZ\$180** a year per user



New Zealand users consume over **50 minutes** of YouTube a day on average



⁹⁹ YouTube user number is based on data from the AlphaBeta consumer survey and Internet population data. Average length of YouTube usage based on data from the AlphaBeta consumer survey.

¹⁰⁰ Information obtained from Stuff, October 3, 2016 - <http://www.stuff.co.nz/business/industries/84889193/hopes-netflix-might-absorb-extra-cost-of-gst-dashed>. The price of Netflix standard service is NZ\$15 per month or NZ\$180 per year.

¹⁰¹ Google New Zealand Blog - <https://newzealand.googleblog.com/2016/06/new-zealands-youtube-greats-gather-in.html>

¹⁰² Reported by Sport New Zealand, March 16, 2015 - <http://www.sportnz.org.nz/news-and-events/media-releases-and-updates/articles/sport-and-recreation-still-a-big-part-of-kiwi-lives>

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

¹⁰³ Glasshouse Consulting (2016) Where are the audiences? Glasshouse Consulting Ltd

¹⁰⁴ Reported by Roy Morgan Research, October 29, 2015 - <http://www.roymorgan.com/findings/6525-rugby-world-cup-viewership-in-australia-vs-new-zealand-june-2015-201510282115>

¹⁰⁵ Reported by Roy Morgan Research, May 23, 2016 - <http://www.roymorgan.com/findings/6818-state-of-the-nation-new-zealand-may-2016-201605230112>

Gmail: Simple, convenient communication

Gmail generated over NZ\$350 million in estimated benefits to New Zealand consumers in 2015. These benefits were derived from the value that consumers place on the convenience and ease of using Gmail to communicate with friends, family, organisations, and businesses in their personal lives.

Our consumer survey reveals that more than 1.5 million people value Gmail at over NZ\$195 a year on average. As a comparison, a basic telephone landline subscription from Spark will cost an average New Zealand household around NZ\$54 per month.¹⁰⁶ Thus, NZ\$195 is enough to cover more than three months of the landline subscription.

Furthermore, over 65% of Gmail usage can be attributed to using Gmail for leisure.¹⁰⁷

Estimated benefits to consumers from Gmail

In New Zealand during 2015:*



Gmail supports greater than **NZ\$350 million** in benefits to consumers in New Zealand



Email provider of choice for over **1.5 million** New Zealanders



Valued by customers at over **NZ\$195 a year** per user



New Zealanders used **Gmail** mainly for leisure, with more than **65%** of Gmails sent for leisure



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

¹⁰⁶ Information obtained from Spark, 2017 - <https://www.spark.co.nz/shop/landline/>
¹⁰⁷ These estimates are computed by AlphaBeta based on data from the AlphaBeta consumer survey.

BOX 8

Making information easily available to everyone

People from different demographics (e.g. ethnic group, income, or age) value a range of Google’s products. Looking at benefits across ages, the AlphaBeta consumer survey in New Zealand shows that a large majority of New Zealand’s online population aged 50 years and above utilise Google’s products and services such as Google Maps and Search.¹⁰⁸ However, generations may be engaging differently with these services. While younger users may be tuning into Shaaanxo (see Box 3), the older generation might be using YouTube to look for recipes or listen to music from their youth. Different ethnic groups are also engaged with Google’s products in New Zealand – the Google Maori search page was created in 2008 and is being used tens of thousands of times every day; Google has also launched Te Reo as an available language in Google Translate in 2013.^{109 110}

Google enables consumers to find things and information easily online, aiding their decision-making processes and offering them a great array of choices to choose from. For example, people can choose: which restaurant to dine in after reading online reviews, which template to use to write their resumes after viewing tutorials on YouTube, and which insurance policy to consider after doing quick searches on Google Search. For instance, if we look at the search term “Insurance” on Google Trends, New Zealanders have always been highly interested in finding out more about insurance on Search; this might be due to the frequent earthquakes (over 15,000 earthquakes per

year) that the nation experiences, prompting locals to look for measures to best mitigate the associated risks.^{111 112} Thus, this relatively new “Power of Choice” can help New Zealanders make informed decisions as they are no longer restricted by the lack of knowledge. This phenomenon also benefits business owners as they are now able to study consumer behaviours and habits, similarly through Google’s products such as Google Analytics, and adjust their marketing narratives and store promotions specifically to their target audiences.

Furthermore, most of Google’s products and services are freely available and they are utilised daily; for example, over 3.5 million New Zealanders made on average over 5 Google searches per day in 2015.¹¹³ This means that New Zealanders are enjoying significant consumer surplus as they can use the money and time saved from using Google’s products on other activities. For instance, without having to spend extra time to look for answers in books in the library, consumers can just do quick searches on Google and acquire solutions to their queries.

Therefore, through Google, New Zealanders can have easy and free access to knowledge in the new digital age.

¹⁰⁸ AlphaBeta consumer survey is representative of the online population in New Zealand.
¹⁰⁹ Reported by Newshub, July 23, 2008 - <http://www.newshub.co.nz/nznews/google-launches-maori-version-of-search-engine-2008072313>
¹¹⁰ Reported by idealog, December 13, 2013 - <http://idealog.co.nz/tech/2013/12/google-translate-completes-journey-te-reo>
¹¹¹ Google Trends - <https://www.google.com.sg/trends/explore?date=2010-11-01%202016-12-01&geo=NZ&q=insurance>
¹¹² Information obtained from GNS Science, New Zealand Earthquakes - <https://www.gns.cri.nz/Home/Learning/Science-Topics/Earthquakes/New-Zealand-Earthquakes>
¹¹³ Information from the AlphaBeta Consumer Survey.

SOCIETAL BENEFITS

Estimated societal benefits of Google

In New Zealand during 2015:*



Google spearheaded the **Innovation Partnership** in 2013, together with other organisations, to promote digital innovation across the three sectors

Business



Government



Education



The initiative aims to drive productivity and efficiency by leveraging the internet and digital tools

Google has launched **Google Maps for 7 out of 9 “Great Walks”** hiking tracks across New Zealand; enabling potential international visitors to be captivated by the images online. This has boosted the tourism industry in New Zealand



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



SOCIETAL BENEFITS

Calculating societal benefits

Societal benefits are more difficult to calculate compared to benefits to businesses and consumers because they reflect benefits that only show up in indicators over the longer term or comprise benefits that are difficult to quantify, like the impact on charities or local innovation. While these benefits are often hard to quantify, they are important contributions to New Zealand that can be observed and described. For example, benefits to not-for-profit organisations can be described in terms of the increased exposure and reach that Ad Grants provide for these organisations.

Google's overarching digital project in New Zealand is the Innovation Partnership. Spearheaded by Google in 2013, the Innovation Partnership is a network of organisations that aims to promote digital innovation in New Zealand across three sectors – business, education, and government.¹¹⁴ The initiative strives to drive productivity and efficiency by assisting different parties to fully leverage on the Internet and various digital tools.¹¹⁵ It also funds research studies in the digital and technology space. Some of the projects include the Manaiakalani Digital Teacher Academy and the "Digital Journey".

Human capital development

Developing human capital within our society is crucial because businesses need to access high-quality talent and labour productivity is a key driver of continued economic growth. Furthermore, as New Zealand transforms progressively into a digital economy, younger generations need to be exposed to technology earlier. Educational methods need to evolve to stimulate critical thinking and engage these young learners.

Google invests significantly in building up the next generation of talent in New Zealand and combining technology with education to better engage them. Given that much of New Zealand's urban areas are connected to UFB, Google can better collaborate with schools to make education fun and engaging with technology.¹¹⁶

For instance, Google provides G Suite for Education free of charge in schools.¹¹⁷ It comprises an entire suite of collaboration and communication tools to be used in the classroom, allowing New Zealand children to learn more with the help of technology. By 2015, over 50 million students and teachers have already used G Suite for Education in classrooms all over the world and more than 10 million students worldwide have started using Chromebooks for their learning.¹¹⁸ It has been estimated that in

New Zealand, over 1,000 schools use G Suite for Education.¹¹⁹ In a recent report by Core Education in 2016, researchers studied the Kaikohekohe Initiative in rural Northland, New Zealand, and its associated benefits to the community. This initiative is about three primary schools leveraging digital tools such as G Suite for Education and Chromebooks to enhance the education landscape and make learning and teaching enjoyable for all. The benefits have been significant and have occurred relatively shortly after these schools have adopted the digital tools (i.e. results are observable after 2 to 3 years). As a result of technology, students are waiting less for instructions and help, understanding more, collaborating frequently with others, and being exposed to new and creative learning methods.¹²⁰ Teachers are recording improvements in their students' writing capabilities and public speaking skills.¹²¹ One parent has commented about her child's development "[My child] is sharing. That is the biggest thing that has changed ... They interact more with us about their learning. Prior to this, they would just do it. There was not much interaction, but with the Chromebooks, they want to show us what they are doing and get us more involved."¹²²

On top of G Suite for Education and Chromebooks, Google has created various learning products such as Google Expeditions and Quizzes in Google Forms.

Please refer to Box 9 for case studies.

Computer science has increasingly grown in prominence as expertise in this subject is highly valued in today's digital era. However, for a long time, there has not been an online computer science textbook that is readily available for users to refer to.¹²³ Hence, Google supported a project in 2012 by computer science professor Tim Bell at Canterbury University to produce an interactive computer science field guide for high school students.¹²⁴ This project is open source and is constantly being revised to remain up to date, providing both students and teachers with essential.

Google is also committed to supporting university undergraduates. Google collaborates with New Zealand universities to conduct modules to equip students with digital skills. For example, Google has worked with the University of Auckland to launch a Digital Media & AdWords Programme for students to learn about the advertising industry and gain work experience. Through the programme, students will obtain Google AdWords accreditation, be exposed to careers in digital media, gain valuable transferable digital skills, and network with employers from the industry.¹²⁵

¹¹⁴ Information obtained from Innovation Partnership, A vision for a digital New Zealand - <http://www.innovationpartnership.co.nz/>

¹¹⁵ Reported by Crown Fibre Holdings, June 11, 2013 - <http://www.crownfibre.govt.nz/2013/06/googles-innovation-partnership-and-ultra-fast-broadband/>

¹¹⁶ Information obtained from Fast broadband, New Zealand's Internet upgrade, Ministry of Business, Innovation & Employment - <http://www.mbie.govt.nz/info-services/sectors-industries/technology-communications/fast-broadband>

¹¹⁷ G Suite for Education is formerly known as Google Apps for Education.

¹¹⁸ Reported by teachthought, October 22, 2015 - <http://www.teachthought.com/the-future-of-learning/technology/google-apps-for-education-now-has-more-than-50-million-users/>

¹¹⁹ Number of schools estimated based on information obtained from AlphaBeta (2016) Google Economic Impact Australia 2015 AlphaBeta, reporting by Education Counts - <https://www.educationcounts.govt.nz/statistics/schooling/number-of-schools>, and reporting by Australia Bureau of Statistics, March 18, 2016 - <http://www.abs.gov.au/AUSSTATS/abs@nsf/Lookup/4221.0Main+Features392015?OpenDocument>

¹²⁰ Taylor (2016) *Stories of transformational change: How three Northland school communities came together to make a difference* Core Education.

¹²¹ Taylor (2016) *Stories of transformational change: How three Northland school communities came together to make a difference* Core Education.

¹²² Taylor (2016) *Stories of transformational change: How three Northland school communities came together to make a difference* Core Education.

¹²³ Reported by Crown Fibre Holdings, June 11, 2013 - <http://www.crownfibre.govt.nz/2013/06/googles-innovation-partnership-and-ultra-fast-broadband/>

¹²⁴ Information obtained from Computer Science Field Guide, About - <http://csfieldguide.org.nz/en/about.html>

¹²⁵ Reported by The University of Auckland, July 28, 2015 - <https://www.auckland.ac.nz/en/for/current-students/career-development-and-employability-services/events/2015/06/Digital-Media-and-AdWords-Programme.html>

BOX 9

Improving the education ecosystem in New Zealand

Human capital development requires several components: high-quality learning resources, easily accessible materials, and educators who are equipped to facilitate learning. Google contributes to both the quality and accessibility of information in the education system, for both young and lifelong learners. To support quality of education, Google's products provide access to a diverse range of sources, and some of its products enable the use of more effective teaching and learning methods. To support accessibility, most of Google's resources are freely available online to those with Internet access. In addition, Google runs initiatives to equip teachers to use digital tools effectively in the classrooms. These approaches help to improve the education ecosystem in New Zealand. Exhibit 7 provides an overview of Google's impact on the education ecosystem in New Zealand.

One of the visions of the Innovation Partnership is to build up a digitally capable generation. It aims to ensure every child is taught in a digitally enabled classroom, by a digitally capable teacher, and should graduate ready to work in a digital economy.¹²⁶ With the support of UFB, students can manage their own learning in schools and at home if they have access to a computer and the Internet.

One local school that has used G Suite for Education is Point England School in Tamaki, Auckland. It is a Maori and Pasifika primary

school with about 650 students.¹²⁷ After developing an innovative blended digital learning pedagogy using G Suite for Education, Point England School saw its students' literacy outcomes improve as teachers and students could work collaboratively on projects; students could assist one another in peer learning; and students were immersed in an interactive learning environment.¹²⁸ As such, G Suite for Education has helped equip students with valuable skills and experiences, such as teamwork and innovative thinking, that will be critical in developing local talents for the global economy in the future.

Google also rolled out a series of new tools that teachers can leverage to make learning in classrooms a more memorable experience. One of them is the Google Expeditions programme. Since its global launch in 2015, more than 1 million students across 11 countries have embarked on a Google Expedition.¹²⁹ The programme allows students to go on a virtual reality trip to over 200 destinations ranging from the Great Barrier Reef in Australia to the Grand Canyon in the United States. Through this highly immersive and visual learning method, students can have a holistic learning experience.¹³⁰ Other Google educational products include Google Cast for Education (which allows students and teachers to share their screens wirelessly from anywhere in the classroom), Quizzes in Google Forms (which

enables teachers to automate some of the marking and give more timely feedback to their students), and educational Apps on Chromebooks (such as Soundtrap which provides an option for educators to record podcasts and carry out video calls for student consultations).^{131 132}

Furthermore, general Google products have also been utilised to support learning in the classroom. Examples of these relevant tools include Google Maps, Google Earth, and YouTube. A study in 2013 found that the use of Google Maps and Google Earth in classes (in both secondary and tertiary institutions) have improved students' spatial thinking and geographic knowledge in certain subjects such as geography, science, and mathematics.¹³³ Similarly, YouTube has also been used by teachers to better engage students, allowing them to incorporate audio and visuals into their lessons. Researchers have discovered that video facilitates learning in three different ways: learning through cognition, experience, and emotion (Exhibit 8).^{134 135} It is also found that YouTube format of videos, short videos of around 2 to 6 minutes, optimised student engagement and enhanced learning.¹³⁶

Google also recognises the value of equipping educators. In partnership with the University of Auckland's Faculty of Education and Social Work and the Manaiakalani Education Trust, Google supports the Manaiakalani Digital Teacher academy.¹³⁷ The academy provides graduate teachers with 2 years of teaching and training in a fully immersive digital

environment, where they will be paired with mentors, develop skills required in a digital learning classroom, and have hands-on teaching experience in one of the partner schools.¹³⁸ For example, teachers will be taught coding and animation software (e.g. Scratch) so that they can engage their students in innovative and visual ways.¹³⁹ Through this training, teachers are able to better appreciate and harness technology in their curriculum, putting them in a better position to develop their students for the digital economy.



Google Expeditions

¹²⁶ Information obtained from Innovation Partnership (2016) A vision for a digital New Zealand Innovation Partnership - <http://www.innovationpartnership.co.nz/>

¹²⁷ Information obtained from Point England School, About Us - <http://www.ptengland.school.nz/about-us>

¹²⁸ Google for Education, Case Studies - <https://www.google.com/edu/case-studies/pt-england-school/>

¹²⁹ Google New Zealand Blog - <https://newzealand.googleblog.com/2016/07/updates-from-iste-4-new-tools-to-help.html>

¹³⁰ Google Official Blog - <https://googleblog.blogspot.sg/2015/09/bring-virtual-reality-field-trips-to.html>

¹³¹ Google New Zealand Blog - <https://newzealand.googleblog.com/2016/07/updates-from-iste-4-new-tools-to-help.html>

¹³² Information obtained from Soundtrap - <https://www.soundtrap.com/edu/>

¹³³ Oxera (2013), What is the Economic Impact of Geo Services, Oxera.

¹³⁴ Snelson (2008), YouTube and Beyond: Integrating Web-Based Video into Online Education. In K. McFerrin, R. Weber, R. Carlsen & D. Willis (Eds), Proceeding of Society for Information Technology & Teacher Education International Conference 2008 (pp. 732 – 737). Chesapeake, VA: Association for the Advancement of Computing in Education (AACE).

¹³⁵ Hansch et al (2015) "The role of video in online learning: Findings from the field and critical reflections" TopMOOC Research Project.

¹³⁶ Guo et al (2014) "How video production affects student engagement: An empirical study of MOOC videos" MIT.

¹³⁷ Information obtained from The University of Auckland, Manaiakalani Digital Teacher Academy - <http://www.education.auckland.ac.nz/en/about/teaching-learning/MDTA.html>

¹³⁸ Information obtained from Manaiakalani Digital Teacher Academy - <https://sites.google.com/a/manaiakalani.org/mdta2014/home>

¹³⁹ Information obtained from Stephanie Peck's Teaching Journey - <http://stephmpeck.blogspot.sg/>

EXHIBIT 7

Impact of Google on education quality and access

QUALITY



SUPPORTING TEACHERS AND SCHOOLS

Manaialakani Digital Teacher academy: provides graduate teachers with mentorship and training in a fully immersive digital environment. For example, they will be taught coding and animation software to enable them to try new methods of teaching



LEARNING IN THE CLASSROOM

Maps: use of Google Maps and Google Earth in classroom found to improve students' spatial thinking, data collection, and geographic knowledge in subjects such as science and geography

YouTube: use of videos to provide different learning experiences that are cognitive, experiential and emotional e.g. virtual field trips, demonstrations, and documentaries



LEARNING AT HOME OR FOR LIFE

Search: enables students and lifelong learners to answer questions from a large variety of sources

YouTube: contains thousands of educational videos available free online. Digital learning studies have found that short videos maximize viewer engagement

ACCESS

G Suite for Education: range of collaboration and communication tools to be used in the classroom. It has been estimated that over 1,000 schools in New Zealand use G Suite for Education

Computer Science Field Guide: interactive online computer science field guide for high schools, readily available for both teachers and students to refer to

Apps for School: free student collaboration and document sharing.

Maps, Search, YouTube: free resources available to students in schools with Internet access

Google Expeditions programme: equips students to go on a virtual reality trip to over 200 destinations ranging from the Great Barrier Reef in Australia to the Grand Canyon in the United States

Maps, Search, YouTube: free resources available to anyone with Internet access (over 4.1 million New Zealanders)

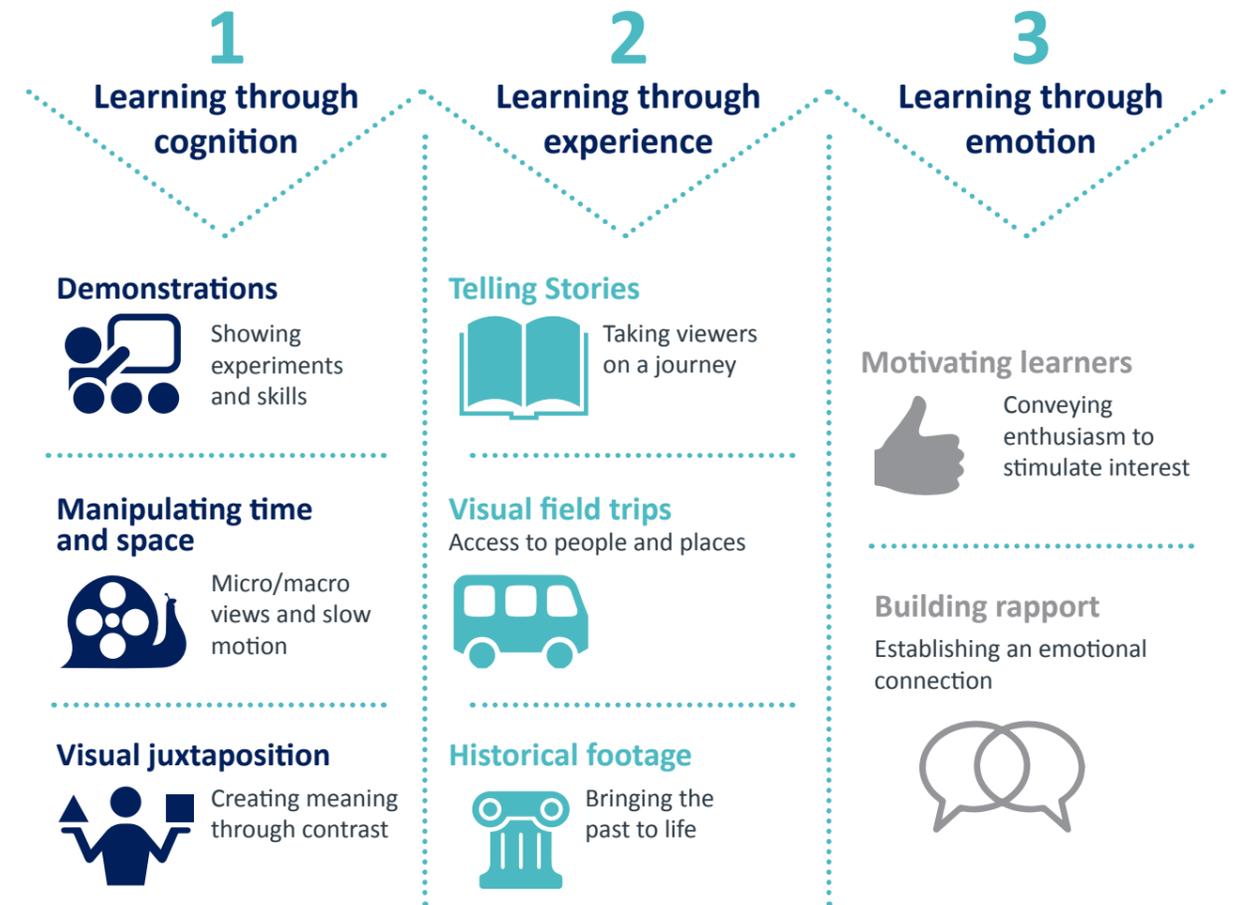
Search: allows students and lifelong learners to answer questions conveniently and freely. Online search methods take on average a third of the time needed for offline search (e.g. visiting the library), which encourages more searching and greater curiosity

Google Cultural Institute: online users can view curated artworks from both local and overseas museums

Maps: enables individuals to virtually explore places in New Zealand and around the world e.g. "Great Walks" in New Zealand

EXHIBIT 8

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.

Culture and the arts

The Google Cultural Institute collaborates with local museums in New Zealand, including the Auckland War Memorial Museum, to highlight over 2,000 various artifacts and artworks online on its Google Arts and Culture platform.¹⁴⁰ This allows the online population (both locals and foreigners) to view New Zealander art and learn more about New Zealand's heritage and culture with ease. Furthermore, users can select virtual tours of these museums online, allowing museums to engage a broader audience.

Online web safety

As society becomes increasingly connected via the Internet, potential issues such as threats to personal data security and cyber-bullying have emerged. In a recent report by Internet NZ and UMR Research, it is estimated that 72% of New Zealanders are concerned about the risks around personal security on the Internet and 69% are cautious about cyber-bullying.¹⁴¹ Anticipating this emergence of digital risks, Google has paired with local online sites that advocate digital safety like NetSafe and Sticks'n Stones to start the Web Ranger Programme in New Zealand from 2013.¹⁴² The programme encourages teenagers aged between 14 to 17 years old to be advocates for a safe and secure online community. Web rangers attend workshops and training to produce content to share with their peers on how to make the Internet a safe and secure place for all.¹⁴³ Through this community-led initiative, the online population in New Zealand can watch out for one another and ensure that everyone benefits from the digital economy.

Increased local innovation

Google has launched several initiatives in New Zealand to help both early stage and mid stage startups with programs like the Google Launchpad,

Google Developer Relations, Launchpad Accelerator, and +GCP program. Launchpad Accelerator is a programme that equips technology startups with mentorship, global media opportunities, and equity-free support.¹⁴⁴ Another example is the +GCP program which provides online storage solutions and data analytics tools for startups.¹⁴⁵

SMEs form the bulk of New Zealand's enterprises, however, many of these firms have not fully utilised digital technology for their operations due to various reasons, including lack of information or experience with digital tools.¹⁴⁶ In a 2014 research study, it was estimated that if all New Zealand companies utilised the Internet effectively, the resulting increased productivity and efficiency would contribute NZ\$34 billion to the economy.¹⁴⁷ Hence, to facilitate greater usage of digital tools in New Zealand, Google supports a local social enterprise, the "Digital Journey", in advocating its cause. In addition to curating information on key digital areas like Search Engine Optimisation, "Digital Journey" also provides a free online assessment tool to help SMEs review their current usage of technology and construct a viable action plan to go digital.¹⁴⁸ Hence, by equipping SMEs with the necessary tools, they can innovate, overcome barriers, and extend their reach.

Google also exposes New Zealanders to new creative occupations, such as being YouTube creators or App developers, ensuring that locals will be gainfully employed and resilient regardless of the economic situation. As mentioned above, YouTube creators can pursue their passion, create intriguing videos, and have a viable stream of income from advertisements. Google also engages current content creators (e.g. YouTube creators, App developers), helping them to utilise Google suite of products to innovate and reach the online population (both locally and abroad).

For instance, Google has teamed up with NZ On Air

to set up the "Skip Ahead" grants programme which is a NZ\$300,000 scheme. The programme aims to create funding and new opportunities for thriving local YouTube creators, improve their narrative skills and quality of production.¹⁴⁹

These initiatives help to cultivate New Zealand's digital economy and stimulate local innovation.

Supporting charities

Google assists not-for-profit organisations to raise awareness of their causes and operate in more efficient ways. Google provides not-for-profit organisations with several in-kind benefits,

including free Ad Grants of up to NZ\$14,300 worth of advertising each month for each eligible not-for-profit organisation, and G Suite products at no cost.¹⁵⁰ Advertising through Google enables not-for-profit organisations to broaden their reach and awareness of their causes and to attract potential donors. G Suite for Nonprofits gives not-for-profit organisations free access to the G Suite range of products such as Gmail. These products are designed to improve labour productivity through easier communication and reduce switching costs between applications. Organisations also can reduce operating expenses by using the cloud-based software, saving space and equipment costs.

BOX 10

Providing not-for-profits with digital tools and a global audience



Kiwis for kiwi is one not-for-profit organisation that has reaped positive benefits from using Ad Grants. Kiwis for kiwi, a fully independent charity, was established in 2012 to protect the kiwi and their natural habitat with the involvement of public agencies such as the Department of Conservation and individual New Zealanders.¹⁵¹ Before using Ad Grants, Kiwis for kiwi was facing a series of headwinds: its support base was small, its website was

not getting new traffic and the organisation was not growing. To develop a stronger online presence and reach out to a larger audience for donations and support, Kiwis for kiwi utilised the Ad Grants. It embarked on an AdWords campaign to better connect with potential donors with relevant keywords. Within a month of advertising, the organisation saw a 105% increase in its online website traffic and attracted a record 12,000 visitors. Referral traffic from AdWords continues to grow over time and represents about 80% of Kiwis for kiwi's total site visits today. Thus, with Ad Grants, Google empowers not-for-profits to continue to innovate and leverage on digital tools to connect to people in this digital age.

"With a limited marketing and advertising budget, we find we are often preaching to the converted. Ad Grants has offered Kiwis for kiwi a new channel and opportunity to reach a new audience." – Michelle Impey, Executive Director.¹⁵²

¹⁴⁰ Google Arts & Culture - <https://www.google.com/culturalinstitute/beta/search?q=New Zealand>

¹⁴¹ Reported by InternetNZ, October 26, 2016 - <https://internetnz.nz/news/online-personal-safety-top-priority-kiwis>

¹⁴² Google New Zealand Blog - <https://newzealand.googleblog.com/2014/04/calling-kiwi-teenagers-to-become-web.html>

¹⁴³ Information obtained from Web Rangers NZ, NetSafe - <https://www.netsafe.org.nz/webrangers/>

¹⁴⁴ Google Developers Launchpad - <https://developers.google.com/startups/>

¹⁴⁵ +GCP program refers to the Google Cloud Platform program. Google Cloud Platform - <https://cloud.google.com/>

¹⁴⁶ Information derived from reporting by NZ Herald, May 8, 2013 - http://www.nzherald.co.nz/business/news/article.cfm?c_id=3&objectid=10882310 and Stuff, June 25, 2014 - <http://www.stuff.co.nz/business/small-business/10198006/SMEs-still-backbone-of-NZ-business>

¹⁴⁷ Glass et al (2014) The value of Internet services to New Zealand businesses Sapere Research Group.

¹⁴⁸ Information obtained from Digital Journey, About Us - <http://www.digitaljourney.nz/about>

¹⁴⁹ Information obtained from NZ On Air - <http://www.nzonair.govt.nz/digital/what-we-fund/skip-ahead/>

¹⁵⁰ Reported by Techsoup New Zealand, August 26, 2014 - <https://www.techsoup.net.nz/blog/google-nonprofits-programme-launches-new-zealand>

¹⁵¹ Information obtained from Kiwis for Kiwi, Who we are - <https://www.kiwisforkiwi.org/about-us/who-we-are/>

¹⁵² Google Ad Grants, Kiwis for kiwi - <https://www.google.com/grants/success-stories/kiwis-for-kiwi.html>



SOCIETAL BENEFITS

Boosting the tourism industry

New Zealand boasts amazing natural landscapes, with native forests and valleys, that are ideal for hiking and camping in the great outdoors. New Zealand has 9 walking tracks across the country called the “Great Walks”, ranging from the Kepler Track in the Fiordland region to the Tongariro Northern Circuit in the Central North Island.¹⁵³ To allow a greater audience to view the spectacular views from these tracks, Google has worked with the Department of Conservation from 2012 to equip hikers with the Google Trekker (a backpack with 15 cameras), allowing them to capture 360 degree images while they embarked on their trails.¹⁵⁴ After 4 years, Google teamed up with Air New Zealand and the Department of Conservation to launch images for 7 “Great Walks” on Google Maps, enabling any online user to virtually step on these trails or prepare himself for the actual hike in New Zealand.¹⁵⁵ This provides a boost to New Zealand tourism industry as it lets potential tourists have the option to experience the stunning

landscapes and vast open spaces, enticing them to travel.

Christopher Luxon, Air New Zealand chief executive, commented “Through our partnership with the Department of Conservation, we’ve seen a big increase in visitor numbers on the ‘Great Walks’. The introduction of the Google Trekker imagery is another way to further this momentum using new technology to inspire and give visitors a preview of what it’s like to walk in the ‘Great Walks’.”¹⁵⁶ The Fiordland Regional Tourism Organisation estimates that the Fiordland, home to several “Great Walks”, has seen an increase of over 25% in international visitors between September 2015 to March 2016.¹⁵⁷ As more visitors come to visit the “Great Walks”, local economies will also benefit as these tourists spend on accommodation, gifts, and food. While further analysis would be required to attribute the spike to the launch of the “Great Walks” on Google Maps, Google has indeed exponentially expanded the online reach of these tourist attractions to potential visitors all over the world.

¹⁵³ Information obtained from the Department of Conservation - <http://www.doc.govt.nz/parks-and-recreation/things-to-do/walking-and-tramping/great-walks/map/>

¹⁵⁴ Google Maps - <https://maps.googleblog.com/2015/11/take-walk-on-wild-side-with-street-view.html>

¹⁵⁵ Reported by Stuff, November 5, 2015 - <http://www.stuff.co.nz/travel/destinations/nz/73503987/new-zealands-great-walks-launch-on-google-maps>

¹⁵⁶ Reported by Stuff, November 5, 2015 - <http://www.stuff.co.nz/travel/destinations/nz/73503987/new-zealands-great-walks-launch-on-google-maps>

¹⁵⁷ Information from Statistics New Zealand, International Visitor Survey: Place visited (RTO) - <http://nzdotstat.stats.govt.nz/wbos/Index.aspx?DataSetCode=TABLECODE7573#>

Disaster preparation: Google Public Alerts

To make critical information more accessible to the public and relief teams during natural disasters, Google.org partnered with civil agencies in New Zealand (GNS Science, Ministry of Civil Defense and Emergency Management, and others) in 2015 to curate essential environmental data and broadcast them on Google’s platforms (Google Now, Google Maps and Google Search).¹⁵⁸ Through these platforms, New Zealanders will be informed on their devices or when they use Google’s products about possible earthquakes in the region. For instance, Google’s services will prompt citizens about incoming disasters, and show them evacuation routes, shelter locations, and other critical information. These platforms speed up information dissemination and allow quicker relief coordination and evacuation, elevating survival rates.

Reduced environmental impact

Google Maps cuts down average trip times and contributes to conserving the environment in New Zealand. In 2015, Google Maps helped drivers save on average roughly 7% of time spend on the roads by navigating them to the most direct route, considering live traffic conditions.¹⁵⁹ This, in turn, helped to reduce travel time and reduced congestion. By optimising the trips between destinations for more than 2.5 million Maps users, Google Maps helped to save between 14,500 - 19,500 tonnes of CO₂e in vehicle emissions in 2015. The amount of emissions saved is equivalent to the annual emissions of 3,000 - 4,000 passenger cars. Thus, Google Maps helps to reduce the carbon footprint of New Zealanders and allows them to do their part to alleviate climate change.

We derived the amount of emissions saved from our AlphaBeta consumer survey and the AlphaBeta Google Maps study. Please refer to Appendix for more details.

¹⁵⁸ Google New Zealand Blog - <https://newzealand.googleblog.com/2015/11/stay-informed-after-quakes-with-google.html>

¹⁵⁹ Time savings obtained from AlphaBeta Google Maps Study in key cities in New Zealand (Auckland, Christchurch, and Wellington).

APPENDIX A – Detailed Methodology

Summary

This report describes the total economic impact of Google in New Zealand during 2015 as comprised of three components: business benefits, consumer benefits, and societal benefits. 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 is additional, the concepts are distinct. The amounts were initially quantified in US dollars and then converted to local currency based on the average exchange rate in 2015.¹⁶⁰

To estimate the business benefits, we calculated the activity generated by businesses that use Google’s services to drive sales and income. Services that businesses and individuals use to generate income include Search and AdWords, AdSense, YouTube, and G Suite.

Estimating the consumer benefits supported by Google is a challenging task. This is because individuals typically do not pay for the Google’s services that they use, including Search, Maps, Gmail, and YouTube. There are several established methodologies for estimating the benefits of free services, including willingness to pay (how much an individual values Google’s products?) and value of time (how much time did an individual save by using a Google product?). This study uses the former as the primary estimation approach while using the latter as a secondary verification method for selected products. The research includes a first-of-its-kind consumer survey amongst the New Zealand online population as well as big data gathering methods to determine the value of time saved by using Google Maps for driving and public transport.

Finally, Google supports benefits for the broader society through its various initiatives and not-for-profit operations. We used a combination of quantitative and qualitative analysis to create a snapshot of these broader benefits.

Methodology and Data: Business benefits

The business benefits supported by Google are calculated by considering the revenues and net advertising benefits of New Zealand businesses and advertisers using Google’s products.¹⁶¹ These benefits proxy for the “gross economic activity” generated by Google, meaning the gross revenue, income or savings generated by businesses through the use of Google products. This gross economic activity does not measure the flow-on economic effects generated, such as further purchases from their suppliers or the economic activity generated by the employees of these businesses who spend their wages in the broader economy. Gross economic activity also does not account for activity that may have been displaced by Google and the methodology does not attempt to estimate the incremental impact of Google on the New Zealand economy beyond what would be the case if Google didn’t exist but other companies like it did. The hypothetical scenarios required to calculate truly incremental benefits or “net economic activity” generated by Google are highly speculative and beyond the scope of this study.

For the calculation of business benefits of each product (except AdSense), we employed a top down and bottom up approach. To reflect both approaches, we report our estimates as ranges, rather than point estimates (with the exception of G Suite due to the relatively small size of the benefit).

Search and AdWords

The business benefits of Search and AdWords are estimated using two methods to establish a range for the total benefits, a top down approach and a bottom up approach. The top down approach estimated the total size of the search advertising segment in New Zealand and the proportion of this space that Google represents. The bottom

up approach estimated the number of page views in New Zealand, the proportion of pages with advertisements, the number of advertisements per page and the average click-through rate.

To estimate the income generated by businesses paying for online advertising through Google a return on investment (ROI) ratio range of 3.4 – 8 was applied, and both estimates were reported.¹⁶² This ROI ratio was developed from a few assumptions:

- Using a large sample of proprietary data, Hal Varian, Google’s Chief Economist, estimated that businesses received US\$2 in revenue for every US\$1 spent on advertising. This finding was published in the American Economic Review in 2009.
- Businesses also receive free clicks because of

unpaid 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 percent of paid clicks.
- Because of these assumptions, an ROI ratio of 8 is estimated. This ROI ratio is taken as 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.

We report the ranges of these estimates.

Table 1: Inputs and sources for calculating business benefits of Search and AdWords

Estimation	Metric	Source
Top down approach	Total market expenditure on search advertising	• Statista (2015)
	Google Search’s traffic share	• Stats Monkey (2014)
Bottom up approach	Google Search traffic data	• Stats Counter Global (for Android market share), Google (2015) • Nielsen online data • Industry expert interviews
	% pages that display advertisements	• Varian (2009), Jansen & Spink (2009) • Deloitte UK Econ. Impact Study
	Advertisements per page on average	• Varian (2009), Jansen & Spick (2009) • Deloitte UK Econ. Impact Study
	CTR for Search, Desktop (Estimate)	• Google Display Benchmark Tool for AdSense (03/2016) • Marin Research (2014)
	CTR for Search, Mobile (Estimate)	• GDBT for AdSense (03/2016) • Marin Research (2014)
Both methods	Average CPC for Search (Estimate)	• Word Stream (2015) • Marin Research (2014)
	ROI Lower and Upper Bound	• Varian (2009), Jansen & Spick (2009) • Deloitte UK Econ. Impact Study
	% of Android devices in country	• Statscounter Global Statistics (2015)

¹⁶⁰ Average exchange rate for 2015 was 1 USD = 1.43 NZD. Information sourced from X-Rates.com.

¹⁶¹ Net advertising benefits refers to the increase in revenues and sales that can be directly attributed to advertising minus the related advertising expenditure.

¹⁶² ROI reflects the net advertising benefits that businesses receive from online advertising (i.e. total additional revenue generated as a result of advertising minus online advertising cost).

AdSense

The direct business benefit from Google AdSense is estimated as the net advertising benefits generated by businesses placing advertisements on these websites by New Zealand’s online content creators. We estimated this figure using Google’s published advertising revenue from Google network’s websites and multiplied this by New Zealand’s share of global AdSense impressions. Furthermore, we applied a ROI derived from academic evidence of the return that advertisers make from online advertising.

Table 2: Inputs and sources for calculating business benefits of AdSense

Estimation	Metric	Source
Advertiser gross profits	Advertising revenue from Google Network Member’s websites	• Google Annual Report (2015)
	ROI from AdSense	• Gupta et al. (2015)
	Country share of global impressions on AdSense	• DoubleClick (2013)

YouTube

We estimated the direct benefits of YouTube to advertisers in New Zealand in two ways and reported the estimates of these methods as a range. First, the top down method estimated the total video advertising spend in New Zealand and YouTube’s share of that market. Second, the bottom up method estimated YouTube cost per view, the view rate of advertising, the total videos viewed in a year and the proportion of videos with advertising. The top down and bottom up estimates are then multiplied with the ROI ratios for YouTube ad.

Table 3: Inputs and sources for calculating business benefits of YouTube

Estimation	Metric	Source
Top down approach	Total market revenue from digital video advertising	• Statista (2015)
	YouTube’s traffic share of streaming	• AdCorp (2013)
Bottom up approach	YouTube traffic data	• Stats Counter Global (for Android market share) • Nielsen online data • Industry expert interviews
	% of videos with viewable ads	• Deloitte UK Econ. Impact Study
	YouTube CPV (Estimate)	• Deloitte UK Econ. Impact Study • Gray (2012) • Word Stream (2015) • Marin Research (2014)
	% of videos with clickable ads	• Whatsadvertising (2015)
	YouTube CTR	• Gray (2012)
	YouTube CPC (Estimate)	• Whatsadvertising (2015) • Word Stream (2015) • Marin Research (2014)
	Both methods	YouTube ROI ratio
Percentage of video views from abroad		• Social Blade
% of Android devices in country		• StatCounter Global Statistics (2015)

G Suite

We estimated the direct benefits of Google G Suite in two ways. First, we derived the top down estimate using the number of businesses in New Zealand and the share of New Zealand businesses using G Suite. Second, the bottom up method involved the number of smartphone users in New Zealand, the percentage of smartphones with the Android operating system and the percentage of Android devices with the Google Admin App installed. The top down and bottom up estimates are then multiplied with the average expenditure on G Suite per company and the ROI ratio for G Suite. An average of the two estimates was reported.

Table 4 : Inputs and sources for calculating business benefits of G Suite

Estimation	Metric	Source
Top down approach	Number of companies in country	• MBIE (2014)
	Share of companies in country using G Suite	• Computer World (2015)
Bottom up approach	Number of smartphone users	• e-marketer (2015)
	% of smartphones with Android operating system	• Statscounter Global Statistics (2015)
	% of Android devices with Google Admin installed	• Google Play Store • Industry expert interviews
Both methods	ROI for G Suite	• Forrester Consulting (2015)
	Average expenditure per company	• MBIE (2014) • Google G Suite (2015)

Methodology and Data: 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 benefit 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 several established methodologies for estimating the consumer benefits of free services

- Willingness to pay: This method estimates benefits by asking individuals how much they value specific products.
- Value of time: This method estimates benefits by calculating how much time an individual saved by using a good or service.

This study uses the former, including the latter as a secondary verification method for time saved through Google Search and Google Maps for driving and public transport. See Box 6 for more details on these methodologies.

AlphaBeta consumer survey

An online consumer survey was conducted amongst 400 New Zealand respondents, with the sample verified to be representative of the country's online population according to key demographic data including gender, age, income and geography. A sample size of over 400 people was chosen so as to provide estimates that fall within a 95% confidence interval with a 5% margin of error, accounting for the size of New Zealand's online population. In accordance with the consensus in the economic literature, 5% constitutes a robust and acceptable margin of error.

Google Search

We estimated the benefits of Search to consumers in two ways. Both methods are reported separately. First, we used willingness to pay, where consumers are asked to value their favorite online search provider. Second, we calculated the value of time saved compared with offline methods. To calculate this, we applied time saving estimates from an experiment that measured the time taken to conduct a search online versus a search at the library.¹⁶³ 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 New Zealand by using Google Search. Our method uses the average number of searches that people conduct per day for leisure from the AlphaBeta consumer survey and applies this to the number of Google Search users in New Zealand. In 2015, New Zealand had more than 3.5 million Google Search users, who conducted approximately over 5 searches per day. More than 65 per cent of these were conducted for leisure rather than work purposes. The time saved from using Google Search was multiplied by the average national wage rate.

¹⁶³ Chen et al. (2014) A day without a search engine: an experimental study of online and offline searches. *Experimental Economics*, Vol 17, Issue 4, pp 512-536

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Table 5: Inputs and sources for calculating consumer benefits of Search

Estimation	Metric	Source
WTP for Google Search	Amount that consumers value product per year	• AlphaBeta Consumer Survey
Value of time saved using Google Search	Time saved per search	• Varian (Presentation 2014) • Chen et al. (2014)
	Average daily searches per user	• AlphaBeta Consumer Survey
	% searches made for leisure	• AlphaBeta Consumer Survey
	Monthly wage rate	• ILO (2014)
Both methods	Online Population (OP)	• World Bank (2015)
	Google search users as % of OP	• AlphaBeta Consumer Survey
	% of Android devices in country	• Statscounter Global Statistics (2015)

Google Maps

We estimated the benefits of Google Maps to consumers using willingness to pay, where consumers are asked to value their favourite online maps service. Second, we used the value of time method to separately estimate the time saved by using Maps for driving and public transport. Both methods are reported separately.

Estimating the benefit of using Google Maps from navigation was challenging because there are not well established figures on how often we use a tool like Google Maps to help us plan a trip. There also are not well established figures on how much time a trip optimiser saves an individual. Data needed to calculate the benefits of Google Maps was collected as part of the AlphaBeta consumer survey. The survey was conducted amongst over 400 respondents with key demographic data including age, gender, geography, and income, respective of the countries online population.

The AlphaBeta consumer survey provided the proportion of the online population using Google Maps for transport. Respondents were asked on how many trips, in the past two weeks, they had used Google Maps to plan or navigate their journey. The survey recorded the average number of trips per week and the average length per trip.

We estimated the value of time saved the following way. Using data collected by AlphaBeta from 8,668 driving and 8,478 public transport trips across popular routes in Auckland, Christchurch, and Wellington, time saving was 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). The average percentage time saved per trip was estimated and the average time difference between using and not using Google maps calculated.

Table 6: Inputs and sources for calculating consumer benefits of Google Maps

Estimation	Metric	Source
WTP for Google Maps	Amount that consumers value product at	• AlphaBeta Consumer Survey
	Google Maps users as % of OP	• AlphaBeta Consumer Survey
Value of time saved using Google Maps on public transport	% of time saved per trip on average	• AlphaBeta Google Maps Study
	Trips per week	• AlphaBeta Consumer Survey
	Average trip time	• AlphaBeta Consumer Survey
	Maps users, driving, % of OP	• AlphaBeta Consumer Survey
Value of time saved using Google Maps while driving	% of time saved per trip on average	• AlphaBeta Google Maps Study
	Trips per week	• AlphaBeta Consumer Survey
	Average trip time	• AlphaBeta Consumer Survey
	Maps users, driving, % of OP	• AlphaBeta Consumer Survey
Both methods	Online population	• World Bank (2015)
	Monthly Wage rate	• ILO (2014)

YouTube

We calculated the benefits of YouTube to consumers using willingness to pay, where consumers were asked to value their favorite online video service. Results from the AlphaBeta consumer survey amongst the New Zealand online population were used.

Table 7: Inputs and sources for calculating consumer benefits of YouTube

Estimation	Metric	Source
WTP for YouTube	Amount that consumers value product per year	• AlphaBeta Consumer Survey
	Online population (OP)	• World Bank (2015)
	YouTube users as % of OP	• AlphaBeta Consumer Survey
	% of Android devices in country	• Statscounter Global Statistics (2015)

Gmail

We calculated the benefits of Gmail to consumers using willingness to pay, where consumers were asked to value their favorite online email service. Results from the AlphaBeta consumer survey amongst the New Zealand online population were used.

Table 8: Inputs and sources for calculating consumer benefits of Gmail

Estimation	Metric	Source
WTP for Gmail	Amount that consumers value product per year	• AlphaBeta Consumer Survey
	Online population (OP)	• World Bank (2015)
	Gmail users as % of OP	• AlphaBeta Consumer Survey

Methodology and Data: 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. For instance, we only estimated the environmental impact due to the use of Google Maps in this report. While the rest of the benefits are often not conducive to comprehensive quantitative measurement, they are important contributions to New Zealand that can be observed and described.

Emissions saved due to Google Maps

We estimated the societal benefits of Maps to users in two ways. First, we used responses to the AlphaBeta consumer survey to compute the average duration of trips made with the aid of

Google Maps. Second, we calculated the average trip distance obtained from the AlphaBeta Google Maps data collected to calculate time savings from navigating with Maps. For both methods, we used data from the AlphaBeta consumer survey on the average number of trips made with the aid of Google Maps per Google Maps user, the average percentage of distance savings due to Google Maps. We combined this with third party data on the average urban vehicle speed (this is a conservative number as a large proportion of trips assisted by Google Maps in New Zealand are likely to be on rural roads), the average vehicle occupancy rate and the average amount of carbon emissions for cars per km travelled to derive the amount of emissions saved. Finally, we used the average emissions of a passenger car per year to compute the counterfactual of effective cars taken off the road. We report a range of estimates from these two methods.

Table 9: Inputs and sources for calculating societal benefits of Google Maps

Estimation	Metric	Source
AlphaBeta Consumer Survey Method	Average number of trips made with the aid of Maps per Maps user	• AlphaBeta Consumer Survey
AlphaBeta Google Maps Study Method	Average trip length	• AlphaBeta Google Maps Study
Both Methods	Average number of trips	• AlphaBeta Consumer Survey
	Average percentage of distance savings	• AlphaBeta Google Maps Study
	Average urban vehicle speed	• NZ Ministry of Transport
	Average vehicle occupancy rate	• NZ Ministry of Transport
	Average amount of carbon emissions for cars per km travelled	• European Commission
	Average amount of emissions per passenger car per year	• US Environmental Protection Agency

We provide detail on how each of the remaining societal benefits was estimated in the relevant sub-section in Chapter 4.

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