THE GROWING DIGITAL ECONOMY IN THE PHILIPPINES:

OPPORTUNITIES, CHALLENGES, AND GOOGLE'S CONTRIBUTIONS

αlphaβeta
strategy x economics

OCTOBER 2021

CONTENTS

THE GROWING DIGITAL ECONOMY IN THE PHILIPPINES: OPPORTUNITIES, CHALLENGES, AND GOOGLE'S CONTRIBUTIONS

BY 2030, IF LEVERAGED FULLY, DIGITAL TRANSFORMATION CAN CREATE UP TO...

PHP5 TRILLION (USD101.3 BILLION) in annual economic value[1]

THREE PILLARS OF ACTION

1 ENHANCE DIGITAL SKILLS TRAINING AND EDUCATION

2 ACCELERATE DIGITAL ADOPTION AND INNOVATION

3 PROMOTE DIGITAL TRADE OPPORTUNITIES

KEY CHALLENGES TO EACH PILLAR

1	2	3
Low participation rates in digital skills courses as well as the lack of relevant and suitable courses for training	Low digital adoption among businesses and the lack of access to capital and support for digital transformation	Complex cross-border transaction regulations which are not entirely compatible with regional partners

EXAMPLES OF GOOGLE'S CONTRIBUTIONS TO EACH PILLAR

1	2	3
Google partnered with the Department of Education to provide 22 million **Google Workspace for Education accounts** for learners across the country	From 2020 to Sept 2021, **"MSME Caravan"** has trained more than 46,000 MSME owners and their employees. This is made possible through collaborative efforts with partners including the Department of Trade and Industry (DTI)	**Business Profile,** previously known as Google My Business, has been instrumental to boosting the visibility of local businesses and helping them realize their global ambitions

GOOGLE'S BROADER ECONOMIC BENEFITS

BUSINESSES

Google supports **PHP363.4 BILLION (USD7.4 BILLION)** in annual benefits to businesses in the Philippines[2]

CONSUMERS

Google supports **PHP214.5 BILLION (USD4.3 BILLION)** in annual benefits to consumers in the Philippines[2]

SOCIETY

By enabling businesses to unlock new revenue streams and expand their businesses, Google indirectly supports **OVER 110,000 JOBS** in the Philippines. Its other initiatives also bring strong intangible benefits such as "Digiskarteng Pinay", a program that aims to equip women with new skills through YouTube

1. Economic value refers to GDP increments, productivity gains, cost savings, time savings, increased revenues, increased wages and increased tax collection.
2. Figures are estimated based on the latest available annual data as at time of research in 2020.
Note: Estimates are based on AlphaBeta analysis using a range of original and third-party sources. See report's Appendix for methodology.

EXECUTIVE SUMMARY

Backed by strong government support, the Philippines' digital sector contributes significantly to its economy today. In 2020, the Internet economy in the Philippines was estimated to be worth USD7.5 billion and is expected to grow by 30 percent annually to reach USD28 billion by 2025.[1] To realize this digital potential, the Philippine Government has crafted specific roadmaps to guide policymaking. For instance, the "E-Commerce Philippine 2022 Roadmap" is a strategic framework that presents the country's strategic plans, policies, and other support measures to harness the benefits of e-commerce.[2] The roadmap targets to increase the contribution of e-commerce to gross domestic product (GDP) from 3.4 percent in 2020 to 5.5 percent in 2022.[3] In collaboration with the Philippines Digital Economy Steering Committee coordinated by the National Economic and Development Authority (NEDA), the World Bank published the "Philippines Digital Economy Report 2020".[4] The report assesses the state of the digital economy in the Philippines and prescribes policy recommendations to help the country harness the potential of the digital economy.

Despite the progress, there is room for further digital transformation efforts, and the COVID-19 pandemic has further reinforced their importance. With its young and digitally savvy population, there is considerable potential for the expansion of the Philippines' digital sector. In January 2021, Filipinos aged 16 to 64 spent the highest average amount of time using the Internet globally and the number of digital buyers in the Philippines is expected to grow by 16.7 percent annually from 2017 to 2022, the second-highest growth rate in Asia Pacific (APAC) behind Indonesia.[5] The pandemic has also amplified the importance of digital transformation. A study has found that, globally, the pandemic has effectively pushed forward the digital revolution by five years, providing an opportunity for the Philippines to ride the next digital wave.[6] Digital transformation will be important to boost the country's economic recovery efforts and enhance the long-term resilience of its economy in the post-pandemic future.

However, the country faces several barriers to fully effecting digital transformation. As the Philippines ramps up its digital transformation efforts, there are several obstacles that could hinder the country from realizing the full potential of digital technologies. First, digital adoption among businesses, particularly micro, small and medium-sized enterprises (MSMEs), is low. According to a 2020 survey of MSMEs by the Department of Trade and Industry (DTI), over half of the respondents did not have any web presence (e.g., a website, or presence on social media or an e-commerce platform).[7] Second, there is a lack of

1. The value of the Internet economy was sized in terms of the Gross Merchandise Value (GMV) of products and services of sectors within the Internet economy. These sectors include e-commerce, transport and food, online travel, online media and financial services. For more details, see source: Google, Temasek, and Bain & Company (2020), "e-Conomy SEA 2020." Available at: https://storage.googleapis.com/gweb-economy-sea.appspot.com/assets/pdf/Philippines-e-Conomy_SEA_2020_Country_Insights.pdf
2. Department of Trade and Industry (2021), "Basta e-Commerce Madali". Available at: https://ecommerce.dti.gov.ph/madali/
3. Department of Trade and Industry (2021), "Outcomes and measures of success." Available at: https://ecommerce.dti.gov.ph/madali/outcome.html
4. World Bank (2020), A better normal under COVID-19: Digitalizing the Philippine economy now. Available at: http://documents1.worldbank.org/curated/en/796871601650398190/pdf/Philippines-Digital-Economy-Report-2020-A-Better-Normal-Under-COVID-19-Digitalizing-the-Philippine-Economy-Now.pdf
5. Digital buyers refer to Internet users who directly buy goods and services from a seller over the Internet using a web browser. For more details, see sources: Accenture (2017), Insights to Digital Commerce. Available at: https://www.accenture.com/_acnmedia/PDF-67/Accenture-Insight-Digital-Commerce.pdf; Datareportal (2021), "Digital 2021: The Philippines". Available at: https://datareportal.com/reports/digital-2021-philippines
6. McKinsey & Company (2020), The Next Normal: The recovery will be digital. Available at: https://www.mckinsey.com/~/media/mckinsey/business%20functions/mckinsey%20digital/our%20insights/how%20six%20companies%20are%20using%20technology%20and%20data%20to%20transform%20themselves/the-next-normal-the-recovery-will-be-digital.pdf
7. Department of Trade and Industry (2021), "Understanding e-commerce in the Philippines." Available at: https://ecommerce.dti.gov.ph/madali/baseline_survey.html

awareness of existing programs and policies to facilitate digital adoption. The same DTI survey revealed that only 26 percent of MSMEs were aware of digitalization programs offered by the government and other institutions.[8] Third, there are gaps in access to digital tools, fueled by factors such as the lack of digital infrastructure. A 2019 government survey revealed that while 32 percent of households in the National Capital Region had access to the Internet, only five percent in predominantly rural regions such as the Bangsamoro Autonomous Region in Muslim Mindanao (BARMM) and Bicol provinces had access.[9] Finally, a digital skills gap in the workforce could hamper digital transformation. The World Economic Forum's Competitiveness report found that while the skills of the current workforce (e.g., years of schooling) in the Philippines are above the regional average; the country lags its neighbors on equipping skills for the future workforce (e.g., digital education).[10]

This report finds that, if leveraged fully, digital technologies could create an annual economic value of PHP5 trillion (USD101.3 billion) by 2030.[11] To put this in perspective, this is equivalent to about 27 percent of the Philippines' GDP in 2020.[12]

The key messages of this report include:

- **Eight key technologies hold transformative potential for businesses and workers in the Philippines.** These include mobile Internet; cloud computing; big data; Artificial Intelligence (AI); financial technology (FinTech); the Internet of Things (IoT) and remote sensing; advanced robotics; and additive manufacturing. By allowing the creation of new business models and productivity savings, these technologies could create significant economic value for the Philippines.

- **If leveraged fully, digital transformation can unlock PHP5 trillion (USD101.3 billion) worth of economic value in the Philippines by 2030.** By generating productivity gains, revenue boosts, cost savings, and GDP increments, digital technologies can unlock up to PHP5 trillion (USD101.3 billion) worth of economic value annually in the Philippines by 2030. The sectors projected to be the largest beneficiaries are the consumer, retail and hospitality; education and training; and agriculture and food sectors.

8. Department of Trade and Industry (2021), "Understanding e-commerce in the Philippines." Available at: https://ecommerce.dti.gov.ph/madali/baseline_survey.html
9. Department of Information and Communications Technology (2020), "National Information and Communications Technology Household Survey (NICTHS)". Available at: https://dict.gov.ph/ictstatistics/wp-content/uploads/2020/06/NICTHS-FINAL-REPORT-PRESENTATION_26-JUNE-2020.pdf
10. World Bank (2020), Philippines Digital Economy Report 2020. Available at: https://openknowledge.worldbank.org/handle/10986/34606
11. Economic value refers to GDP increments, productivity gains, cost savings, time savings, increased revenues, increased wages and increased tax collection.
12. Based on AlphaBeta analysis. See Appendix A for details on the methodology.

- **Digital adoption is also crucial for the country to gain resilience in the post-pandemic future.** Beyond its immediate economic impacts, the COVID-19 pandemic is likely to have long-term implications in three aspects of the Philippine economy, namely: 1) the emergence of a hybrid workplace that supports digital freelancing; 2) accelerating the shift towards digital payments, and 3) severe disruptions to the business operations of MSMEs. By providing MSMEs access to global markets, equipping businesses with digital capabilities to conduct electronic transactions, and facilitating remote work, technology applications can help businesses manage the long-term economic implications of the COVID-19 pandemic while staying resilient against future "black swan" events.[13] These applications can generate an annual economic value of up to PHP3.5 trillion (USD69.9 billion) – this is equivalent to about 69 percent of the total estimated digital opportunity for the Philippines. While digital technologies can support businesses in adapting to adverse events, there have been intensifying worries of job losses as technologies displace workers. However, this is not always the case as digital adoption could support higher-quality jobs for Filipinos and improve the country's productivity.

- **Three pillars of action are required for the Philippines to fully capture its digital opportunity.** While the Philippines is already making significant progress in some of these areas, there is scope for the country to push further on three policy areas:

  – First, it is crucial for the Philippines to ***enhance digital skills training and education***. The country is already making significant efforts in developing digital talent, such as ensuring the responsiveness of tertiary curriculums to equip the future workforce with emerging skills needs. For example, the IT and Business Process Association of the Philippines (IBPAP) partnered with the Commission on Higher Education (CHED) to develop a systems thinking course.[14] The country also inculcates a strong focus on the use of information and communications technology (ICT) in the education sector through the "Digital Rise Program", under which digital boards and televisions were installed

13. A black swan is an unpredictable event that is beyond what is normally expected of a situation and has potentially severe consequences. Examples include the current COVID-19 pandemic.
14. Systems thinking is an approach to problem solving that views problems as part of a wider, dynamic system. It is the process of understanding how things influence one another as part of a whole.

in over 707,600 classrooms, and teachers and students were provided with tablets and laptops to access online learning resources.[15] In addition, a key priority highlighted in the "Philippine Development Plan 2017-2022" is to strengthen the inclusion of skills and education programs. This is achieved by targeting community-based training at low-income and other marginalized individuals who are unable to access formal training provisions due to financial or geographical challenges.[16] To upskill the current workforce, the government has been actively involving industry partners to shape the curriculums of training institutes. As part of the "National Technical Skills Development Plan (NTESDP) 2018-2022", enterprise-based training programs are implemented by companies through apprenticeships of up to six months or dual training programs where such apprenticeships run concurrently with school or training curriculums.[17] Despite significant government efforts to improve the availability and accessibility of digital skills courses, participation rates remain low. To increase participation rates in these training courses, the country needs to raise awareness of the "in-demand" skills that are required at the workplace and reskilling opportunities available. The country can also consider implementing sector-specific digital skilling roadmaps similar to Singapore's Industry Transformation Maps (ITMs), which provide sector-based information on career pathways, the skills required for relevant technologies to the sector, and reskilling options.[18]

- Second, there is scope to further ***accelerate digital adoption and innovation*** in the Philippines. To achieve the full benefits of digital transformation, the Philippines needs to promote an environment that is conducive for innovation and pursue policies that support entrepreneurial activities and the deployment of cutting-edge technologies, such as AI and cloud computing. The country is currently pursuing several policies in this regard. The Department of Science and Technology (DOST) and the Philippine Council for Industry, Energy and Emerging Technology Research and Development (PCIEERD) have jointly developed the "Startup Research Grant Program" to fund research and development (R&D) activities and accelerate the commercialization of innovative products across sectors.[19] The DTI also recently launched the "National AI Roadmap" to accelerate the adoption and utilization of AI in the country.[20] Despite a comprehensive range of policies to promote digital adoption and innovation, the country faces several roadblocks including the lack of access to capital and limited understanding of the benefits of digital transformation. To lower the barriers to digital adoption, the government can consider funding the cost of acquiring digital talent and technologies and providing access to digitalization resources and advisory. In addition, there is scope for the Philippines to upgrade its digital infrastructure to ensure affordable and reliable Internet access nationwide.

- Third, it is crucial that the Philippines continues to ***promote digital trade opportunities*** for businesses in the country. To do this, the country is already currently engaged in several multilateral trade agreements to align its trade-related practices with the international community. These include the "Regional Comprehensive Economic Partnership" (RCEP) which the country is targeting to ratify by 2021, and the United Nations Economic and Social Commission for Asia and the Pacific's (UNESCAP) "Framework Agreement on Facilitation of

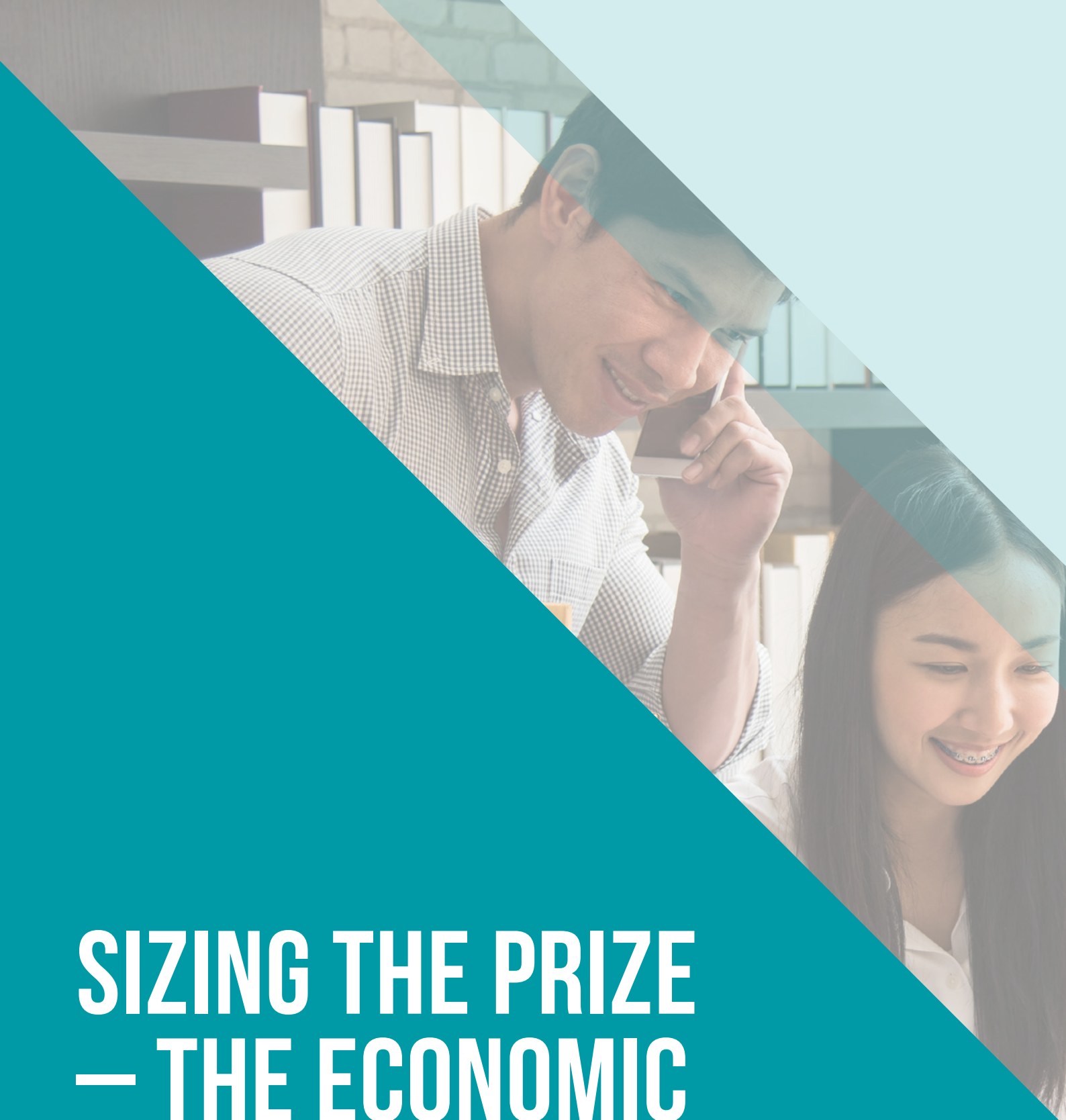
15. TeacherPH (2020), "Accelerating the DepEd Computerization Program in the light of COVID-19 pandemic". Available at: https://www.teacherph.com/deped-computerization-program-covid-19-pandemic/
16. Technical Education and Skills Development Authority (2019), "Community Based Programs". Available at: http://www.tesda.gov.ph/about/tesda/37
17. Technical Education and Skills Development Authority (2019). "Enterprise Based Programs". Available at: http://www.tesda.gov.ph/About/TESDA/38
18. Koh, F. (2020) The Straits Times. "Review of growth strategy for 23 sectors to be completed by next year, says DPM Heng." Available at: https://www.straitstimes.com/singapore/politics/review-of-growth-strategy-for-23-sectors-to-be-completed-by-next-year-says-dpm
19. Philippine Council for Industry, Energy and Emerging Technology Research and Development (2019), "Featured news: Get to know the fifteen pioneer grantees of DOST's Startup Research Grant Program." available at: https://pcieerd.dost.gov.ph/2-uncategorised/367-get-to-know-the-fifteen-15-pioneer-grantees-of-dost-s-startup-research-grant-program
20. Open Gov Asia (2021), "The Philippines launches National AI Roadmap". Available at: https://opengovasia.com/the-philippines-launches-national-ai-roadmap/

Cross-border Paperless Trade in Asia and the Pacific".[21] The country is also supporting businesses in building up their digital capabilities through the "Philippine Export Competitiveness Program" (PECP) which introduces enabling technologies that facilitate cross-border transactions and boost the competitiveness of Filipino exports. For the Philippines to be well positioned to capture the growth of cross-border transactions in the region, it is important for the country to address existing high trade costs and improve the efficiency of export-related processes. Businesses will benefit from streamlined administrative procedures that reduce the cost of compliance associated with non-tariff measures and harmonizing customs procedures (e.g., "Customs Modernization and Tariff Act") with globally recognized frameworks. The country could also take a more proactive approach to participate in international agreements with a strong focus on promoting digital trade, such as the "Digital Economy Partnership Agreement" (DEPA) signed between Singapore, New Zealand, and Chile.[22]

- **Google is making significant contributions to each of the three pillars.** By providing access to digital tools through Google Workspace for Education and creating a learning ecosystem on YouTube, Google is supporting distance learning for both educators and learners. Coupled with Google's other initiatives (e.g., the "Grow with Google" program), Google is enhancing digital skills and education in the Philippines. To accelerate digital adoption and innovation, Google's tools and programs such as AppSheet and "MSME Caravan" help to build digital capabilities for all types of businesses. For instance, large local enterprises can benefit from using digital tools such as AppSheet to automate business processes and increase efficiency. Google's products and services have also played an important role in promoting digital trade opportunities in the country. For example, Business Profile, previously known as Google My Business, has been instrumental to boosting the visibility of local businesses online and helping them realize their global ambitions. Google's "Framework for Responsible Data Protection Regulation", which aims to provide clarity to supportive data governance laws, also advocates for interoperable and adaptable data protection regulations, enabling businesses and consumers to benefit from cross-border digital services.[23]

- **Through its products and services, Google also delivers broader economic benefits to businesses, consumers and the wider society in the Philippines.** Google's products and services are estimated to bring about total annual business and consumer benefits **worth PHP363.4 billion (USD7.4 billion)** and **PHP214.5 billion (USD4.3 billion)**, respectively. The products that these benefits were estimated for include Google Search, Google Ads, AdSense, Google Play, YouTube, Google Maps, Google Drive, and Google Docs, Sheets and Photos. For businesses, such benefits come in the form of increased revenue through better customer outreach and access to new markets, as well as improved productivity through time savings. Consumers experience greater convenience, access to information, and more avenues for learning and skills development. Beyond its economic contributions to businesses and individuals, Google also supports benefits to the wider society in the Philippines. By enabling businesses to unlock new revenue streams and expand their businesses through the use of Google Ads, AdSense, and YouTube, Google indirectly supports **over 110,000 jobs** in the Philippines.[24] Furthermore, Google delivers intangible benefits through its programs such as providing skilling and income-earning opportunities for female entrepreneurs and promoting safe Internet usage in the Philippines.

21. Business Mirror (2020), "Philippines is 1st among Asean peers to accede to UN treaty on digital trade."
Available at: https://businessmirror.com.ph/2020/01/18/philippines-is-1st-among-asean-peers-to-accede-to-un-treaty-on-digital-trade/
22. Beehive.gov.nz (2020), "NZ concludes digital economy trade talks with Singapore and Chile."
Available at: https://www.beehive.govt.nz/release/nz-concludes-digital-economy-trade-talks-singapore-and-chile
23. Google (2020), Framework for Responsible Data Protection Regulation.
Available at: https://services.google.com/fh/files/blogs/google_framework_responsible_data_protection_regulation.pdf
24. Jobs supported refer to new jobs that may have been created through a business' use of Google's platforms, as well as ongoing employment of jobs that previously existed.



SIZING THE PRIZE — THE ECONOMIC OPPORTUNITY OF DIGITAL TRANSFORMATION IN THE PHILIPPINES

Digital transformation can generate significant economic value across all sectors of the economy. Beyond the technology sector, digital technology can bring about transformative impacts on traditional sectors like manufacturing; consumer, retail and hospitality; and education and training. If leveraged fully, digital transformation can create up to PHP5 trillion (USD101.3 billion) worth of economic value annually by 2030. This is equivalent to about 27 percent of the country's GDP in 2020. The largest economic beneficiary of digital transformation in the Philippines is its consumer, retail, and hospitality sector, which is estimated to account for about 24 percent of the total economic value.

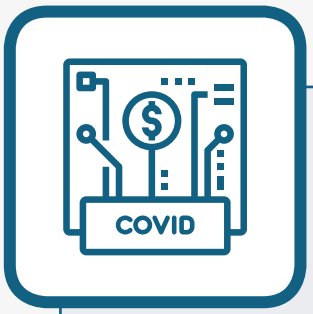
Digital adoption is also crucial for the country to gain resilience during the COVID-19 crisis and in the post-pandemic future. By providing MSMEs access to global markets, equipping businesses with the digital capabilities to conduct electronic transactions and facilitating remote work, technology applications can help businesses manage the long-term economic implications of the COVID-19 pandemic. In the post-pandemic era, digital technologies are key to boosting the competitiveness and resilience of businesses in adapting to the evolving business environment. These include e-commerce platforms in the retail industry and remote patient monitoring in the health sector. It is estimated that 69 percent of the Philippines' digital opportunity – at PHP3.5 trillion (USD69.9 billion) – could be derived from such technology applications.

While digital technologies can support businesses and workers in adapting to adverse events, there have been intensifying worries of job losses as technologies displace workers. However, this is not always the case as digital adoption could improve the productivity of the workforce, reducing the

"SIZING THE PRIZE"
THE ECONOMIC VALUE OF DIGITAL TRANSFORMATION

IF LEVERAGED FULLY, DIGITAL TRANSFORMATION CAN CREATE AN IMPACT OF UP TO...

PHP5 TRILLION (USD101.3 BILLION)
in annual economic value[1]



CLOSE TO 70%
of this value[1] could come from technologies that help mitigate the economic impacts of the COVID-19 pandemic

... IN THE PHILIPPINES BY 2030

1. Economic value refers to GDP increments, productivity gains, cost savings, time savings, increased revenues, increased wages and increased tax collection.
Note: Estimates are based on AlphaBeta analysis using a range of original and third-party sources. See report's Appendix for methodology.

prices of goods. Consequently, demand for these goods increases, which in turn spearheads the creation of more jobs as more labor is hired to meet the increased demand for goods. Furthermore, digital adoption could create higher-quality jobs for Filipinos by automating routine physical tasks and allowing humans to focus on higher value-add work.

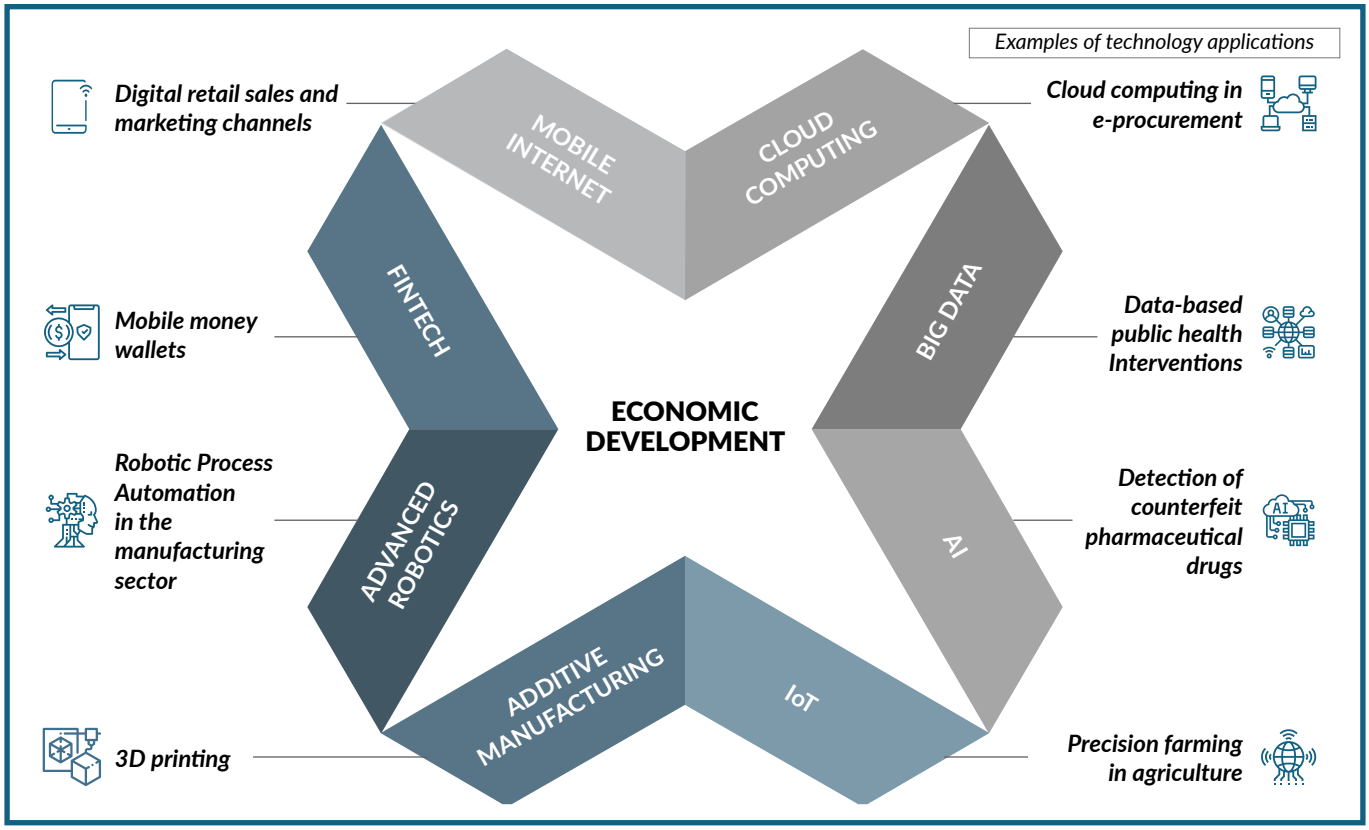
1.1 DIGITAL TRANSFORMATION CAN UNLOCK UP TO PHP5 TRILLION (USD101.3 BILLION) WORTH OF ECONOMIC VALUE IN 2030

Digital technologies can unlock significant economic value in the Philippines. In particular, eight key technologies hold transformative potential for the country (Exhibit 1). Box 1 shows an overview of these technologies, and the potential each has for creating productivity boosts for businesses and workers in the Philippines.

To assess the economic potential of digital transformation in the Philippines, 43 technology applications – each mapping to one of the eight technologies – were identified across ten industry sectors. The economic value of each technology application was estimated under a scenario of full adoption in 2030 (Exhibit 2).

EXHIBIT 1:

CURRENT RESEARCH REFLECTS EIGHT TRANSFORMATIVE TECHNOLOGIES WITH STRONG ECONOMIC POTENTIAL



BOX 1.
EIGHT KEY TECHNOLOGIES WITH TRANSFORMATIVE POTENTIAL FOR THE PHILIPPINES

Drawing upon an extensive range of literature on emerging technologies and their potential economic benefits, eight key technologies that hold transformative potential for workers, businesses, and the government have been identified.[25] These include:

- **Mobile Internet.** The rapid rise of the smartphone and associated increase in mobile Internet penetration rates have accelerated the growth of Internet services worldwide. While the mobile Internet in the Philippines has already driven the adoption of new business models such as the app economy, over-the-top (OTT) services and mobile-commerce (or "m-commerce"), there are several mobile Internet-enabled applications that have yet to see full adoption in the country. These include the use of smartphone-based government e-services to streamline the delivery of public services such as financial assistance.

- **Cloud computing.** Referring to the delivery of information technology (IT) resources over the Internet, cloud computing technologies allow individuals and entities to access technology services such as enhanced computing power, data storage and management tools on an as-needed basis. Buying, owning, and maintaining physical data centers and servers can be cost-prohibitive, particularly for MSMEs. In addition, public cloud hosting boosts productivity by providing tailored productivity tools, enabling improved security and making resources available on an on-demand basis. Cloud computing has also become essential for leveraging other technologies such as AI and machine learning.

- **Big data.** Big data, and the analysis of it, refers to the ability to analyze extremely large volumes of data, extract insights and act on them – often in or close to real-time. Predictive analytics can help workers and businesses analyze customer preferences more effectively to increase customer satisfaction. With the information derived from analytics, businesses can also design targeted programs for customer engagement.

- **Artificial Intelligence (AI).** AI refers to the ability of software or hardware to exhibit human-like intelligence. This entails a set of technologies that enable computers to perceive, learn, reason and assist in decision-making to solve problems in ways that are similar to what people do.[26] Examples of AI applications include virtual assistants, autonomous vehicles and speech recognition tools.

- **Financial technology (FinTech).** Sometimes referred to as Digital Financial Services (DFS), FinTech has been instrumental in boosting the financial services sector through facilitating deposits, payments and providing individuals with access to more advanced financial products such as loans, savings and investments. Moreover, by allowing for cashless payments, FinTech has also been responsible

25. Sources include: McKinsey Global Institute (2013), Disruptive technologies: Advances that will transform life, business, and the global economy. Available at: https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/disruptive-technologies; Wilkinson (2019), "5 frontier technology trends shaping international development", Bond News. Available at: https://www.bond.org.uk/news/2019/06/5-frontier-technology-trends-shaping-international-development; Google and AlphaBeta (2020), The Digital Sprinters: Public policies to support economic development through digital technologies. Available at: https://alphabeta.com/our-research/the-digital-sprinters-capturing-a-us34-trillion-through-innovative-public-policy/

26. Microsoft (2018), The future computed. Available at: https://blogs.microsoft.com/wp-content/uploads/2018/02/The-Future-Computed_2.8.18.pdf

for driving greater growth in other sectors (e.g., consumer, retail and hospitality).

- **Internet of Things (IoT) and remote sensing.** IoT systems relate to the network of physical objects ("things") that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the Internet. These systems can monitor and manage the performance of connected objects and machines.[27] IoT has several applications across sectors with significant economic potential: wearable devices can help monitor and maintain health and wellbeing, thereby lowering public health expenditure; energy consumption can be monitored and optimized in buildings; equipment use can be enhanced; and the health and safety performance of factories improved.

- **Advanced robotics.** The advent of advanced robotics has allowed for an expanding range of tasks that robots can perform. Compared with conventional robots, advanced robots have superior perception, integrability, adaptability, and mobility.[28] These improvements permit faster setup, reconfiguration, as well as more efficient and stable operations. For instance, in the manufacturing sector, advanced robotics can increase productivity and flexibility in both the factory and the supply chain, and enable producers to rapidly adjust to changing customer needs.

- **Additive manufacturing.** This relates to technologies that build 3D objects by adding layer upon layer of material. There is a range of potential benefits, such as the ability to handle complex, low-volume components where rapid turnaround is critical.[29]

27. MGI (2019), The rise of Digital Challengers – How digitisation can become the next growth engine for central and eastern Europe.
Available at: https://digitalchallengers.mckinsey.com/files/McKinsey%20CEE%20report_The%20Rise%20of%20Digital%20Challengers.pdf
28. Boston Consulting Group (2019), Advanced robotics in the factory of the future.
Available at: https://www.bcg.com/publications/2019/advanced-robotics-factory-future
29. Sharp (2019), "Is additive manufacturing the right choice for your electronic assembly?" JJS Manufacturing Blog.
Available at: https://blog.jjsmanufacturing.com/additive-manufacturing-electronic-assembly

EXHIBIT 2:

43 DIGITAL TECHNOLOGY APPLICATIONS ACROSS 10 SECTORS WERE IDENTIFIED TO SIZE THE PHILIPPINES' ECONOMIC OPPORTUNITY FROM DIGITAL TRANSFORMATION

Agriculture & food
- Precision farming technologies
- IoT-enabled supply chain management
- Food safety technologies
- Real-time market information

Consumer, retail & hospitality
- Digital retail sales and marketing channels
- IoT-enabled inventory management
- Automation & AI customer service in hotels
- Data analytics on travel patterns
- Online F&B delivery channels

Education & training
- E-career centers and digital jobs platforms
- Personalized learning
- Online retraining programs

Financial services
- Big data analytics
- Reg tech
- Digital banking services
- Mobile money wallets

Government
- E-services
- Cloud computing
- E-procurement
- Geographic Info. System enabled tax collection
- Data analytics for government transfer payments
- Digitization of government payments

Health
- Remote patient monitoring
- Telehealth applications
- Data-based public health Interventions
- Detection of counterfeit pharmaceutical drugs
- Smart medical devices
- Electronic medical records

Infrastructure
- Smart grids
- 5D BIM & project management technologies
- Predictive maintenance technologies
- Smart buildings

Manufacturing
- Big data analytics
- Additive manufacturing
- IoT-enabled supply chain management
- Automation & robotics

Resources
- Smart exploration and automation in mining operations
- Predictive safety technologies
- Predictive maintenance technologies

Transport services
- Smart roads
- Smart ports
- Autonomous vehicles
- Geospatial services

Key technologies:

- *Mobile Internet*
- *FinTech*
- *Advanced robotics*
- *Additive manufacturing*
- *Cloud computing*
- *Big Data*
- *AI*
- *IoT*

Taking into account the combined potential economic value of the 43 technology applications, it is estimated that **digital technologies have the potential to create an annual economic value of PHP5 trillion (USD101.3 billion) in the Philippines by 2030**.[30] This is equivalent to 27 percent of the Philippines' GDP in 2020 (Exhibit 3).

The consumer, retail, and hospitality sector is projected to be technology's largest economic beneficiary in the Philippines. This sector is estimated to be able to gain annual economic benefits of up to PHP1.2 trillion (USD24.7 billion) in 2030 – amounting to about 24 percent of the country's total digital opportunity.[31] Other top sector beneficiaries include education and training (PHP607.1 billion or USD12.3 billion), agriculture and food (PHP576.7 billion or USD11.7 billion), government (PHP550.2 billion or USD11.1 billion), and manufacturing (PHP465.9 billion or USD9.4 billion).[32]

The key opportunities posed by digital technologies for these sectors are as follows:

- **Consumer, retail and hospitality.** Many retail businesses in the Philippines are turning to online platforms, such as e-commerce marketplaces and mobile applications, to digitize their offerings. In the retail industry, the productivity gains from marketing and selling goods through digital channels have been estimated to range from six to 15 percent – these arise as a result of being able to reduce labor requirements, harness inventory efficiencies, and cutting real estate costs (e.g., rental of store space).[33] With COVID-19, the transition from offline to online stores has been accelerated as retailers find alternative means to reach out to customers during lockdowns.[34] For example, SSI Group, the Philippines' luxury retailer, launched a home-based concierge service, "The Specialist", which facilitates and assists customers shopping at home by selecting merchandise, arranging deliveries and managing orders.[35] During the pandemic, SSI Group also onboarded more brands, including Gap, Lacoste and ZARA, onto its e-commerce sites and sales on these marketplaces have grown almost 400 percent since its launch three years ago.[36]

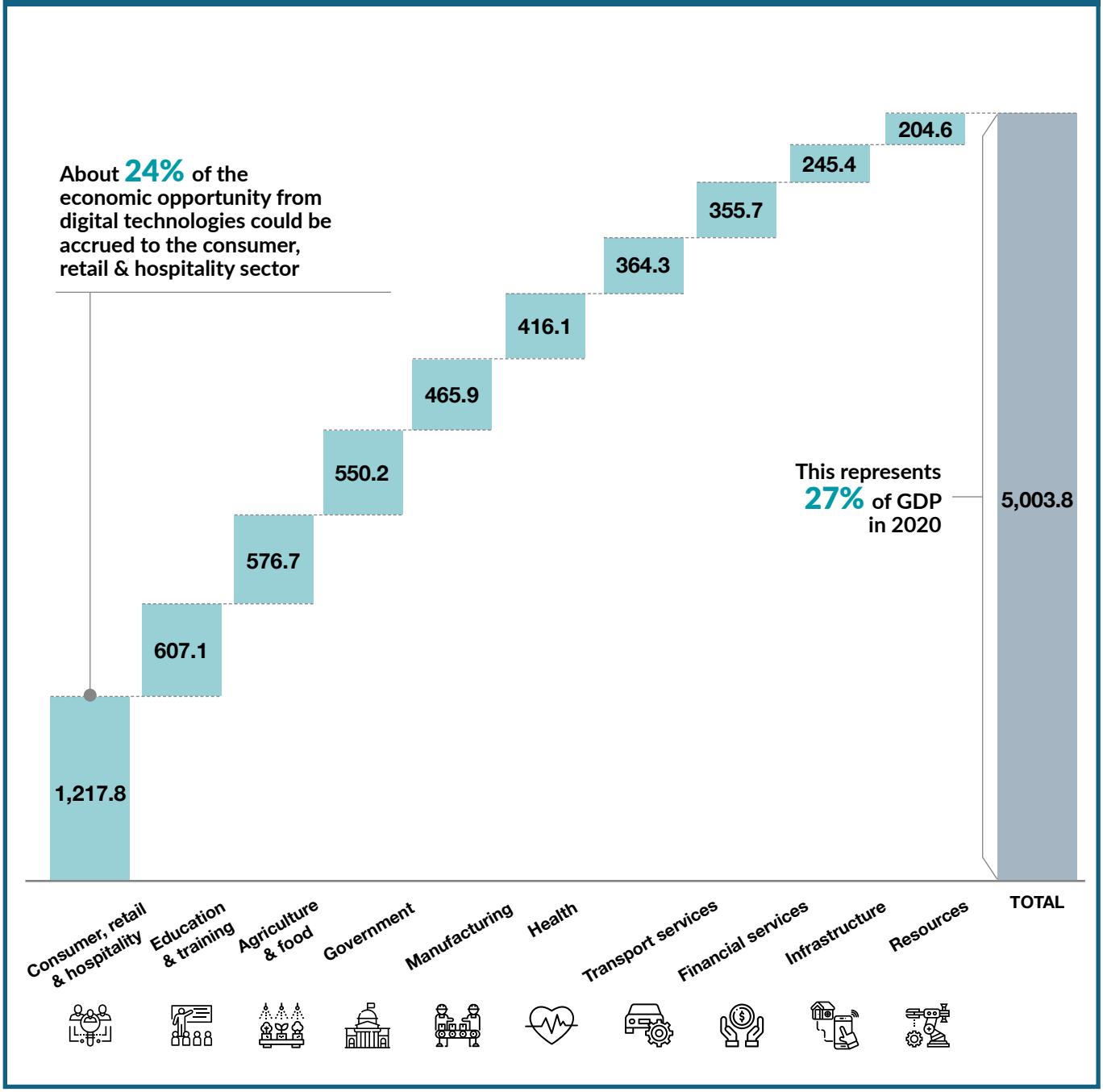
- **Education and training.** Digital technologies hold the promise of improving the quality and reach of education, especially during the COVID-19 pandemic when in-person learning was challenging to undertake. For example, the Makai City local government distributed flash drives for 85,000 public school students to participate in blended learning (a mix of learning online and face-to-face education).[37] These flash drives contain digitized self-directed learning modules and video lectures that can be accessed on any electronic gadgets such as smartphones, laptops, tablets and televisions. Digital technologies can also cater to the unique learning interests of students through digital personalized learning tools. For example, NUADU, an educational app driven by AI and big data, is designed to identify each student's learning gaps and create a customized learning experience to bridge these gaps effectively.[38] It is estimated to help each teacher save up to seven hours per week spent on supporting students with weaker academic performance.[39] Outside the education system, online job-matching platforms have been instrumental in addressing unemployment by rapidly matching newly unemployed workers with urgent job openings which would otherwise have flown under the radar. In the Philippines,

30. These estimates do not represent GDP or market size (revenue), but rather economic impact, including GDP increments, productivity gains, cost savings, time savings, increased revenues, increased wages and increased tax collection.
31. Based on AlphaBeta analysis. See Appendix A for details on the methodology.
32. Based on AlphaBeta analysis. See Appendix A for details on the methodology.
33. McKinsey Global Institute (2013), Disruptive technologies: Advances that will transform life, business, and the global economy. Available at: https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/disruptive-technologies
34. Philippine News Agency (2020), "Rise of online shopping nationwide, not just from metro." Available at: https://www.pna.gov.ph/articles/1112078
35. SSI Group (2020), "SSI Group provides new shopping experiences in-store, at-home and online". Available at: https://ssilife.com.ph/blog/ssi-group-provides-new-shopping-experiences-in-store-at-home-and-online
36. CNN (2020), "Personal shoppers, e-commerce driving SSI Group recovery". Available at: https://cnnphilippines.com/business/2020/11/13/SSI-Group-personal-shoppers-e-commerce-pandemic-recovery.html
37. Inquirer.net (2020), "Makati LGU provides OTG flash drive for blended learning of students". Available at: https://newsinfo.inquirer.net/1342602/makati-lgu-provides-otg-flash-drive-for-blended-learning-of-students
38. NUADU, "Reach your goals!". Available at: https://nuadu.com/en
39. NUADU (2019), "Introducing NUAGA to schools in the Philippines". Available at: https://newsroom.nuadu.com/news/introducing-nuadu-to-schools-in-the-philippines/

EXHIBIT 3:

BY 2030, DIGITAL TECHNOLOGIES COULD SUPPORT UP TO PHP5 TRILLION (USD101.3 BILLION) OF ANNUAL ECONOMIC IMPACT IN THE PHILIPPINES

POTENTIAL ANNUAL ECONOMIC VALUE FROM DIGITAL TECHNOLOGIES, BY SECTOR[1]
PHP BILLION, 2030



1. These estimates do not represent GDP or market size (revenue), but rather economic impact, including GDP increments, productivity gains, cost savings, time savings, increased revenues, increased wages and increased tax collection. In this analysis, 43 technology applications were considered, and the economic value that each provides was estimated under the full adoption scenario, i.e., the scenario that 100% of businesses in the sector adopt the application.

Note: Numbers may not sum due to rounding.

SOURCE: AlphaBeta analysis

Kalibrr job portal uses AI to match over 2.5 million active job seekers to relevant jobs based on their skills and experience.[40] Since 2012, the company has partnered with over 18,000 companies and is boosting the effectiveness of its job matching algorithm to increase the number of job matches from 75,000 per year to one million per year.[41]

- **Agriculture and food.** Technologies such as big data analytics and IoT-enabled supply chain management can provide significant productivity benefits to the agriculture and food sector. For example, the International Rice Research Institute (IRRI) and the Department of Agriculture (DA) jointly launched Rice Crop Manager (RCM), a mobile app that provides smallholder rice farmers with timely field-specific recommendations on nutrient and crop management.[42] It is estimated that by using this app, farmers can increase rice yields on average by 0.4 tons and their net incomes by PHP5,900 (USD122) per hectare during each harvest season, as compared to conventional farming methods. Digital technologies are also used to help farmers finance their inputs. For instance, Cropital and FarmOn are crowdfunding platforms that help farmers raise funds to support their harvest.[43] In addition, platforms that help businesses and households purchase agricultural produce directly from farmers, thereby shortening supply chains and boosting profits for farmers, have emerged. For example, KROPS, a cloud-based e-commerce application that eliminates the middlemen between farmers and buyers, allows farmers to sell their produce directly to buyers online.[44] The cloud infrastructure adopted by KROPS has helped the mobile app to scale rapidly based on demand. As of May 2018, over 7,000 farmers had registered for the mobile application, which had supported over USD250 million worth of agricultural transactions. In particular, some farmers saw their income increase by 70 percent after using the app.

40. LinkedIn (2021), "Kalibrr". Available at: https://www.linkedin.com/company/kalibrr-technology-ventures/about/
41. Global Innovation Exchange (2019), "Kalibrr". Available at: https://www.globalinnovationexchange.org/innovation/kalibrr
42. Department of Agriculture (2020), "Rice Crop Manager now available as an Android application". Available at: https://ati.da.gov.ph/ati-main/news/03192020-1333/rice-crop-manager-now-available-android-application
43. e27 (2019), "These agritech startups might be the next big thing in the Philippines." Available at: https://e27.co/these-agritech-startups-are-the-next-big-thing-in-the-philippines-20190718/
44. Microsoft (2018), "Crop in hand: how a cloud-based application brings farmers closer to end users." Available at: https://news.microsoft.com/apac/features/crop-in-hand-how-a-cloud-based-application-brings-farmers-closer-to-end-users/

- **Government.** There is a vast scope for the government to improve service delivery and cost efficiency using digital technologies. Such technologies include digitizing government services, cloud computing, e-procurement, and Geographic Information System (GIS) enabled tax collection. For example, e-procurement could save governments up to five percent on expenditures and 50 to 80 percent on transaction costs.[45] The Philippines has already taken steps to adopt such technologies. In 2018, the government saved PHP10.7 billion (USD221 million) after upgrading the Philippine Government Electronic Procurement System (PhilGEPS) – a centralized online portal that connects government agencies to bidders.[46] These upgrades facilitated open and competitive bidding by ensuring faster, efficient and more responsive mechanisms for the acquisition of goods and services. The government also uses digital channels to deliver public services electronically. For example, services like passport appointments, ID applications for persons with disabilities (PWD), and public health services have been digitized.[47]

- **Manufacturing.** Technology applications, such as big data analytics, additive manufacturing, supply chain management, and advanced robotics, can help modernize traditional processes in the manufacturing sector and boost productivity. By improving demand forecasting and production planning, leading to increased efficiency in meeting customer needs, it has been estimated that the use of big data analytics can bring about a 2.5 to three percent increase in the profit margins of manufacturers.[48] For example, Schneider Electric deployed smart technologies, such as IoT, in its plant in the Province of Cavite. These technologies helped the company optimize its energy usage and production processes, helping it achieve over 13 percent in energy savings and 14 percent growth in production annually.[49] The company also installed virtual reality (VR)-equipped rooms to support continuous learning for employees. By creating a virtual experience that closely simulates real-life situations, employees can learn how to operate new technologies in a safe environment.

45. OECD, E-procurement for good governance and development in Italy, North Africa, and the Middle East. Available at: https://www.oecd.org/mena/governance/39856250.pdf
46. Inquirer.net (2019), "Gov't saves record P10.7B on improved procurement".
Available at: https://business.inquirer.net/263683/govt-saves-record-p10-7b-on-improved-procurement
47. Government of the Philippines (2021), "Government Services Directory." Available at: https://stg.portal.gov.ph/eservices-directory
48. McKinsey Global Institute (2011), Big data: The next frontier for innovation, competition and productivity.
Available at: https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/big-data-the-next-frontier-for-innovation
49. Industrial Automation (2019), "Schneider Electric Launches Philippines First Smart Factory."
Available at: https://iaasiaonline.com/schneider-electric-launches-philippines-first-smart-factory/

1.2 TECHNOLOGIES WILL BE CRUCIAL IN ADDRESSING THE LONG-TERM IMPLICATIONS OF COVID-19

Social distancing measures and border closures to curb the spread of the COVID-19 pandemic have severely curtailed economic activity in the Philippines. Key services sectors such as the wholesale and retail trade sectors declined by 5.4 percent in 2020 and the country's overall GDP contracted by 9.5 percent in the same year, its worst performance since 1947.[50] The economic downturn has also had an impact on the labor market: the unemployment rate rose from 5.3 percent in January 2020 to 8.7 percent in January 2021.[51] Beyond presenting immediate economic shocks, the pandemic has three potentially long-term implications for the Philippine economy:

- **Emergence of a hybrid workplace that supports digital freelancing.** As part of the COVID-19 mitigation measures, the Philippines has joined the global trend of encouraging workers to conduct work remotely.[52] During the implementation of the enhanced community quarantine (ECQ), 72 percent of companies in the Philippines were operating remotely. In particular, 31 percent of employers in the Information Technology – Business Process Outsourcing (IT-BPO) industry activated remote working arrangements during this time. The shift towards telecommuting has spurred the growth of the nation's gig economy, which thrives on hiring employees on a flexible and freelance setup. A survey by American financial services company, Payoneer, reported that the Philippines saw a 208 percent growth in freelancers in the first half of 2020.[53]

- **Accelerating the shift towards digital payments.** Before the COVID-19 pandemic, Filipino consumers have been slow to embrace digital payments and 80 percent of online sellers select cash-on-delivery as their preferred payment method.[54] During the pandemic, the fear of contracting the virus and lockdown measures restricting consumers from visiting banks led to a shift towards digital money. The country's largest provider of mobile money services, GCash, reported an eight-fold increase in the number of transactions made on its platform in May 2020.[55] The Philippine Government also ramped up efforts in promoting the widespread usage of electronic payments. For example, in October 2020, the governor of Bangko Sentral ng Pilipinas (BSP), the central bank of the Philippines, encouraged the entire bureaucracy to adopt digital payments by leveraging EGov Pay, a digital payments platform for administrative services.[56]

- **Severe disruptions to the business operations of MSMEs.** As the backbone of the national economy, MSMEs make up over 99 percent of the roughly 1.4 million registered businesses in the Philippines, contributing to 63 percent of employment and

50. Sources include Philippine Statistics Authority, "Annual National Accounts Linked Series (2000-2020)". Available at: https://psa.gov.ph/national-accounts/base-2018/data-series; Nikkei Asia (2021), "Philippines GDP shrinks 9.5% in 2020, worst since 1947." Available at: https://asia.nikkei.com/Economy/Philippines-GDP-shrinks-9.5-in-2020-worst-since-1947
51. Sources include Philippine Statistics Authority (2020), "Employment Situation in January 2020." Available at: https://psa.gov.ph/statistics/survey/labor-and-employment/labor-force-survey/title/Employment%20Situation%20in%20January%202020; Philippine Statistics Authority (2021), "Employment Situation in January 2021." Available at: https://psa.gov.ph/statistics/survey/labor-and-employment/labor-force-survey/title/Employment%20Situation%20in%20January%202021
52. KMC (2020), "Working from home in the Philippines: Why remote working is not a long-term business solution".
Available at: https://kmcmaggroup.com/research-insights/2020/working-from-home-in-the-philippines-why-remote-working-is-not-a-long-term-business-solution/
53. Forbes (2020), "A New Payoneer Report shows COVID 19 is accelerating freelance growth".
Available at: https://www.forbes.com/sites/jonyounger/2020/09/01/a-new-payoneer-report-shows-covid-19-is-accelerating-freelance-growth/?sh=42f586dd5c02
54. Techwire Asia (2020), "The Philippines is going cashless – finally". Available at: https://techwireasia.com/2020/07/digital-payments-are-finally-soaring-in-the-philippines/
55. Nikkei Asia (2020), "Digital payment grows in Philippines amid COVID-19 fears".
Available at: https://asia.nikkei.com/Business/Companies/Digital-payment-grows-in-Philippines-amid-COVID-19-fears
56. NewsBytes (2020), "BSP wants entire gov't bureaucracy to use EGov Pay facility".
Available at: https://newsbytes.ph/2020/10/29/bsp-wants-entire-govt-bureaucracy-to-use-egov-pay-facility/

36 percent of GDP.[57] However, they remain vulnerable to external shocks, such as the COVID-19 pandemic. A survey conducted between March to April 2020 found that 73.1 percent of MSMEs were forced to close their businesses a few weeks after the COVID-19 outbreak and lockdown measures were implemented.[58] While the country is recovering from the economic downturn, MSMEs are continuing to confront a sharp drop in demand and revenue. Despite the lifting of the ECQ in Metro Manila, a majority of MSMEs were still temporarily closed or were operating at decreased capacity, according to a United Nations Development Program (UNDP) survey.[59]

Technology adoption will be crucial for businesses and workers to manage the potential long-term implications of the crisis and future black-swan events.[60] There is a significant opportunity for digital technologies, such as big data analytics, to support MSMEs and freelancers in boosting their resilience and future-proof their operations. Of the 43 tech applications that were sized, 23 have the potential to help businesses and workers adapt to and flourish in the post-pandemic era. These tech applications can generate an annual economic value of PHP3.5 trillion (USD69.9 billion) – that is equivalent to 69 percent of the total digital opportunity by 2030 (Exhibit 4).

There are three channels in which technology applications can allow businesses to navigate and even flourish during black-swan events like the current pandemic (Exhibit 5).

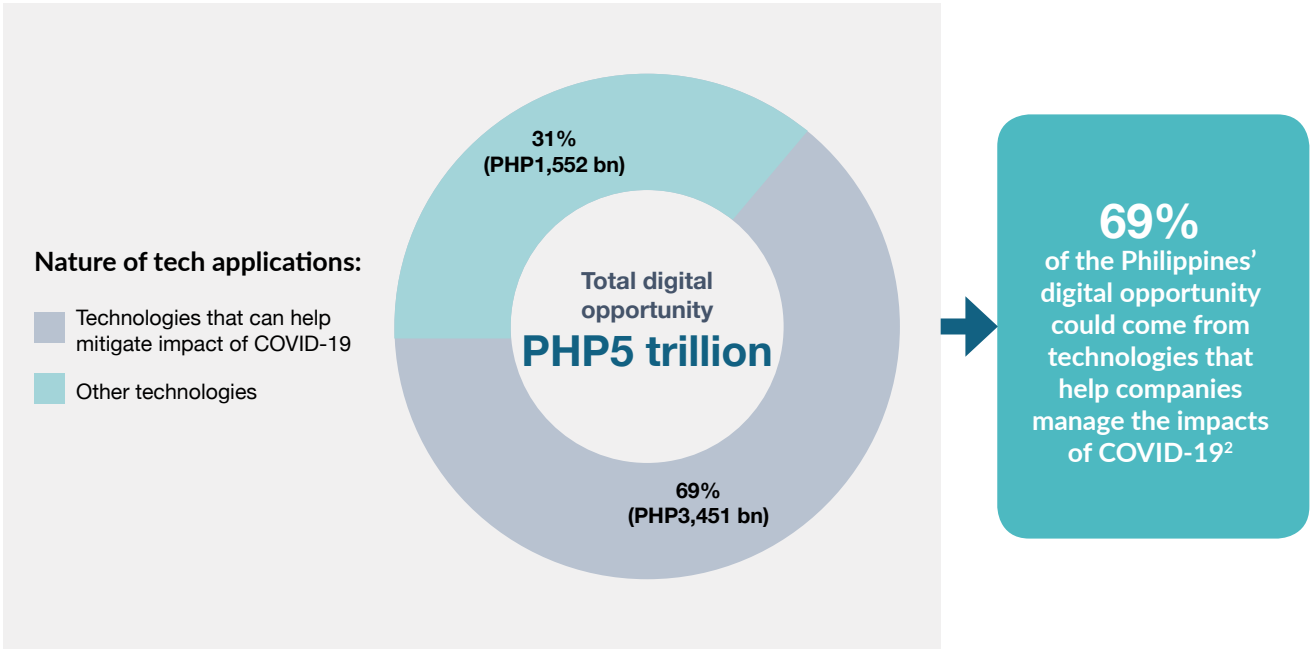
- **Embracing hybrid work arrangements to enable business continuity.** COVID-19 has brought about lasting shifts to business practices. One key shift is necessitating the use of digital collaborative tools, as workers are increasingly required to work from home. These digital technologies allow for workers to conduct operations remotely by facilitating virtual collaboration, automating production processes and controlling physical operations remotely from off-site locations. Examples of relevant technology applications include automation and AI customer service in hotels, remote patient monitoring and robotics in hospitals, and automation in manufacturing. For instance, Metro Pacific Hospital Holdings Inc. (MPHHI) is utilizing technology to introduce a range of virtual

57. Congressional Policy and Budget Research Department (2020), Facts in Figures.
Available at: https://cpbrd.congress.gov.ph/images/PDF%20Attachments/Facts%20in%20Figures/FF2020-19_MSMEs.pdf
58. Asian Development Bank Institute (2021), COVID-19 impact on micro, small, and medium-sized enterprises under the lockdown: evidence from a rapid survey in the Philippines. Available at: https://www.adb.org/sites/default/files/publication/677321/adbi-wp1216.pdf
59. UNDP (2020), "MSME Sector is key to COVID-19 Inclusive Recovery for PH".
Available at: https://www.ph.undp.org/content/philippines/en/home/presscenter/pressreleases/2020-/msme-sector-is-key-to-covid-19-inclusive-recovery-for-ph.html
60. A black swan is an unpredictable event that is beyond what is normally expected of a situation and has potentially severe consequences. Examples include the current COVID-19 pandemic.

EXHIBIT 4:

OF THE TOTAL DIGITAL OPPORTUNITY OF PHP5 TRILLION (USD101.3 BILLION), 69% IS DRIVEN BY TECHNOLOGIES THAT CAN HELP MITIGATE THE IMPACTS OF COVID-19

% OF ECONOMIC VALUE DERIVED FROM DIGITAL TECHNOLOGIES,[1] BY NATURE OF TECHNOLOGY, 2030



1. These estimates do not represent GDP or market size (revenue), but rather economic impact, including GDP increments, productivity gains, cost savings, time savings, increased revenues, increased wages and increased tax collection. In this analysis, 43 technology applications were considered, and the economic value that each provides was estimated under the full adoption scenario, i.e., the scenario that 100% of businesses in the sector adopt the application.

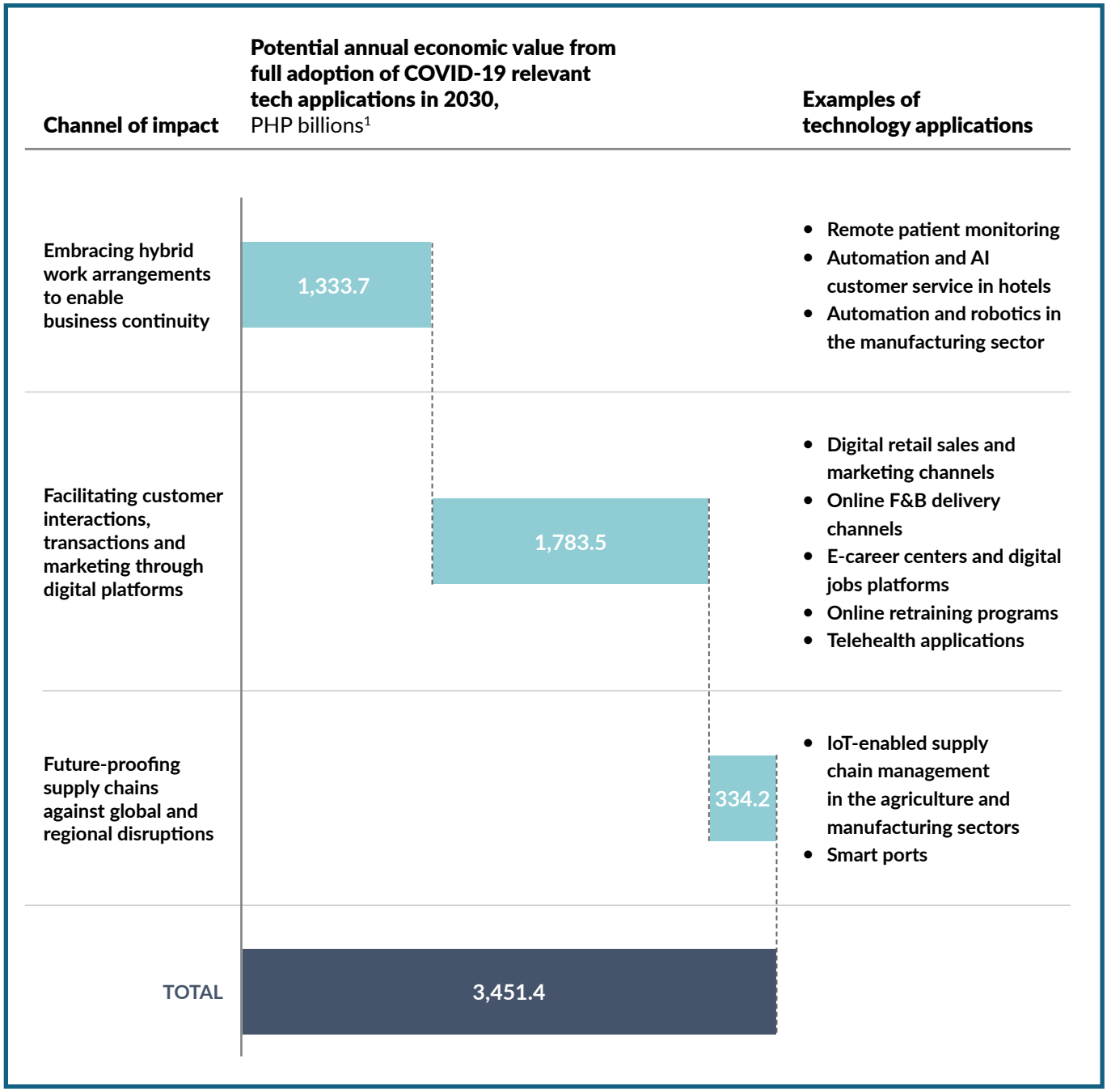
2. These refer to technology applications that enable companies to sustain business continuity and improve business performance despite implications of the COVID-19 pandemic. For example, in the retail sector, the digitization of retail platforms (e-commerce) enable companies to continue selling their products and services despite government-mandated social restrictions and reduced physical crowds as a result of the pandemic.

Note: Numbers may not sum due to rounding.

SOURCE: AlphaBeta analysis

EXHIBIT 5:

TECHNOLOGIES THAT MITIGATE THE LONG-TERM IMPACTS OF COVID-19 CAN GENERATE UP TO PHP3.5 TRILLION (USD69.9 BILLION) IN ANNUAL ECONOMIC VALUE BY 2030



1. These estimates do not represent GDP or market size (revenue), but rather economic impact, including GDP increments, productivity gains, cost savings, time savings, increased revenues, increased wages and increased tax collection. In this analysis, 43 technology applications were considered, and the economic value that each provides was estimated under the full adoption scenario, i.e., the scenario that 100% of businesses in the sector adopt the application.

Note: Numbers may not sum due to rounding.

SOURCE: AlphaBeta analysis

services such as virtual consultations, e-pharmacy and remote patient monitoring. These virtual services allow hospitals to resume full services to patients and keep foot traffic to a safe minimum.[61] Combined, such technology applications are projected to deliver a total annual economic value of PHP1.3 trillion (USD27 billion) if fully adopted by 2030 (Exhibit 5).

- **Facilitating customer interactions, transactions and marketing through digital platforms.** Emerging technologies, such as blockchain technology and big data, have enabled businesses to gain valuable insights into the customer journey and create a seamless and improved customer experience. As customers gravitate towards online marketplaces and services, technologies also enable businesses to continue customer interactions and marketing activities online. Examples of relevant technology applications include digital e-commerce platforms in the retail industry, online food and beverage (F&B) delivery services in the hospitality industry, e-career centers and digital jobs platforms for the recruitment industry, and telehealth apps in the health sector. Some of these applications were already deployed to great effect in the Philippines' health sector during the pandemic. For example, the Department of Health launched hotlines to facilitate telemedicine in the National Capital Region of the country during the pandemic-induced lockdown.[62] Combined, such technology applications are projected to deliver a total annual economic value of PHP1.8 trillion (USD36.1 billion) if fully adopted by 2030 (Exhibit 5). Box 2 highlights an example of how a Filipino organization successfully leveraged digital technologies to boost sales during the COVID-19 crisis, while Box 3 showcases how the government made use of digital tools to enable local businesses to sell goods and services in overseas markets during the pandemic.

- **Future-proofing supply chains against global and regional supply chain disruptions.** The pandemic has highlighted the need for businesses to incorporate resilience in their supply chains to weather disruptions such as the restrictions of imports and exports as countries implement lockdowns. These disruptions can be managed by technologies that allow for the remote tracking of goods that cross borders, and enhance the capabilities of businesses to search and switch to alternative channels or sources. For instance, sensor data-driven operations analytics from IoT devices (e.g., wireless sensors in trucks and warehouses) provide remote reporting of locations of goods, allowing businesses to optimize transportation and improve their distribution management. Beyond tracking the physical movement of goods in real-time from the point-of-origin to the final point-of-sale, IoT devices can also help supply chain managers identify when goods are delayed in transit, allowing for contingency planning of alternative routes to prevent bottlenecks in the supply chain. Another example is predictive analytics which utilizes data analytics, machine learning and other technologies to analyze past events and identify future threats, such as pandemics, financial turmoil, geopolitical uncertainty, and natural disasters. Through scenario planning, organizations can make effective trade-off decisions on the optimal stock to hold and balancing the cost of inventory versus the cost of failing to satisfy customers. Model simulations can be conducted swiftly based on real-time inventory data, customer demand and supplier capabilities.[63] Combined, such technology applications are projected to deliver a total annual economic value of PHP334.2 billion (USD6.8 billion) if fully adopted by 2030 (Exhibit 5).

61. Philstar (2020), "Metro Pacific hospitals explore telemedicine, remote patient care".
Available at: https://www.philstar.com/business/2020/07/12/2027281/metro-pacific-hospitals-explore-telemedicine-remote-patient-care
62. Department of Health (2020), "DOH BOOSTS TELEMEDICINE SERVICES FOR NCR; SERVICE TO EXPAND TO OTHER REGIONS SOON."
Available at: https://doh.gov.ph/doh-press-release/DOH-BOOST-TELEMEDICINE-SERVICES-FOR-NCR-SERVICE-TO-EXPAND-TO-OTHER-REGIONS-SOON
63. KPMG (2020), Building supply chain resilience through digital transformation.
Available at: https://assets.kpmg/content/dam/kpmg/xx/pdf/2020/06/building-supply-chain-resilience-through-digital-transformation.pdf

BOX 2.
LAGUNA WATER HYACINTH HANDICRAFT PRODUCERS ASSOCIATION (LWHHPA): LEVERAGING E-COMMERCE TO BOOST SALES DURING COVID-19

LWHHPA is an association for MSMEs in the Philippines' Laguna province. The members of the association produce handicrafts and other fashion accessories, such as bags, shoes, baskets, and trays using water hyacinth or water lilies in Laguna. When many non-food businesses were struggling during the pandemic, the association took advantage of e-commerce platforms to increase sales and boost employment in the region.[64] During the pandemic, LWHHPA sold its members' products on e-commerce marketplaces to access clients from the National Capital Region, Davao, Cagayan De Oro, and Cebu. This helped the members increase their gross sales from PHP600,000 (USD12,400) in 2019 to PHP1 million (USD20,667) in 2020, or a 70 percent increase year-on-year, with their water hyacinth-based products like placemats and coasters eventually being sold out. Due to the high demand for the products, the MSMEs within LWHHPA were able to employ 11 women in Los Baños, Laguna.

Photo Source: https://www.dti.gov.ph/regions/region-4a/region-4a-success-stories/lwhhpa-survives-pandemic/

64. Department of Trade and Industry (2021) "LWHHPA survives pandemic through export."
Available at: https://www.dti.gov.ph/regions/region-4a/region-4a-success-stories/lwhhpa-survives-pandemic/

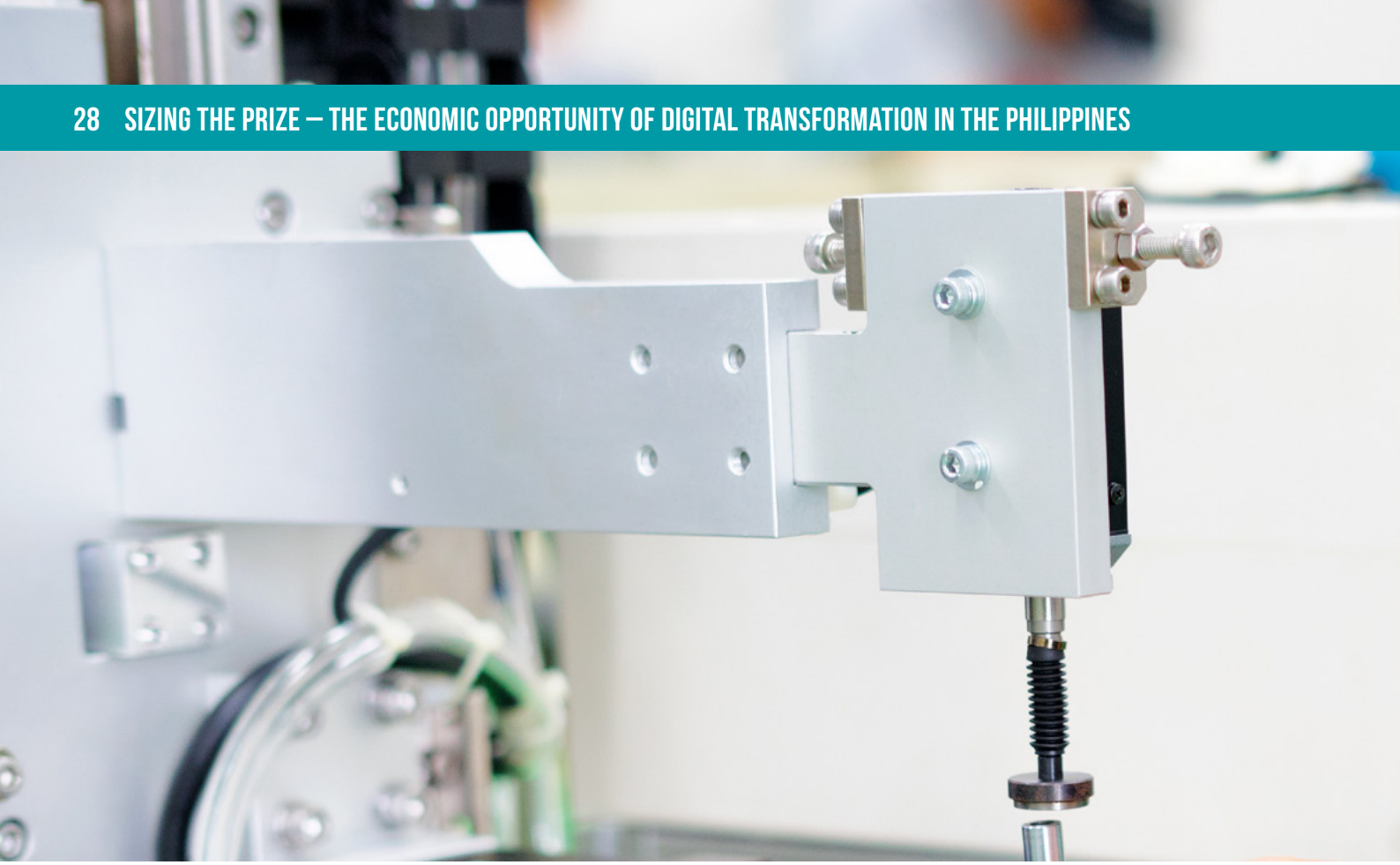
BOX 3.
DIGITAL TECHNOLOGIES CREATE EXPORT OPPORTUNITIES FOR BUSINESSES IN THE PHILIPPINES

Though trade has traditionally been dominated by physical goods, growth in global goods trade has flattened while global data flows have surged, with the amount of cross-border bandwidth having grown 45 times since 2005.[65] This is projected to increase by an additional nine times over the next five years as flows of information, searches, communication, video, transactions, and intra-company traffic continue to rise. Digital trade is, therefore, crucial as a way to increase and diversify sales channels used by businesses in the Philippines.

Past research by AlphaBeta and the Hinrich Foundation found that digital technologies were already being leveraged to some extent to boost Philippine exports.[66] It estimated that the Philippines' digital exports accounted for about 5.4 percent of the country's total export value at PHP187 billion (USD3.7 billion) in 2017. This meant that if "digital" were a sector, it would rank as the country's sixth largest export sector. This value encompasses the export value of **digitally-enabled products** which includes goods exported via e-commerce platforms and revenues earned from overseas downloads of domestically developed smartphone apps, as well as the export value of **digitally-enabled services** which includes telecommunication services (e.g., export of video conferencing, digital file sharing and Voice Over Internet Protocol or VOIP services) and online video advertising revenues gained from abroad. The research also found that a significantly larger digital export opportunity in 2030 was at stake. It estimated that in the absence of digital trade barriers such as policies that restrict cross-border data flows or the international exchange of digital services, the country's digital export value could grow by a massive 218 percent to reach PHP594 billion (USD11.8 billion) by 2030.

The Department of Trade and Industry (DTI) realized the importance of using digital tools to boost exports, especially during the pandemic. During the pandemic, DTI strengthened "Tradeline Philippines," its business intelligence platform that comprises a real-time business-matching system where foreign buyers' requirements are matched with Philippine suppliers.[67] In the first half of 2020, DTI facilitated 256 Trade Opportunity Reports (TORs) through matching business requests from foreign buyers, a 19.6 percent increase compared to the same period in 2019. DTI also made use of video conferencing software to organize a B2B matching event that helped 18 local exporters match with Japanese businesses.[68] Such events helped the Philippines export locally manufactured products, including medical supplies such as face masks, personal protective equipment (PPE), and medical apparel.

65. McKinsey Global Institute (2016), Digital globalization: The new era of global flows.
Available at: https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/digital-globalization-the-new-era-of-global-flows
66. Hinrich Foundation and AlphaBeta (2019), The Data Revolution: How the Philippines can capture the digital trade opportunity at home and abroad.
Available at: https://alphabeta.com/wp-content/uploads/2019/06/digitrade_philippines_1-pg-view.pdf
67. Department of Trade and Industry (2020), "Export Matching in the Time of Coronavirus."
Available at: https://www.dti.gov.ph/negosyo/exports/emb-news/export-matching-in-the-time-of-coronavirus/
68. Department of Trade and Industry (2020), "DTI organizes online Business to Business (B2B) matching with Japanese buyers."
Available at: https://www.dti.gov.ph/negosyo/exports/emb-news/dti-organizes-online-business-to-business-b2b-matching-with-japanese-buyers/



1.3 DIGITAL ADOPTION COULD ALSO SUPPORT HIGHER-QUALITY JOBS FOR FILIPINOS AND IMPROVE THE COUNTRY'S PRODUCTIVITY

While digital technologies can support businesses and workers in adapting to adverse events, there have been intensifying worries of job losses as technologies displace workers.[69] However, this is not always the case. A study commissioned by the Asian Development Bank (ADB) estimated that technologies associated with the Fourth Industrial Revolution (4IR) will bring both job displacement and job gains in two focus industries: the IT-BPO and electronics manufacturing industries.[70] Such technologies are projected to generate a positive net employment effect of 11 percent in the IT-BPO industry, and ten percent in the electronics industry.[71] While jobs could indeed be lost as a result of automation, new jobs will emerge through the "productivity effect": as technologies bring about improved productivity in the production of goods, the prices of such goods decrease. Consequently, demand for these goods increases, which in turn

69. AlphaBeta (2020), "Skills Development Vital to Enabling Transition to 4IR in Southeast Asia".
Available at: https://alphabeta.com/our-research/skills-vital-to-enabling-transition-to-industry-4-0-in-southeast-asia/
70. Fourth Industrial Revolution (4IR) refers to a range of new technologies that have profound effects on the workplace. The term was first applied to data exchange technologies used in manufacturing. However, it has now acquired a broader meaning in reference to technologies applied across all sectors that combine the physical, digital, and biological worlds. These technologies notably include cyberphysical systems, the Internet of Things, Artificial Intelligence (AI), cloud computing, and cognitive computing. Definition taken from ADB (2021), Reaping the Benefits of Industry 4.0 through Skills Development in High-Growth Industries in Southeast Asia: Insights from Cambodia, Indonesia, the Philippines, and Viet Nam. Available at: https://www.adb.org/publications/benefits-industry-skills-development-southeast-asia 4IR is similar to the digital transformation discussed in this report.
71. AlphaBeta (2020), "Skills Development Vital to Enabling Transition to 4IR in Southeast Asia".
Available at: https://alphabeta.com/our-research/skills-vital-to-enabling-transition-to-industry-4-0-in-southeast-asia/

spearheads the creation of more jobs as more labor is hired to meet the increased demand for goods. With 4IR technologies estimated to lead to significant productivity improvements of 63 and 55 percent respectively in the IT-BPO and electronics industries, the job creation impacts are projected to be large enough to outweigh any job losses due to technology-related worker displacements. This is also dependent on appropriate reskilling programs to ensure that workers who do get displaced are transitioned into the new jobs in the sector or other sectors in the economy.

In addition, digital adoption has the potential to create higher-quality work opportunities for Filipinos. Technology will be able to automate routine physical and interpersonal tasks, leaving humans to focus on more complex and novel tasks that require problem-solving abilities. In the agriculture and food sector, for instance, this can involve using machines to replace manual tasks such as seeding and weeding, freeing farmers to handle sales enquiries and train others. In the Philippines, employers believe that 4IR will be able to reduce time spent on routine physical and interpersonal tasks, such as assembling electronics boards, by over 20 percent in the electronics industry from 2018 to 2025.[72] Employers also expect a 49 percent increase in time spent on analytical tasks, such as working on a computer or other high-tech device, during the same period. By freeing up more time for workers to perform higher value-add tasks, technologies allow workers to switch their attention to more interesting and value-adding work. Additional research by AlphaBeta has also shown that automation has the potential to free up one hour per week for managers (who are able to spend less time collecting data and more time on strategic planning) to eight hours per week for teachers (who spend less time on administrative tasks such as recording test scores and more time on one-to-one student engagements).[73]

72. AlphaBeta (2020), "Skills Development Vital to Enabling Transition to 4IR in Southeast Asia". Available at: https://alphabeta.com/our-research/skills-vital-to-enabling-transition-to-industry-4-0-in-southeast-asia/
73. AlphaBeta and Google (2016), The Automation Advantage. Available at: https://alphabeta.com/wp-content/uploads/2017/08/The-Automation-Advantage.pdf

UNLOCKING THE PRIZE — THREE PILLARS OF ACTION

To fully unlock the digital opportunity, there are three pillars of action that the Philippine Government will have to take action on: 1) Enhance digital skills training and education; 2) Accelerate digital adoption and innovation; and 3) Promote digital trade opportunities.

Presently, the Philippine Government has made significant strides across all three pillars. To enhance digital skills training and education, the Commission on Higher Education (CHED) is collaborating with industry associations and higher education institutions to ensure the responsiveness of tertiary curriculums to equip the future workforce with emerging skills needs. By implementing favorable policies such as the "Innovative Startup Act" and launching national roadmaps to accelerate the adoption of emerging technologies (e.g., "National AI Roadmap") the Philippine government seeks to create a conducive environment that accelerates digital adoption and innovation. The country has also provided capacity-building support to businesses to promote digital trade through the "Philippine Export Competitiveness Program" (PECP), which featured enabling technologies to support cross-border transactions.

For the Philippines to fully adopt digital technologies and expedite the digital-led recovery from the impacts of the pandemic, industry transformation maps could be developed to provide information on technology impacts, career pathways, the skills required and reskilling options for different industries. Despite a comprehensive range of policies to promote digital adoption and innovation, the country faces several roadblocks including the

"UNLOCKING THE PRIZE"
THREE PILLARS OF ACTION

Three pillars of action are required to fully unlock the digital opportunity

1. Enhance digital skills training and education
2. Accelerate digital adoption and innovation
3. Promote digital trade opportunities

Significant effort has already been made in the following areas

- Ensuring the responsiveness of tertiary curriculums
- Inculcating a strong focus on ICT
- Extending digital skilling opportunities to underserved communities
- Collaborating with industry partners to develop training programs
- Implementing favorable policies to support the development of the local startup ecosystem
- Lowering the barriers to digital adoption for MSMEs
- Leveraging cutting-edge technologies, such as AI and cloud computing
- Aligning trade-related practices with the international community
- Providing capacity-building support for businesses to capture digital trade opportunities

However there are areas in which the Philippines can further strengthen its approach on

- Boost awareness on reskilling opportunities
- Incentivize training centers to provide high-quality, industry-relevant courses
- Create flexible qualification pathways to promote skill-based accreditation
- Foster partnerships between global and local technology companies
- Enhance digital infrastructure to support deployment of technology applications
- Build up digital capabilities for enterprises of all sizes
- Streamline and harmonize administrative procedures involved in cross-border transactions
- Participate in multilateral agreements to promote digital trade in the region

lack of access to capital, and a generally limited understanding of the benefits of digital transformation. To tackle these barriers, the government can consider funding the cost of acquiring digital talent and technologies, and providing businesses with access to digitalization resources. There is also strong potential for the Philippines to enhance its existing digital infrastructure to ensure affordable and reliable access to the Internet nationwide. For the country to be well-positioned to capture the growth of cross-border transactions in the region, it is important that administrative procedures are streamlined to reduce the cost of compliance associated with non-tariff measures, and that customs procedures (e.g., the Philippines' "Customs Modernization and Tariff Act") are harmonized with globally recognized frameworks. The country could also take a more proactive approach to initiate negotiations on international agreements with a strong focus on growing the digital economy such as the "Digital Economy Partnership Agreement" (DEPA).

2.1 PILLAR 1: ENHANCE DIGITAL SKILLS TRAINING AND EDUCATION

For the Philippines to seize the benefits offered by the digital economy, it is critical to ensure that workers are well-equipped with the right skills for the future workplace. At the same time, students today will need to be equipped with job-ready digital skills that are required across sectors and job roles to prepare for their future entry into the workforce.

The country is already making significant efforts in building digital talent through the following areas:

- **Ensuring the responsiveness of tertiary curriculums to equip the future workforce with emerging skills needs.** The Philippines has pursued a range of policies to encourage curriculum responsiveness to industry needs. Mechanisms allowing curriculum changes in response to industry needs are at both the national and institutional levels. The industry association for the IT-BPO industry, the IT and Business Process Association of the Philippines (IBPAP), for example, partnered with the Commission on Higher Education (CHED) to develop a systems thinking course as part of tertiary curriculums.[74] The systems thinking course aims to hone analytical skills by teaching learners how to examine business systems through the identification of interdependencies and make recommendations to improve systems performance within organizations.[75] The CHED has also established a set of procedures through which higher education institutions may adjust their programs in response to industry needs.[76] At the institution level, De La Salle University partnered with a local electronics manufacturing services company, EMS Components Assembly, to shape the curriculum for its electronics engineering courses.[77]

- **Inculcating a strong focus on ICT in educational curriculums.** In 2019, the Department of Education

74. Asian Development Bank and AlphaBeta (2021), Reaping the benefits of Industry 4.0 through skills development in the Philippines. Available at: https://www.adb.org/sites/default/files/publication/671881/benefits-industry-skills-development-philippines.pdf
75. Asian Development Bank (2016), Republic of the Philippines: Strengthening Knowledge-Based Economic and Social Development. Available at: https://www.adb.org/sites/default/files/project-documents/46234/46234-001-tacr.pdf
76. These can take place through three channels: introducing new programs reflecting emerging industries and skills, terminating programs that have lost relevance, and updating the curriculums of existing programs to cater to new skill needs. Source: CHED (2015), Manual of Procedures 2015. Available at: https://ched.gov.ph/wp-content/uploads/2017/10/CHED_MOP.pdf
77. Asian Development Bank and AlphaBeta (2021), Reaping the benefits of Industry 4.0 through skills development in the Philippines. Available at: https://www.adb.org/sites/default/files/publication/671881/benefits-industry-skills-development-philippines.pdf

(DepEd) launched the "Digital Rise Program" which aims to equip K-12 students, especially those residing in geographically isolated areas, with digital literacy skills.[78] Through the program, students will take ICT subjects that cover productivity tools, basic programming, multimedia skills and vocational skills. Digital boards and televisions were installed in over 707,600 classrooms and teachers were provided with laptops containing e-learning and multimedia packages to deliver computer classes. Each student also received a tablet or laptop to access online learning resources. By the end of 2020, about 94 percent of public school students in the country had received either tablet PCs or desktops, while 22 percent of teachers received laptops.[79] As part of the country's "Learning Continuity Plan" during the COVID-19 pandemic, the DepEd launched "DepEd Commons", an open educational resources platform to support distance learning, and made the platform freely accessible to both teachers and learners nationwide. Within the first year of going live, over 9.6 million users have registered on the platform.[80]

- **Extending digital skilling opportunities to underserved communities.** Strengthening the inclusion of skills and education programs is one of the priorities highlighted in the "Philippine Development Plan 2017-2022".[81] Within this is a strong focus on improving the mechanisms for ensuring that students with special needs, from indigenous communities, and who are out-of-school are provided with the appropriate support to ensure their completion of basic education. One of the key modes of training in the country is community-based training primarily targeted at low-income and other marginalized individuals who are unable to access formal training provisions.[82] For example, the Department of Science and Technology's (DOST) "e-Filipino" program develops "Community eCentres" (CeCs) where IT and entrepreneurial skills are taught to specific communities.[83] Aimed at providing skill upgrading opportunities for individuals who are willing but unable to pursue training due to financial or geographical challenges, the "TESDA (Technical Education and Skills Development Authority) Online Program" was launched in 2012 to provide free online Technical and Vocational Education and Training (TVET) courses. Within four years of its launch, the number of registered users of the program reached over 1.1 million, with females comprising 60 percent of all enrollees.[84]

78. *TeacherPH (2020), "Accelerating the DepEd Computerization Program in the light of COVID-19 pandemic". Available at: https://www.teacherph.com/deped-computerization-program-covid-19-pandemic/*
79. *Office of the Undersecretary for Administration (2020), Towards a working DepEd Commons. Available at: https://commons.deped.gov.ph/deped-commons-roadmap.pdf*
80. *PTVNews (2021), "DepEd Commons has served more than 9M users in its 1st year". Available at: https://ptvnews.ph/deped-commons-has-served-more-than-9m-users-in-its-1st-year/*
81. *National Economic and Development Authority (2017), Philippine Development Plan 2017-2022. Available at: https://pdp.neda.gov.ph/#:~:text=The%20PDP%202017%2D2022%20is,NA%20BUHAY%20PARA%20SA%20LAHAT.*
82. *Technical Education and Skills Development Authority (2019), "Community Based Programs". Available at: http://www.tesda.gov.ph/about/tesda/37*
83. *Department of Information and Communications Technology (2019), "Programs and Projects". Available at: https://dict.gov.ph/major-programs-and-projects/*
84. *Technical Education and Skills Development Authority (2019), National Technical Skills Development Plan. Available at: https://www.tesda.gov.ph/About/TESDA/47*

- **Collaborating with industry partners to develop training programs for current workers.** There has been a strong focus by the government to actively involve the industry in shaping the curriculums of training institutes. One of the country's largest TVET institutes for electronics and mechanics courses, DualTech Training Institute, closely coordinates with employers to ensure that its course offerings and content reflect the latest industry requirements.[85] In addition, the "National Technical Skills Development Plan (NTESDP) 2018-2022" by TESDA highlighted enterprise-based training programs that would be crucial in ensuring the coverage of Fourth Industrial Revolution (4IR) skills that had were not yet addressed by other modes of training.[86] One of the four modes of training in the Philippines, enterprise-based programs (the others being school-based, center-based and community-based), are implemented within companies and can be in the form of dedicated apprenticeships of four to six months or dual training programs where such apprenticeships run concurrently with school or training curriculums.[87] To ensure the quality of enterprise-based training, TESDA launched the "System for TVET Accreditation and Recognition (STAR) Program" that recognizes programs registered by technical vocational institutions which have surpassed the minimum requirements of TESDA's Unified TVET Program Registration and Accreditation System.[88]

Despite significant government efforts to improve the availability and accessibility of digital skills courses, participation rates in these courses remain low and a strong emphasis is still being placed on traditional qualifications attained through the education system – as opposed to past work experiences. In a recent survey to understand the attitudes of Filipino employers and their workers towards reskilling for AI, 45 percent of employers felt that there were no suitable training programs for their workers to take, while 48 percent of workers stated that they did not know what courses to take.[89] Another employer survey for the electronics manufacturing industry reflected that only seven percent of respondents indicated that they were able to find the right training providers for their workers' needs.[90] The findings point towards a limited awareness by the Philippine workforce of the "in-demand" skills that are required at the workplace, as well as the reskilling opportunities available, despite efforts by the government to catalyze these. The Philippines could consider the following best practices to improve the relevance and accessibility of training programs:

- **Boost awareness on emerging skills needs and reskilling opportunities.** To increase awareness of training opportunities, a starting point could be the development of industry transformation maps, which provide information on technology impacts, career pathways, the skills required for different occupations and reskilling options for different industries.[91] Singapore's Industry Transformation Maps (ITMs) provide an international best practice in this regard. Each ITM is championed by a different government agency, whose area of responsibility is most relevant to the industry.[92] For example, the ITM for the manufacturing sector is led by the Economic Development Board (EDB), while that for the built environment sector is led by the Building and Construction Authority (BCA).[93] A key component of the ITM is the "Skills Framework".[94] Co-created by industry, government and civil society, the framework

85. *Asian Development Bank and AlphaBeta (2021), Reaping the benefits of Industry 4.0 through skills development in the Philippines. Available at: https://www.adb.org/sites/default/files/publication/671881/benefits-industry-skills-development-philippines.pdf*
86. *Technical Education and Skills Development Authority (2019), National Technical Skills Development Plan. Available at: https://www.tesda.gov.ph/About/TESDA/47*
87. *Technical Education and Skills Development Authority (2019). "Enterprise Based Programs". Available at: http://www.tesda.gov.ph/About/TESDA/38*
88. *Philippine News Agency (2017), "TESDA holds first Star Awards to recognize TVIs". Available at: https://www.pna.gov.ph/articles/1014876*
89. *Microsoft and IDC (2018), "Digital transformation to contribute US$8 billion to the Philippines GDP by 2021". Available at: https://news.microsoft.com/en-ph/2018/02/14/digital-transformation-contribute-us8-billion-philippines-gdp-2021/*
90. *Asian Development Bank and AlphaBeta (2021), Reaping the benefits of Industry 4.0 through skills development in the Philippines. Available at: https://www.adb.org/sites/default/files/publication/671881/benefits-industry-skills-development-philippines.pdf*
91. *Skills Future SG (2021), "Skills Framework". Available at: https://www.ssg.gov.sg/wsq/skills-framework.html*
92. *Asian Development Bank and AlphaBeta (2021), Reaping the benefits of Industry 4.0 through skills development in the Philippines. Available at: https://www.adb.org/sites/default/files/publication/671881/benefits-industry-skills-development-philippines.pdf*
93. *Ministry of Trade and Industry (2017), "Media Factsheet – Industry Transformation Maps". Available at: https://www.mti.gov.sg/-/media/MTI/ITM/General/Fact-sheet-on-Industry-Transformation-Maps---revised-as-of-31-Mar-17.pdf*
94. *Asian Development Bank and AlphaBeta (2021), Reaping the benefits of Industry 4.0 through skills development in the Philippines. Available at: https://www.adb.org/sites/default/files/publication/671881/benefits-industry-skills-development-philippines.pdf*

provides key information on career pathways, the existing and emerging skills required for different occupations, and reskilling options for different sectors. It also provides a list of training programs for skills upgrading. This allows both workers and employers to identify emerging skills needs for their workers and enhance talent attraction and retention efforts. In Australia, the National Careers Institute and National Skills Commission were established to strengthen and streamline the delivery of and access to career information for workers.[95] Leveraging comprehensive and regularly updated analysis of current and emerging skill needs in the labor market performed by the National Skills Commission, the newly established National Careers Institute provides up-to-date career information and support to Australians.

- **Incentivize training centers to provide high-quality, industry-relevant courses.** While there has been a strong focus by the government to foster close collaboration with the industry and civil society to create relevant and effective nationwide training frameworks, more could be done to incentivize training centers to provide relevant courses. These courses should be recognized by the industry for in-demand digital skills such as data analytics and software development skills – the digital skills projected to be in the highest demand in the Philippines.[96] The government could steer the industry relevance of education and training through conditional grants or higher accreditation awarded to new training programs which meet certain industry relevance criteria.[97] Grants allowing training programs to be scaled up to serve as a strong incentive for training providers to improve their relevance and quality, while higher accreditation could also be attractive to employers and workers. For example, in Japan, the Ministry of Economy, Trade and Industry (METI) has certified more than 100 practical training courses in the fields of IT and data, some of which are eligible for a subsidy provided by the government.[98] Beyond the basic accreditation, TESDA could establish tiered accreditation levels to set apart higher-quality TVET institutions, which empowers trainees with the information to better differentiate programs.

- **Create flexible qualification pathways to promote skill-based accreditation.** Even though there is a comprehensive range of training courses available for current workers in the Philippines, certification programs require the applicant to have at least graduated from high school. To broaden the accessibility to skilling opportunities, the Philippines can explore the development of flexible skill certification programs that recognize skills attainment outside traditional education channels. A positive example of a skill-based accreditation system is the Malaysian Skills Certification Program, under which skill certificates are granted to workers who do not have any formal educational qualifications but who have obtained relevant knowledge, experience and skills in the workplace to enhance their career prospects (see Box 4).

95. Australian Government (2020), "National Careers Institute". Available at: https://nci.dese.gov.au/about
96. Future Learn (2021), "The top skills in the Philippines for employability". Available at: https://www.futurelearn.com/info/futurelearn-international/top-skills-in-the-philippines
97. OECD (2017), Financial incentives for steering education and training, getting skills right. Available at: https://www.oecd.org/publications/financial-incentives-for-steering-education-and-training-acquisition-9789264272415-en.htm
98. AlphaBeta, commissioned by Amazon Web Services (2021), Unlocking APAC's Digital Potential: Changing Digital Skill Needs and Policy Approaches. Available at: https://pages.awscloud.com/APAC-public-DL-APAC-Digital-Skills-Research-2021-learn.html

BOX 4.
THE MALAYSIAN SKILLS CERTIFICATION PROGRAM

In Malaysia, individuals who do not possess formal educational qualifications have the opportunity to enter into their desired careers through the "Malaysian Skills Certification Program".

Recognized by industry, this program awards skills certificates at five different levels:[99]

- Malaysian Skills Certificate (SKM) Level 1
- Malaysian Skills Certificate (SKM) Level 2
- Malaysian Skills Certificate (SKM) Level 3
- Diploma in Skills Malaysia (DKM) Level 4
- Malaysian Skills Advanced Diploma (DLKM) Level 5

These certificates are awarded across all sectors of the economy – classified into 22 sectors – according to the country's "National Occupational Skills Standard".[100] Importantly, no formal educational qualifications are required – the only requirements for candidates are the ability to speak and write in both Bahasa Melayu and English, and the need to have passed a lower Skills Certificate level before being able to qualify for a higher level in the same field.[101]

Candidates may obtain these certificates through three channels: training in institutions accredited by the Jabatan Pembangunan Kemahiran (Department of Skills Development); industry apprenticeships under the "National Dual Training System"; and through sufficient "Accreditation of Prior Achievement". The third channel refers to accreditation gained through evidence of past work and/or training experience.

With these certificates being accredited as officially recognized qualifications and mapped to equivalent academic qualifications under the "Malaysian Qualifications Framework",[102] Malaysian companies are able to take guidance from this framework when assessing the suitability of job candidates without formal education but who possess the relevant skills to excel at the job.

99. The Official Portal of Department of Skills Department. Malaysian Skill Certificate (SKM).
Available at: https://www.dsd.gov.my/index.php/en/service/malaysian-skills-certificate
100. OECD (2012), Skills development pathways in Asia.
Available at: https://www.oecd.org/cfe/leed/Skills%20Development%20Pathways%20in%20Asia_FINAL%20VERSION.pdf
101. The Official Portal of Department of Skills Department. Malaysian Skill Certificate (SKM).
Available at: https://www.dsd.gov.my/index.php/en/service/malaysian-skills-certificate
102. The Malaysian Qualifications Framework consists of quality assurance standards that cover program design, objectives and learning outcomes, teaching, learning and assessment methodologies, support resources and systems for delivery and improvement. Learning outcomes from programs submitted by higher education providers are verified and evaluated during periodic audit cycles. Source: Malaysian Qualifications Agency (2019), Malaysian Qualifications Framework (MQF) 2nd Edition. Available at: https://www.mqa.gov.my/pv4/document/mqf/2019/Oct/updated%20MQF%20Ed%202%2024102019.pdf

2.2 PILLAR 2: ACCELERATE DIGITAL ADOPTION AND INNOVATION

To achieve the full benefits of digital transformation, an environment that is conducive for innovation and pursue policies that support entrepreneurial activities and the deployment of emerging technologies such as AI and cloud computing is essential.

The country is already making significant efforts in the following areas:

- **Implementing favorable policies to support the development of the local start-up ecosystem.** The Department of Science and Technology (DOST) and the Philippine Council for Industry, Energy and Emerging Technology Research and Development (PCIEERD) have jointly developed the "Startup Research Grant Program" to fund research and development (R&D) activities and accelerate the commercialization of innovative products across sectors, including medical technology (MedTech) and education technology (EdTech).[103] One of the start-ups in the program, Edusuite, is an AI-driven school management system that received PHP12 million (USD235,000) funding and provides its tech solutions to more than 20,000 students, educators and administrators across ten learning institutions nationwide.[104] Besides providing funding, the Philippines has created a favorable regulatory environment to nurture start-ups. In 2019, the Department of Trade and Industry (DTI) signed the "Innovative Startup Act" that aims to strengthen, promote, and develop an innovative and entrepreneurial ecosystem and culture in the Philippines.[105] Key features of the "Innovative Startup Act" include streamlining business registration, providing opportunities to participate in local and international competitions as well as granting tax breaks to start-ups in the Philippine Startup Ecozones and Special Economic Zones.[106]

- **Lowering the barriers to digital adoption for MSMEs.** Despite the high Internet usage among Filipinos, digital adoption across businesses in the country is relatively low. In the retail industry, while retail trade contributes to around 20 percent of GDP, e-commerce facilitates only 0.5 percent of sales.[107] In a survey commissioned by Epson, a Japanese electronics company, respondents across sectors cited the high upfront cost of new technology and the perception that replacing legacy systems would be too difficult, as key barriers to adopting digital tools.[108] To address these challenges, the Department of Science and Technology (DOST) launched the "Small Enterprise Technology and Upgrading Program" (SETUP) – a national strategy developed to encourage MSMEs to adopt technological innovations through the provision of seed funding, technical training for their workforce and technical consultancy services.[109]

- **Leveraging cutting-edge technologies, such as AI and cloud computing.** In the public sector, the Philippine Government has a "Cloud First Policy" that promotes cloud computing as

103. News Bytes (2019), "DOST bares 15 pioneer grantees of startup research grant program".
Available at: https://newsbytes.ph/2019/11/20/dost-bares-15-pioneer-grantees-of-startup-research-grant-program/
104. Deal Street Asia (2020), "Philippines edtech startup EdSuite raises $235k in seed funding".
Available at: https://www.dealstreetasia.com/stories/philippines-edtech-edusuite-funding-147051/
105. HRM Asia (2021), "Innovative Startup Act helps new entrepreneurs in the Philippines".
Available at: https://hrmasia.com/innovative-startup-act-helps-new-entrepreneurs-in-the-philippines/
106. My Business Academy (2019), "Got a startup? Find out how the Innovative Startup Act of the Philippines can help!".
Available at: https://mybusinessacademy.ph/resources/innovative-startup-act/#gref
107. World Bank (2020), A better normal under COVID-19: Digitalizing the Philippine economy now. Available at: http://documents1.worldbank.org/curated/en/796871601650398190/pdf/Philippines-Digital-Economy-Report-2020-A-Better-Normal-Under-COVID-19-Digitalizing-the-Philippine-Economy-Now.pdf
108. The Recycler (2020), "Philippines embraces digital transformation". Available at: https://www.therecycler.com/posts/philippines-embraces-digital-transformation/
109. DOST (2019), "SETUP (Small Enterprise Technology Upgrading Program)."
Available at: https://region9.dost.gov.ph/products-and-services/technology-transfer-and-commercialization/small-enterprise-technology-upgrading-program#:~:text=SETUP%20stands%20for%20Small%20Enterprise,boost%20their%20productivity%20and%20competitiveness.

the preferred technology for government administration and the delivery of government services.[110] In 2017, the Department of Information and Communications Technology (DICT) announced that government agencies at the federal and local levels will need to "adopt cloud computing as the preferred ICT deployment strategy" for its infrastructure planning and procurement. In tandem with the shift to cloud computing, the "Cloud First Policy" explicitly addresses the free flow of data by distinguishing between classified data for which residency or other controls may be required, and all other data exempt from such requirements. At a nationwide level, the Department of Trade and Industry (DTI) launched a "National AI Roadmap" in May 2021 to accelerate the adoption and utilization of AI in the industry.[111] DTI projected that AI adoption can contribute an additional 12 percent to the country's GDP by 2030, or PHP4.4 trillion (USD92 billion). To realize this economic potential, one of the key initiatives highlighted in the roadmap includes the establishment of a private sector-led National Center for AI Research (N-CAIR) which provides capacity-building support for companies to produce new products, processes, and services using AI and boost their competitiveness. In the first three to five years, the center will prioritize the usage of AI applications in the agricultural, mobility, manufacturing, and health sectors.[112]

However, there remain several challenges to increasing digital adoption and promoting innovation in the Philippines. Firstly, although the Philippines is home to the second-largest population in Southeast Asia and boasts a young and tech-savvy population, its start-up ecosystem is relatively underdeveloped compared to its neighbors. For instance, Vietnamese start-ups have secured USD889 million in investments in 2018 as compared to only USD304 million in the Philippines.[113] It was identified that one of the key issues holding the country back is the acute lack of access to capital that prevents the growth of local start-ups. The disparity of early-stage funding per start-up is stark at USD68,000 in the Philippines compared to a global average of USD252,000.[114] Secondly, besides financial barriers to digital adoption, large corporations have a limited understanding of the benefits of digital transformation. Despite having more resources at their disposal, large corporations were not exactly at the forefront of digital transformation, where 77 percent of large organizations found the topic hard to understand.[115]

The country can therefore go further to address the obstacles hindering the growth of the digital economy:

- **Foster partnerships between global and local technology companies.** To attract venture capital firms to reside and invest in local technology companies, it is important that the country

110. *Department of Trade and Industry (2020), "DICT Releases Amended Cloud First Policy for Gov't Transition to "New Normal"." Available at: https://dict.gov.ph/dict-releases-amended-cloud-first-policy-for-govt-transition-to-new-normal/*
111. *Open Gov Asia (2021), "The Philippines launches National AI Roadmap". Available at: https://opengovasia.com/the-philippines-launches-national-ai-roadmap/*
112. *Business World (2021), "Philippines plans to establish artificial intelligence research center". Available at: https://www.bworldonline.com/philippines-plans-to-establish-artificial-intelligence-research-center/*
113. *KrASIA (2019), "What's holding back the Philippines' startup ecosystem?". Available at: https://kr-asia.com/whats-holding-back-the-philippines-startup-ecosystem; Vietnam Briefing (2019), "Investments in Vietnamese Startups Tripled in 2018". Available at: https://www.vietnam-briefing.com/news/investments-vietnamese-startups-tripled-2018.html/#:~:text=In%202018%2C%20investments%20in%20Vietnamese,same%20as%202017%2C%20at%2092.*
114. *World Bank (2020), A better normal under COVID-19: Digitalizing the Philippine economy now. Available at: http://documents1.worldbank.org/curated/en/796871601650398190/pdf/Philippines-Digital-Economy-Report-2020-A-Better-Normal-Under-COVID-19-Digitalizing-the-Philippine-Economy-Now.pdf*
115. *Business Inquirer.net (2019), "PH firms embark on digital transformation". Available at: https://business.inquirer.net/285944/ph-firms-embark-on-digital-transformation*

pursues policies that help firms better connect to global innovation networks, and in particular, catalyze partnerships between global and local technology firms. For example, the Asia Silicon Valley Development Agency (ASVDA) in Taiwan has been coordinating with various strategic partners in Silicon Valley and other technology clusters around the world to facilitate collaborations between Taiwanese start-ups and international corporations.[116] The Philippines can take a leaf from Taiwan's Small and Medium Enterprise Administration's initiative to launch an international start-up hub named "Shalun Startup Terrace", which connects domestic start-ups involved in innovating clean energy technologies (e.g., renewable energy sources) with international accelerators and draw foreign venture capital to Taiwan. Similarly, Singapore has drawn many global tech multinationals to locate in the island city-state through four key drivers.[117] First, the country's innovation-centered business culture provides incentives for global enterprises and start-ups to collaborate on projects. Second, the modern IT infrastructure has rendered a "plug-and-play" business environment in which tech companies can hit the ground running almost immediately. Third, the government's strong commitment to a strong Intellectual Property (IP) regulatory framework gives companies confidence that their R&D investments will stay protected. Finally, the country boasts a highly skilled talent pool for global tech companies to tap on and grow.

- **Enhance digital infrastructure to support the deployment of technology applications.** Low digital adoption in the country can also be traced to the high cost and uneven quality of the Internet. At 16.76 Megabits per second (Mbps), the country's mobile broadband speed is much lower than the global average of 32.01 Mbps.[118] However, the cost of a fixed broadband plan in the Philippines is close to the cost of similar plans in Singapore and Thailand, which have the fastest speeds in the region.[119] Moreover, a 2019 government survey revealed that while 32 percent of households in the National Capital Region had access to the Internet, only five percent in predominantly rural areas such as the Bangsamoro Autonomous Region in Muslim Mindanao (BARMM) and Bicol provinces had access.[120] Affordable and reliable access to the Internet is crucial to ensuring that everyone in the Philippines can take advantage of the opportunities arising from the digital economy. Box 5 shows how South Korea can provide a positive example in this regard.

- **Build up digital capabilities for enterprises of all sizes.** For firms to fully realize the benefits of leveraging digital technologies, the government can consider extending its current "Small Enterprise Technology and Upgrading Program" to provide resources and talent to build up the digital capabilities of both large and small firms. Businesses could bridge the digital skills gap by investing in digital talent and seeking the appropriate partnerships, technologies, and expertise that can help digitally transform their business. Box 6 illustrates how the Singapore Government is co-funding initiatives that allow businesses to deepen their digital capabilities and provide a repository of potential technology solution partners to accelerate digital transformation. Similarly, in Thailand, the government provided various tax incentives to promote the adoption of emerging technologies, such as biotechnology, nanotechnology, and advanced material technology. Eligible companies are entitled to 13 years of tax breaks and a 50 percent reduction in corporate income tax for ten years.[121]

116. National Development Council (2020), "Strategies to Upgrade Taiwan's Startup Ecosystem under Asia-Silicon Valley Development Plan 2.0 ".
Available at: https://ws.ndc.gov.tw/Download.ashx?u=LzAwMS9hZG1pbmlzdHJhdG9yLzExL3JlbGZpbGUvMC8xMzcyNC84MzIyNTVmMC0xNjNlLTQ1YTgtOWNiYi1iZmIzZmY2NDVhMjlucGRm&n=U3RyYXRlZ2llcyB0byBVcGdyYWRlIFRhaXdhbuKAmXMgU3RhcnR1cCBFY29zeXN0ZW0oU2VwLiwgMjAyMCkucGRm&icon=..pdf
117. Economic Development Board, Singapore (2018), "Singapore flexes it standing as Asia's technology capital".
Available at: https://www.edb.gov.sg/en/news-and-events/insights/innovation/singapore-flexes-its-standing-as-asias-technology-capital.html
118. Ookla (Aug 2019), "Speedtest Global Index – Monthly comparisons of internet speeds from around the world". Available at: https://www.speedtest.net/global-index
119. ITU (2017), "World Telecommunication/ICT Indicators Database 2017". Available at: https://www.itu.int/en/ITU-D/Statistics/Pages/publications/wtid.aspx
120. Department of Information and Communications Technology (2020), "National Information and Communications Technology Household Survey (NICTHS)".
Available at: https://dict.gov.ph/ictstatistics/wp-content/uploads/2020/06/NICTHS-FINAL-REPORT-PRESENTATION_26-JUNE-2020.pdf
121. Thailand Board of Investment (2015), Thailand 4.0 – a new value-based economy.
Available at: https://www.boi.go.th/upload/content/Thailand,%20Taking%20off%20to%20new%20heights%20@%20belgium_5ab4f8113a385.pdf

BOX 5.
SOUTH KOREA'S DIGITAL INFRASTRUCTURE ENABLES RELIABLE AND RAPID INTERNET CONNECTIVITY

With one of the fastest Internet speeds in the world, about three times faster than the global average, South Korea is seen as one of the most digitally connected populations in the world.[122] This section identifies three key measures which enabled the country to develop its extensive network of fixed and mobile broadband connectivity.

Implementing infrastructure sharing policies

First, the government implemented infrastructure sharing policies that allowed mobile operators to share the cost of building the country's 5G infrastructure network, effectively reducing deployment costs by USD1 billion.[123] Unlike the requirement for a Congressional franchise in the Philippines,[124] the policies in South Korea ensured fair competition by reducing barriers to entry for new Internet service providers. For instance, each Internet service provider was granted guaranteed fiber capacity to connect their 5G towers to anywhere in the country.[125]

Cultivating a symbiotic relationship between businesses and the government

Second, the country boasts a strong culture of cooperation between the public and private sectors. According to the Korea Economic Institute, the symbiotic relationship between businesses and the government enabled private companies to undertake the structural work of building the infrastructure, while the government encouraged the adoption of the Internet.[126]

Leveraging country's culture to drive adoption of digital tools

Finally, the South Korean Government leveraged the country's culture, which emphasizes achievement and education, by promoting the Internet as a tool for education and advancement which captured the Korean imagination and drove widespread adoption.[127]

122. Pulse (2020), "S. Korea boasts fastest internet connection, triples the global average". Available at: https://pulsenews.co.kr/view.php?year=2020&no=1106605#:~:text=Korea%20boasts%20fastest%20internet%20connection%2C%20triples%20the%20global%20average,-2020.10.28%2014&text=South%20Korea%20reigns%20in%20internet,by%20global%20internet%20analyst%20Ookla.
123. Electronic Frontier Foundation (2020), "Why Is South Korea a Global Broadband Leader?". Available at: https://www.eff.org/deeplinks/2020/02/why-south-korea-global-broadband-leader
124. A congressional franchise refers to a franchise granted by the Philippine Congress and has the authority to construct, establish, operate and maintain communications systems and networks. The grantee cannot lease, transfer, or otherwise dispose of the franchise or related rights without Congress' approval. Global Legal Group (2015), Telecoms, Media & Internet Laws & Regulations. Available at: https://www.sycip law.com/Documents/LegalResources/TEL15_Chapter%2024_Philippines.pdf
125. Electronic Frontier Foundation (2020), "Why Is South Korea a Global Broadband Leader?". Available at: https://www.eff.org/deeplinks/2020/02/why-south-korea-global-broadband-leader
126. Telecom Review (2016), "South Korea tops ICT development, Internet speed & LTE coverage". Available at: https://www.telecomreviewasia.com/index.php/news/featured-articles/52-south-korea-tops-ict-development-internet-speed-lte-coverage
127. IDG Connect (2017), "Five reasons South Korea has the fastest internet". Available at: https://www.idgconnect.com/article/3580022/five-reasons-south-korea-has-the-fastest-internet.html

BOX 6.
SINGAPORE GOVERNMENT LOWERS BARRIERS TO DIGITAL ADOPTION FOR ENTERPRISES UNDERGOING DIGITAL TRANSFORMATION

To support businesses in pivoting towards online business models and deepening their digital capabilities, the Singapore Government has set aside SGD1 billion (USD745 million) to fund a series of digital transformation schemes.

Funding the cost of acquiring digital talent

Jointly developed by the Infocomm Media Development Authority (IMDA) and Enterprise Singapore (ESG), the "Digital Leaders Programme" supports firms in hiring a core digital team and developing digital capabilities to capture new growth opportunities.[128] Through the program, companies receive funding support to hire a Chief Technology Officer who will oversee a team of up to five digital talents who will execute digital initiatives for the organization. Companies will also be linked up with ecosystem partners, such as system integrators, technology companies, strategy consultants and talent search firms to facilitate the recruitment of the digital team, development of digital roadmaps, as well as to support the company's innovation plans.

Providing access to digitalization resources and advisory

One of the largest hurdles SMEs face in their digital transformation journey is access to talent and skills.[129] To overcome this hurdle, the "Chief Technology Officer-as-a-Service" (CTOaaS) scheme aims to provide SMEs access to relevant digitalization resources and advisory for free, or at an affordable cost.[130] Through the scheme, existing digitalization advisory services are consolidated onto a web application that provides a single touchpoint for both digital consultancy and project management services.[131] This enables SMEs, including home-based sole proprietorships, to tap on professional information technology consultancies and receive end-to-end digital advice to transform their business operations.

Funding the cost of adoption of digital technologies by businesses

The "Emerging Technology Programme" incentivizes both SMEs and larger local companies in commercializing their innovations and diffusing technologies.[132] Through this program, the government will co-fund the costs of trials and adoption of frontier technologies like 5G, AI, and blockchain technologies.

128. Infocomm Media Development Authority (2021), "Digital Leaders Programme". Available at: https://www.imda.gov.sg/programme-listing/Digital-Leaders-Programme?utm_medium=gr&utm_source=infographic&utm_campaign=cos-2021&utm_content=dlp
129. Deloitte (2020), The Thailand Digital Transformation Survey Report 2020.
Available at: https://www2.deloitte.com/content/dam/Deloitte/th/Documents/technology/th-tech-the-thailand-digital-transformation-report.pdf
130. The New Paper (2021), "New CTO-as-a-Service scheme to help SMEs tap tech expertise".
Available at: https://www.tnp.sg/news/singapore/new-cto-service-scheme-help-smes-tap-tech-expertise
131. The Straits Times (2021), "Budget debate: Chief technology officers for hire among Govt's plans to help businesses digitalise".
Available at: https://www.straitstimes.com/singapore/politics/chief-technology-officers-for-hire-among-govts-plans-to-help-businesses
132. Ministry of Finance (2021), ANNEX C-1: Accelerating digital transformation to emerge stronger.
Available at: https://www.mof.gov.sg/docs/librariesprovider3/budget2021/download/pdf/annexc1.pdf

2.3 PROMOTE DIGITAL TRADE OPPORTUNITIES

Finally, supporting trade through digital platforms can generate a significant positive impact on the economy. For example, e-commerce platforms can be crucial gateways to connect local merchants to overseas markets and provide a new source of future growth for traditional sectors, such as manufacturing. For the Philippines to be well-positioned to capture the growth of cross-border transactions in the region, it is important that businesses and organizations are able to maximize digital platforms to export their products and services globally. Past research by AlphaBeta and Hinrich Foundation reflected that digital exports (comprising the export of digitally-enabled goods and services) accounted for about 5.4 percent of the Philippines' total export value in 2017, and could potentially grow further by 218 percent by 2030.[133] To promote digital trade opportunities, the Philippines has placed a strong focus on the following actions:

- **Aligning trade-related practices with the international community through agreements.** The Philippine Government is currently engaged in several multilateral trade agreements. For example, the Philippines signed the "Regional Comprehensive Economic Partnership" (RCEP) in November 2020 and is targeting to ratify the trade deal by 2021.[134] The deal does not only include provisions that facilitate trade in goods and services, investment, and economic cooperation, but also emerging trade areas, such as intellectual property (IP), e-commerce, government procurement, and competition.[135] The country has also acceded to the United Nations Economic and Social Commission for Asia and the Pacific's (UNESCAP) "Framework Agreement on Facilitation of Cross-border Paperless Trade in Asia and the Pacific" in December 2019, making it the first Association of Southeast Asian Nations (ASEAN) member-country to do so.[136] Complementing the World Trade Organization's (WTO) "Trade Facilitation Agreement" (TFA), the framework agreement is expected to cut trade costs by at least ten percent for the Philippines by enabling the exchange and mutual recognition of trade-related data and documents in electronic form.[137] This framework also provides the Philippines ready access to potential counterparts for negotiation on cross-border data exchange, setting the foundation to deepen future digital collaborations.[138] Finally, the Philippines is also engaged in the "Joint Statement Initiative" negotiations on e-commerce among WTO members, which will seek to set the baseline for global digital trade.[139] The outcome of these negotiations can have important implications for the future development of e-commerce, including addressing sensitive regulatory issues, ranging from privacy and personal data protection to cybersecurity, as well as industrialization objectives for the digital economy.[140]

- **Providing capacity-building support for businesses to capture digital trade opportunities.** Besides minimizing border frictions with trade partners, the Philippines is supporting businesses in

133. Digitally-enabled goods and services refer to goods exported via e-commerce platforms and overseas downloads of domestically developed smartphone apps, as well as telecommunication services and online video advertising from abroad. Hinrich Foundation and AlphaBeta (2018), The data revolution: How the Philippines can capture the digital trade opportunity at home and abroad. Available at: https://www.hinrichfoundation.com/research/wp/digital/philippines/
134. Business Inquirer.net (2021), "PH to ratify global trade deal this year". Available at: https://business.inquirer.net/315068/ph-to-ratify-global-trade-deal-this-year
135. Inquirer.net (2021), "PH to ratify global trade deal this year". Available at: https://business.inquirer.net/315068/ph-to-ratify-global-trade-deal-this-year
136. Business Mirror (2020), "Philippines is 1st among Asean peers to accede to UN treaty on digital trade."
Available at: https://businessmirror.com.ph/2020/01/18/philippines-is-1st-among-asean-peers-to-accede-to-un-treaty-on-digital-trade/
137. UNESCAP (2020), "Framework Agreement on Facilitation of Cross-border Paperless Trade in Asia and the Pacific".
Available at: https://www.unescap.org/resources/framework-agreement-facilitation-cross-border-paperless-trade-asia-and-pacific
138. Business Mirror (2020), "Philippines Is 1st Among Asean Peers To Accede To UN Treaty On Digital Trade".
Available at: https://businessmirror.com.ph/2020/01/18/philippines-is-1st-among-asean-peers-to-accede-to-un-treaty-on-digital-trade/
139. United Nations Conference on Trade and Development (2020), What is at stake for developing countries in trade negotiations on e-commerce? The case of the Joint Statement Initiative. Available at: https://unctad.org/system/files/official-document/ditctncd2020d5_en.pdf
140. United Nations Conference on Trade and Development (2021), What is at stake for developing countries in trade negotiations on e-commerce?
Available at: https://unctad.org/system/files/official-document/ditctncd2020d5_en.pdf

building up their digital capabilities to access digital trade opportunities. The Department of Trade and Industry-Export Marketing Bureau (DTI-EMB) organized a "Philippine Export Competitiveness Program" (PECP) information session in February 2020.[141] The session featured enabling technologies, such as Quick Response (QR) codes, that can support cross-border transactions and boost the competitiveness of Filipino exports. As part of the "Philippines Export Development Plan 2018-2022", the country aims to increase its export revenue from USD74 billion to USD122 billion by 2022 and has developed comprehensive support packages for four key sectors. Selected based on their comparative advantages, these sectors are electronics, Information Technology and Business Process Management (IT-BPM), processed food and beverages, and tourism and travel-related services.[142]

While the Philippines has made efforts to facilitate digital trade opportunities for the industry, the country could consider the following actions to encourage greater participation in digital trade in the region and advocate cross-border data flows:

- **Streamline and harmonize administrative procedures involved in cross-border transactions.** Trade costs in the Philippines are among the highest in ASEAN, according to the "2019 Doing Business" report.[143] Investors in the Philippines on average pay twice as much to export or import a shipping container as investors in Thailand.[144] This is attributed to the high cost of compliance with non-tariff measures, which encompass a wide range of requirements, including technical regulations, product standards, and customs procedures. Moreover, most of the processes within government agencies are not automated and require manual paperwork or personal visits to their respective offices for the completion and submission of documents. Internal estimates by DTI indicate that this raises compliance costs by an additional 25 percent and increases the processing time by a month, as documents travel back and forth via mail from the regions to the capital. While the government has passed the "Customs Modernization and Tariff Act" (CMTA) to modernize and improve the efficiency of customs procedures, the country has yet to complete the secondary regulations to fully implement the law. A useful first step would be

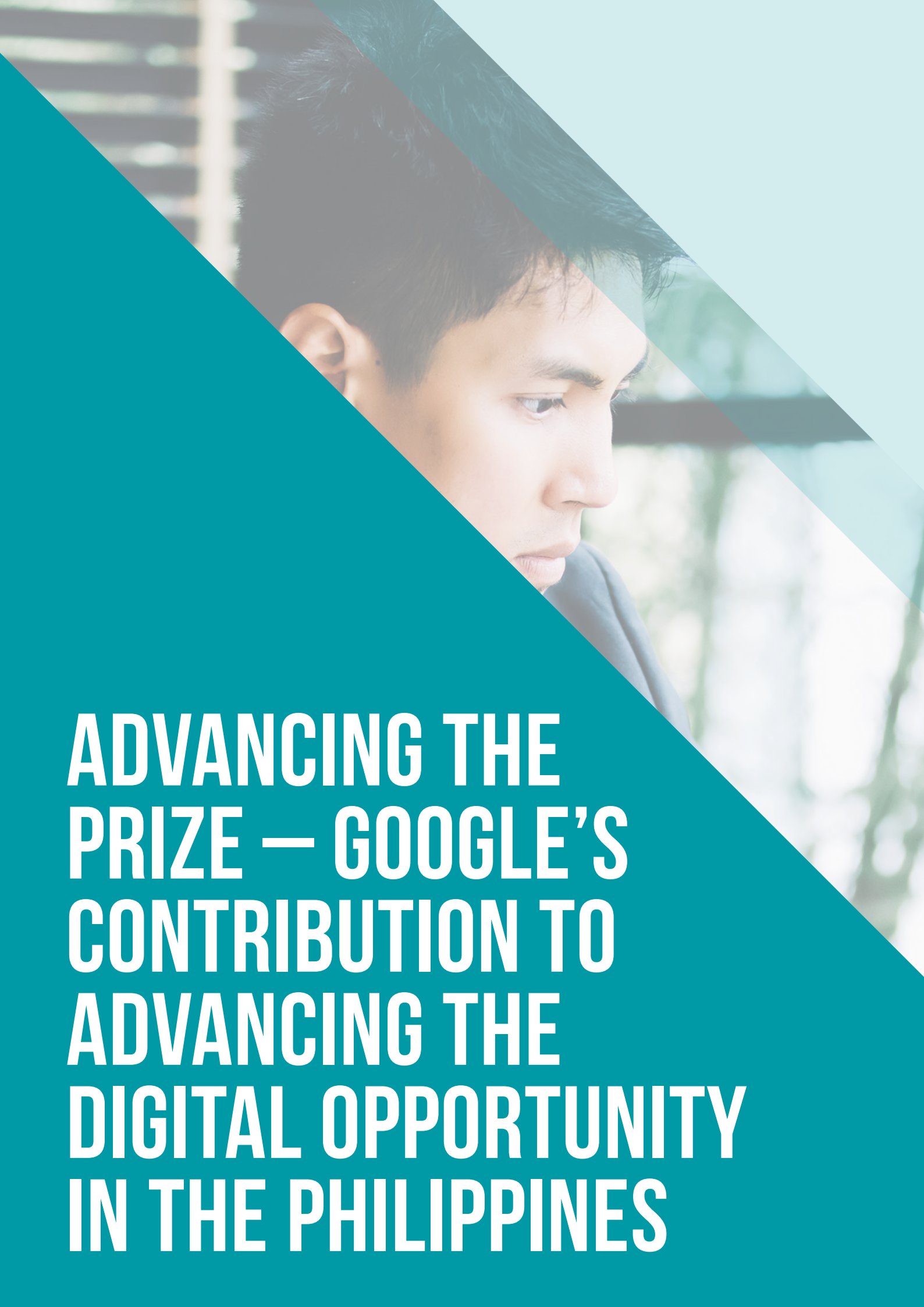
141. Department of Trade and Industry (2020), "DTI-EMB program seeks to upgrade exporters' proficiency in digital trade."
Available at: https://www.dti.gov.ph/negosyo/exports/emb-news/dti-emb-program-seeks-to-upgrade-exporters-proficiency-in-digital-trade/
142. Department of Trade and Industry (2020), "Exporters in the regions propose strategies to implement PEDP development plan amid COVID".
Available at: https://www.dti.gov.ph/negosyo/exports/emb-news/pedp-development-plan-strategies/
143. World Bank (2019), Doing Business 2019.
Available at: https://www.doingbusiness.org/content/dam/doingBusiness/media/Annual-Reports/English/DB2019-report_web-version.pdf
144. World Bank (2020), A better normal under COVID-19: Digitalizing the Philippine economy now. Available at: http://documents1.worldbank.org/curated/en/796871601650398190/pdf/Philippines-Digital-Economy-Report-2020-A-Better-Normal-Under-COVID-19-Digitalizing-the-Philippine-Economy-Now.pdf

to implement the provisions for e-commerce goods outlined in CMTA and align with global baseline standards, such as the "Cross-Border E-Commerce Framework of Standards" by the World Customs Organization (WCO).[145] Once fully implemented, the CMTA will provide the legal basis for the full automation of customs procedures and encourage the further simplification and harmonization of import and export procedures in line with international standards.[146]

- **Participate in multilateral agreements to promote digital trade in the region.** With an Organisation for Economic Co-operation and Development (OECD) report highlighting that a ten percent rise in "bilateral digital connectivity" could improve trade in goods and services by about two and three percent respectively, cross-border data flows are critical for enabling digital exports. While the Philippines is a signatory to multiple international trade agreements, it could take a more proactive approach in initiating negotiations on international agreements with a strong focus on growing the digital economy. Participating in multilateral digital trade agreements can create a conducive environment for businesses to better tap on the digital trade opportunities in the region. An example of such a recently signed agreement is the "Digital Economy Partnership Agreement" (DEPA) signed between Singapore, New Zealand and Chile, which seeks to promote digital trade and help businesses overcome the challenges of scale and distance. DEPA includes provisions that streamline trading procedures through digitizing trading documentation and promoting open cross-border data flows with the necessary data safeguards. Through the DEPA, businesses operating in the three signatory countries can transfer information seamlessly across borders, with the assurance that the data is protected by the relevant security mechanisms and requisite regulations. This provides a conducive environment for data-driven business models such as software-as-a-service and with businesses increasingly reliant on electronic transactions and digital solutions to serve customers regardless of where they are located. Also, businesses looking to better understand foreign markets can now access and use open government data to discover new business opportunities and innovate new products and services.

145. World Customs Organization (2018), Cross-Border E-Commerce Framework of Standards. Available at: http://www.wcoomd.org/-/media/wco/public/global/pdf/topics/facilitation/activities-and-programmes/ecommerce/wco-framework-of-standards-on-crossborder-ecommerce_en.pdf?la=en#:~:text=The%20Framework%20of%20Standards%20is,by%20action%20plans%20and%20timelines.

146. World Bank (2020), A better normal under COVID-19: Digitalizing the Philippine economy now. Available at: http://documents1.worldbank.org/curated/en/796871601650398190/pdf/Philippines-Digital-Economy-Report-2020-A-Better-Normal-Under-COVID-19-Digitalizing-the-Philippine-Economy-Now.pdf



ADVANCING THE PRIZE — GOOGLE'S CONTRIBUTION TO ADVANCING THE DIGITAL OPPORTUNITY IN THE PHILIPPINES

Google has made significant contributions in advancing digital transformation in the Philippines across the three pillars outlined in Chapter 2. By providing access to digital tools through Google Workspace for Education and supporting YouTube creators in creating educational content, Google is supporting distance learning for educators and learners. Through its tools and programs such as AppSheet and "MSME Caravan", Google is promoting innovation and building up the digital capabilities of all businesses, ranging from startups to large local enterprises. To support businesses in going global, tools such as Business Profile, previously known as Google My Business, have been instrumental in boosting the visibility of local businesses online and expanding customer outreach to overseas markets. Google's "Framework for Responsible Data Protection Regulation", which aims to provide clarity to supportive data governance laws, also advocates for interoperable and adaptable data protection regulations that facilitate digital trade.

In addition, Google's products create direct economic benefits for businesses, consumers and the broader society in the Philippines. Businesses and consumers in the country are estimated to derive total annual economic benefits from Google's products worth PHP363.4 billion (USD7.4 billion) and PHP214.5 billion (USD4.3 billion), respectively. These estimates pertain to the following Google products: Google Search, Google Ads, AdSense, YouTube, Google Play, Google Maps, Google Drive, and Google Docs, Sheets and Photos. For businesses, economic benefits come in the form of increased revenue

"ADVANCING THE PRIZE"
GOOGLE'S CONTRIBUTION TO THE PHILIPPINES' DIGITAL TRANSFORMATION JOURNEY

1 Enhance digital skills training and education

2 Accelerate digital adoption and innovation

3 Promote digital trade opportunities

EXAMPLES OF INITIATIVES BY GOOGLE

- Google partnered with the Department of Education to provide 22 million **GOOGLE WORKSPACE FOR EDUCATION ACCOUNTS** for learners across the country

- From 2020 to Sept 2021, **"MSME CARAVAN"** has trained more than 46,000 MSME owners and their employees. This is made possible through collaborative efforts with partners including the Department of Trade and Industry (DTI)

- **BUSINESS PROFILE**, previously known as Google My Business, has been instrumental to boosting the visibility of local businesses and helping them realize their global ambitions

GOOGLE ALSO DELIVERS WIDER BENEFITS TO BUSINESSES, CONSUMERS AND SOCIETY IN THE PHILIPPINES

BUSINESSES

Through significant boosts to productivity and customer outreach, Google is estimated to support **PHP363.4 billion (USD7.4 billion)** worth of annual benefits for businesses in the Philippines[1]

CONSUMERS

By helping consumers save time and generating value through their free products, Google is estimated to support **PHP214.5 billion (USD4.3 billion)** worth of annual benefits for consumers in the Philippines[2]

SOCIETY

By enabling businesses to unlock new revenue streams and expand their businesses, Google indirectly supports **over 110,000 jobs** in the Philippines. Its also delivers a set of programs to support communities such as female entrepreneurs

1. Business benefits refer to the estimated economic impact from the following products: Google Search; Google Ads; AdSense; YouTube; Google Play.
2. Consumer benefits refer to the estimated economic impact from the following products: Google Search; Google Maps; Google Drive; Docs, Sheets and Photos; Google Play.
Note: All data is based on AlphaBeta analysis using a range of original and third party sources. See Appendix in report for detailed methodology. Figures are estimated based on the latest available annual data as at time of research in 2020.

through increased customer outreach and access to new markets, as well as improved productivity through time savings. Consumers experience greater convenience, access to information, and more avenues for learning and skills development opportunities. Beyond its economic contributions to businesses and individuals, Google also supports benefits to the wider society in the Philippines. By enabling businesses to unlock new revenue streams and expand their businesses through the use of Google Ads, AdSense, and YouTube, Google indirectly supports over 110,000 jobs in the Philippines. Google also delivers intangible benefits through its programs, such as providing skilling and income opportunities for female entrepreneurs and promoting safe Internet usage in the Philippines.

3.1 GOOGLE CONTRIBUTES TO EACH OF THE THREE PILLARS OF DIGITAL TRANSFORMATION IN THE PHILIPPINES

Across the three pillars of action, Google has made significant contributions in the Philippines through its programs, products and services. To **enhance digital skills training and education (Pillar 1)**, Google has done the following:

- **Reskilling and upskilling current workers digitally.** As one of Google's flagship training programs, "Grow with Google" partnered with Lazada University to provide small business owners access to free short courses online and interactive bite-sized courses via the Google Primer app.[147] The training courses cover topics such as business strategy, digital marketing and address barriers to entry when starting an online store. Besides uplifting basic digital literacy for business owners, Google is supporting workers transitioning into jobs in the digital economy. Through Google Career Certificates, Google provides flexible, online training for Filipinos to equip them with job-ready skills and earn qualifications that can lead to jobs in high-growth fields.[148] These courses include IT support, data analytics, project management, user experience (UX) design, and Android development. For instance, to groom developers in the Philippines, Google provides free, self-paced online training for aspiring developers.[149] Upon completion of the online training, graduates who registered and completed the Associate Android Developer Certification exam will earn a digital badge that is recognized by employers.

- **Providing digital tools to support new models for the education system.** Beyond the initiatives to support the current workforce in leveraging technologies, Google is also supporting the upskilling of the next generation of the workforce through digital tools. By working closely with the Department of Education (DepEd), Google will be providing 22 million licenses to access Google Workspace for Education for learners across the country.[150] Tailored for learning and teaching, the Google Workspace for Education license includes access to collaboration tools, such as Classroom, and communication tools such as

147. News Bytes (2020), "Google ties up with Lazada for free digital skills training to online sellers". Available at: https://newsbytes.ph/2020/11/02/google-ties-up-with-lazada-for-free-digital-skills-training-to-online-sellers/
148. Grow with Google (2021), "Google Career Certificates". Available at: https://grow.google/certificates/#?modal_active=none
149. Grow with Google (2021), "Associate Android Developer Certification". Available at: https://grow.google/androiddev/#?modal_active=none
150. ABS CBN (2020), "Distance learning training for teachers gets $250,000 Google grant". Available at: https://news.abs-cbn.com/news/08/19/20/distance-learning-training-for-teachers-gets-250000-google-grant

Google Meet.[151] In addition, Google is also training teachers in utilizing the digital tools available on the platform. Together with the National Educators Academy of the Philippines, Google and DepEd will be training regional IT officers to become Google Certified Trainers and Admins to manage the distribution of Google Workspace for Education accounts to schools.[152]

- **Partnering with telecommunications service providers and content creators to support distance learning.** Recognizing the surge in demand for Internet access during distance learning, Google inked partnerships with local telecommunications service providers, Globe Telecom and Smart Communications Inc, to introduce prepaid mobile data packs.[153] Designed to support e-learning, these prepaid mobile data packs start at PHP10 (USD0.20) for 1.14 gigabytes per day, about 40 percent cheaper than other data packs, which make them the most affordable and comprehensive prepaid mobile data plan to date. Moreover, Globe Telecom will be providing a comprehensive onboarding process, tailor-made teacher training and strong after-sales support for partner schools and institutions nationwide.[154] To further develop the YouTube learning ecosystem in the Philippines, Google organized the "EduCreator Camp". The week-long virtual training camp was targeted at empowering YouTube content creators with resources, mentorship and network to make educational videos.[155] Content creators learned production techniques and best practices from leading creators, such as Team Lyqa and Numberbender, to develop high-quality educational content.[156]

- **Extending digital skilling opportunities to underserved communities.** To foster digital skills development in underserved communities in the Philippines, Google has undertaken several initiatives. For example, Google.org, Google's philanthropic arm, supported The Asia Foundation with grant funding to launch a USD3.3-million "Go Digital ASEAN" initiative. The initiative aims to close the digital gap in ASEAN countries, including the Philippines, and improve digital literacy among communities in rural regions and underserved areas — including entrepreneurs, underemployed youth, and women.[157] In the Philippines, the initiative is implemented by the Pailig Development Foundation and Clevergrit Web Services. Clevergrit Web Services provides trainers and expertise to refine the program's curriculum

151. Google for Education (2021), Available at: https://edu.google.com/products/workspace-for-education/editions/
152. Adobe Magazine (2020), "Digital: Google Philippines delivers four initiatives to support inclusive distance learning in the country". Available at: https://www.adobomagazine.com/philippine-news/digital-google-philippines-delivers-four-initiatives-to-support-inclusive-distance-learning-in-the-country/
153. Manila Bulletin (2020), "Google delivers four initiatives to support inclusive distance learning in the Philippines". Available at: https://mb.com.ph/2020/08/24/google-delivers-four-initiatives-to-support-inclusive-distance-learning-in-the-philippines/
154. Tech Beat (2020), "Globe and Google for Education transform digital learning in local schools". Available at: http://www.techbeat.ph/globe-and-google-for-education-transform-digital-learning-in-local-schools/
155. ABS CBN (2020), "Distance learning training for teachers gets $250,000 Google grant". Available at: https://news.abs-cbn.com/news/08/19/20/distance-learning-training-for-teachers-gets-250000-google-grant
156. Manila Bulletin (2020), "Google delivers four initiatives to support inclusive distance learning in the Philippines". Available at: https://mb.com.ph/2020/08/24/google-delivers-four-initiatives-to-support-inclusive-distance-learning-in-the-philippines/
157. Go Digital ASEAN (2020), 'Go Digital ASEAN: Digital skills to address the economic impact of COVID-19' Project. Available at: https://asiafoundation.org/publication/factsheet-go-digital-asean-digital-skills-to-address-the-economic-impact-of-covid-19/

in the Philippines, whereas Pailig Development Foundation helps bring the program to beneficiaries across Mindanao. "Go Digital ASEAN" aims to train 25,000 individuals in the country to maximize their employment and business growth opportunities.[158] The initiative offers three courses, namely "Digital Tools for Jobseekers", "Harnessing Social Media to Expand Your Business", and "Getting your Business Online".

To **accelerate digital adoption and innovation (Pillar 2)**, Google has launched the following efforts in the Philippines:

- **Providing capacity-building support for businesses transitioning online to expedite economic recovery.** As part of Google's ongoing commitment to support economic recovery in the Philippines, Google launched "MSME Caravan" in partnership with DTI in February 2020.[159] The program features a series of free digital upskilling workshops for MSMEs to learn how to adopt digital tools, grow their business, and navigate the challenging business environment during the pandemic.[160] From 2020 to September 2021, Google's digital skilling initiative MSME Caravan has trained more than 46,000 MSME business owners and their employees. Box 7 illustrates examples of MSMEs which have attended these free workshops and successfully adopted digital tools to grow their business. Another key initiative launched by Google and DTI is the "Ctrl + Biz: Reboot Now!" webinar series which invited experts from Google and other technology firms to share digital tools and strategies for MSMEs to learn and apply easily.[161] In the first section of the webinar series, the online event attracted 6,000 participants on Zoom and 73,000 views on Facebook.[162]

- **Boosting the visibility of businesses through Google's products and services.** In light of the challenges faced by the services-oriented sectors such as consumer, retail and hospitality during the pandemic, Google has included free listings in the search results on the Google Shopping tab.[163] This allows merchants to gain free exposure to consumers using Google's search engine to fulfill their shopping needs, regardless of whether they advertise with Google. In the tourism industry,

158. Go Digital ASEAN the Philippines (2021), Available at: https://godigitalasean.ph/about/
159. ABS CBN News (2020), "Google Philippines, DTI launch partnership to boost 'online presence' of MSMEs". Available at: https://news.abs-cbn.com/business/02/26/20/google-philippines-dti-launch-partnership-to-boost-online-presence-of-msmes
160. Google Philippines (2021), "MSME Caravan". Available at: https://adsonair.withgoogle.com/events/msme-caravan
161. E-commerce DTI (2021), "CTRL + BIZ: Reboot Now Webinar Series". Available at: https://ecommerce.dti.gov.ph/reboot-package/ctrl-biz-reboot-now/
162. Department of Trade and Industry (2020), "CTRL + BIZ: Reboot Now! webinars (series 2)". Available at: https://www.dti.gov.ph/archives/advisories-archives/ctrl-biz-reboot-now-2/
163. Google The Keyword (2020), "It's now free to sell on Google". Available at: https://blog.google/products/shopping/its-now-free-to-sell-on-google/

BOX 7.
"MSME CARAVAN" FEATURES BUSINESSES THAT HAVE SUCCESSFULLY CREATED AN ONLINE PRESENCE WITH GOOGLE'S DIGITAL TOOLS

QMANSI

Michelle Mariano is a former accountant turned businesswoman. Together with her husband, Roderick, she started a calamansi farm and owns a processing facility in Quirino province that produces 5,000 calamansi products daily.[165]4After their first product, QMansi Puree, reaped positive results, they went on to expand their product range by innovating two more drinks. As the business continued to grow, Mariano was searching for ways to expand her business beyond her province.

After attending a seminar jointly organized by Google and DTI in Quirino, Mariano was introduced to Business Profile, previously known as Google My Business. Almost immediately after getting on Business Profile, she acquired customers from cities across the Philippines including Manila, Pasig and Caloocan. Her Business Profile was also discovered by a businessman from South Korea who offered a business partnership and visited her farm in Quirino. Mariano hopes that the QMansi brand will gain recognition beyond the supermarkets in the Philippines and reach international audiences. "We are humbled that QMansi has gone places because of Business Profile. We are also proud at the same time that because of our products, more people now recognize the province of Quirino. We are grateful to DTI and Google for the training that they conducted which helped us reach where we are right now," said Mariano.

GERMANO'S CHILI

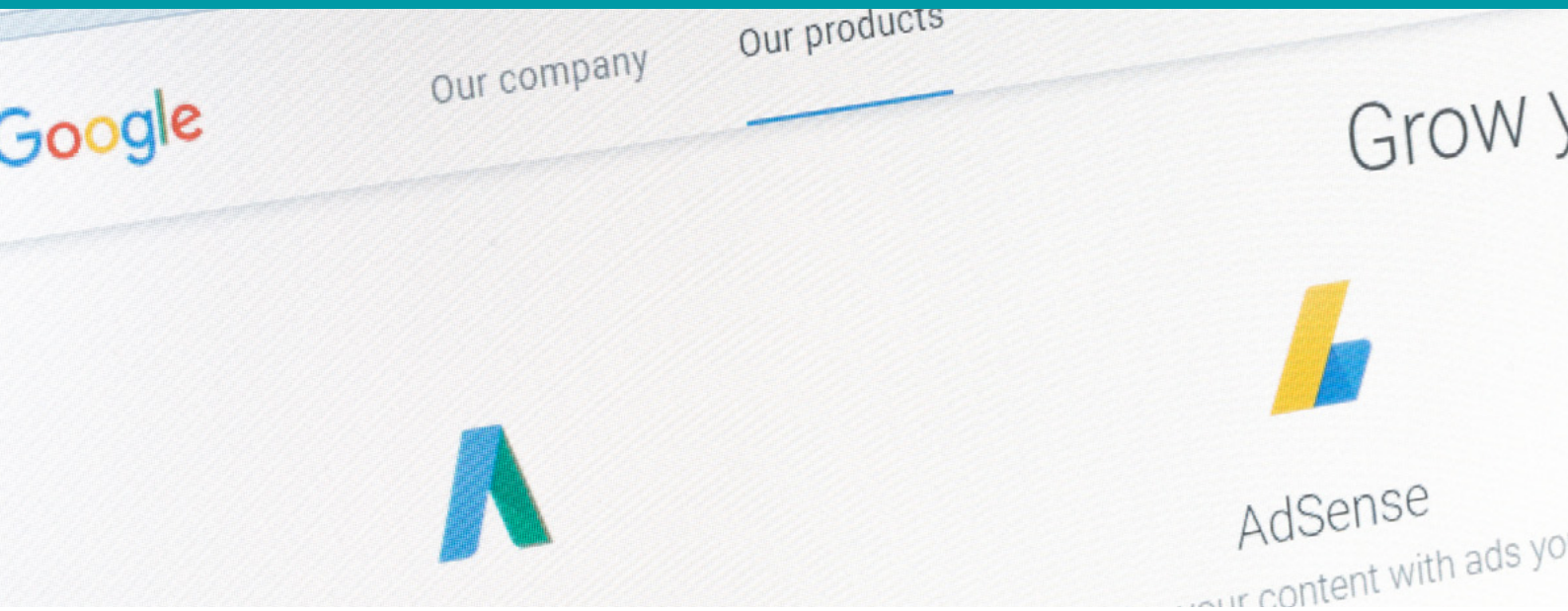
Gerome Panlilio is a former pharmacist who decided to continue his brother Germano's business of recreating the experience of eating chili garlic from restaurants in homes by selling bottled products.[165] Initially, it was an uphill challenge as his chili garlic bottles did not have a brand and stores were unwilling to distribute his products. Panlilio attended seminars on sales, accounting and marketing to learn how to promote his products. A seminar supported by Google and DIT in 2017 introduced Panlilio to Business Profile which helped his product branding. "I learned about Business Profile through a seminar… (that) taught Business Profile and (showed) how easy it was to set up and it was free, I was hooked. Business Profile helped me with the branding of my product. I was amazed at how many views and interest that came with it," said Panlilio. Despite the limited resources, the business was able to supply major supermarkets such as SM, Robinsons, Puregold, Rustans and Shopwise. The business now produces about 400 bottles of chili garlic daily and distributes products to Manila supermarkets. To accommodate the growing business, Panlilio expanded its production site which allowed him to create more items aside from chili garlic.

164. Manila Standard (2020), "Google launches MSME Caravan campaign to digitize small businesses worldwide". Available at: https://manilastandard.net/tech/business0/318943/google-launches-msme-caravan-campaign-to-digitize-small-businesses-nationwide.html
165. Manila Standard (2020), "Google spices up chili oil maker's business". Available at: https://manilastandard.net/mobile/article/319092

Google Maps collaborated with the Department of Tourism (DOT) to add local tourism spots in the Explore tab.[166] By following DOT's profile on Google Maps, users can receive recommendations ranging from restaurants and shopping malls to cultural attractions and other tourist activities. When the COVID-19 outbreak occurred, many businesses saw a fall in in-store revenues as most people stayed at home and refrained from venturing outdoors for fear of contracting the virus. Business Profile was instrumental in creating a digital storefront for businesses to sell online and expand their outreach to gain new customers. Google also added new features to facilitate businesses in capturing new sources of revenue that emerged during the COVID-19 pandemic. With increasing consumer demand for food delivery and takeout, businesses that created Business Profiles were given the option of adding dining attributes such as "takeout" and "no-contact delivery" on their profile. This greatly enhanced the ease with which customers could order food while minimizing physical contact. At the same time, businesses could continue operating while abiding by social distancing measures.

- **Reinventing processes in large enterprises and improving efficiency.** Besides supporting small enterprises in going digital, Google's products and services play a vital role in accelerating digital transformation in large enterprises. For example, Globe Telecom is a large telecommunications company in the Philippines which was hoping to transform the company's digital culture – including automating business processes, fostering digital collaboration, instilling an innovation mindset within the organization. Despite its huge size, Globe Telecom succeeded in implementing Google Workspace to its workforce of 17,000 people in only four months.[167] The company started adopting messaging and communication platforms, including Google Meet, and productivity and collaboration

166. News Bytes (2020), "Google PH offers free digital training as more local biz go online".
Available at: https://newsbytes.ph/2020/10/25/google-ph-offers-free-digital-training-as-more-local-biz-go-online/
167. Google Cloud (2021), "Globe Telecom: Automating business processes and enhancing collaboration with AppSheet + Google Workspace".
Available at: https://cloud.google.com/customers/globe-telecom

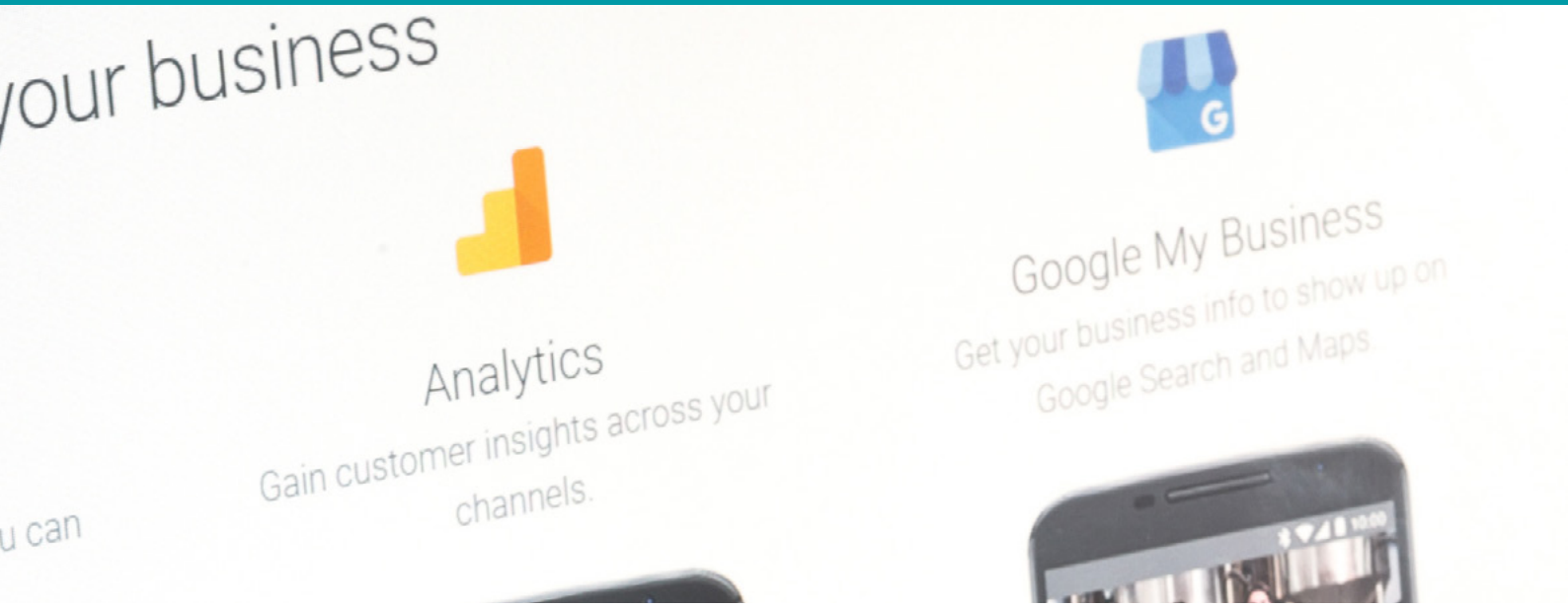


apps such as Google Drive, Slides, Sheets, Forms and Sites. It also adopted AppSheet, part of Google Cloud, which enables teams to collaborate more efficiently and generate solutions faster. After adopting AppSheet, employees could build and iterate apps to automate internal processes without support from the business' IT operation. As a result, Globe Telecom has reduced its business process turnaround time by nearly 80 percent.

- **Supporting the development of the local start-up ecosystem.** Google launched its "Google for Startups Accelerator: Southeast Asia" program, a three-month online accelerator bootcamp to discover and grow high-potential tech-based start-ups that are using innovative solutions to address the region's challenges in the post-pandemic era.[168] As part of this program, start-ups receive tech and business mentorships, opportunities to connect with relevant teams from Google and its network of industry partners and attend workshops on topics such as product design, customer acquisition, and leadership. Two Filipino start-ups were selected to join the program – Advance, an on-demand credit platform, which uses FinTech to provide short-term salary advances for Filipino employees and Rumarocket that has developed an AI tool for companies to make hiring decisions using behavioral science.[169] Advance aims to serve one million employees and 10,000 businesses by 2025.[170] Furthermore, Google.org, Google's philanthropic arm, supported Youth Business International (YBI) with USD5 million in grant funding to help over 200,000 underserved businesses globally.[171] In the Philippines, YBI worked with local grantee, QBO innovation Hub. QBO Innovation Hub has launched programs to help start-ups scale up such as the "RESQUE: Startups vs. COVID-19 Competition" and "INQBATION: Leveling Up B2B Startups".[172]

- **Investing in network and Internet infrastructure.** Besides uplifting local businesses directly, Google has also made significant investments of more than USD2 billion in network infrastructure to help improve the capacity of network services in the APAC region, including the Philippines.[173] These investments are crucial in providing the underlying infrastructure layer for businesses to deliver their products and services through

168. Google for Start-ups (2020), "Google for Start-ups Accelerator: Southeast Asia". Available at: https://sites.google.com/view/gfs-accelerator-sea/home
169. Google The Keyword (2020), "Support for Southeast Asian startups tackling big challenges". Available at: https://blog.google/around-the-globe/google-asia/support-southeast-asian-startups/
170. Tech in Asia (2020), "Philippine on-demand salary platform Advance secure seed funding". Available at: https://www.techinasia.com/advance-secures-seed-funding
171. Youth Business International (2021), "Google.org". Available at: https://www.youthbusiness.org/supporter/google-org
172. Manila Bulletin (2021), "Pinoy Tech Start-ups Elevate Customer Experience through Technology". Available at: https://mb.com.ph/2021/07/21/pinoy-tech-start-ups-elevate-customer-experience-through-technology/ and Adobo Magaine (2020), "Digital: QBO awards PHP 1M in cash prizes to 10 startups in their first-ever Virtual Demo Day". Available at: https://adobomagazine.com/philippine-news/digital-qbo-awards-php-1m-in-cash-prizes-to-10-startups-in-their-first-ever-virtual-demo-day/
173. Analysys Mason (2020), Economic impact of Google's APAC network infrastructure. Available at: https://www.analysysmason.com/consulting-redirect/reports/impact-of-google-network-APAC-2020/



the Internet and thus, boosting the country's overall economic activity and digital connectivity. Box 8 shows the impact of Google's network infrastructure investments on businesses in the Philippines.

- **Broadening access to digital tools and promoting digital inclusivity.** Google is also driving inclusiveness by enabling Filipinos to participate in the digital economy. In the Philippines, Google launched "Google Go", an AI-powered "all-in-one" app tailor-made for low-end devices which may have less space or less reliable Internet connections.[174] This enables more Filipinos to access the Internet, discover, share and find content online, with search results on the app optimized to save up to 40 percent of data.

To **promote digital trade opportunities (Pillar 3)**, Google is involved in the following:

- **Developing digital platforms to promote domestic exports.** Google's products and services, such as Business Profile (previously known as Google My Business), enable local small businesses to export and reach international markets (see Box 9).

- **Promoting protection and privacy of data and information.** By instilling trust in data sharing among organizations and countries, robust cross-border data privacy safeguards and user controls can encourage individuals and businesses to engage in digital trade (as highlighted in Chapter 2). As a strong advocate for interoperable and adaptable data protection regulations, Google is supporting the Philippines' efforts to develop personal data protection legislation by preparing a set of high-level principles on data protection. Government agencies and businesses can consider adopting Google's "Framework for Responsible Data Protection Regulation".[175] This framework aims to provide clarity to supportive data governance laws, protect individuals and communities from harm and misuse of data while enabling businesses and consumers to benefit from using digital services. It also promotes global interoperability by encouraging countries to adopt an integrated framework of privacy regulations and cross-border data transfer mechanisms that ensure protections follow the data, not national boundaries. The Philippine Government can refer to this framework in their efforts to develop interoperable, and adaptable data protection regulations.

174. Google The Keyword (2019), "6 highlights from Google for Philippines." Available at: https://blog.google/around-the-globe/google-asia/6-highlights-google-philippines/
175. Google (2020), Framework for Responsible Data Protection Regulation.
Available at: https://services.google.com/fh/files/blogs/google_framework_responsible_data_protection_regulation.pdf

BOX 8.
GOOGLE'S NETWORK INFRASTRUCTURE INVESTMENTS IN THE PHILIPPINES

By improving the capacity of network services, investments in network infrastructure such as edge infrastructure allow local Internet service providers to better manage higher Internet traffic and enable faster data transfers.[176] These, in turn, allow them to deliver innovative services such as cloud services, video conferencing, and gaming. Google's infrastructure investments in the APAC region bring new supply (i.e., through laying of submarine cables) and improve the diversity of international links (i.e., submarine cables with multiple routes connecting to different parts of the world) to the Philippines. A recent study found that by allowing for increased business activity through higher rates of Internet use, Google's investments in network, submarine cables, and edge infrastructure in APAC collectively contributed a total USD14 billion to the Philippines' GDP cumulatively from 2010 to 2019, and are expected to contribute an additional USD22 billion from 2020 to 2024.[177] The study also found that Google's network infrastructure investment spurred job creation through two channels: direct job creation in the construction and telecommunications industries, and indirect job creation facilitated by the improvement of broadband connectivity (especially in the ICT, financial services, and manufacturing sectors). The same study estimated that a total of 93,000 jobs were created in the Philippines as a result of Google's network investments in APAC in 2019.

176. Edge infrastructure stores assets with less immediate needs in regional and central data centers while enabling local versions of the client's applications to run within their legacy networks readily without downtime.
177. Analysys Mason (2020), Economic impact of Google's APAC network infrastructure – Focus on the Philippines. Available at: https://www.analysysmason.com/consulting-redirect/reports/impact-of-google-network-APAC-2020/

BOX 9.
BUSINESS PROFILE BRINGS FILIPINO LOCAL PRODUCTS TO INTERNATIONAL SHORES

Dalareich Chocolate House

Founded in 1994, Dalareich Chocolate House is one of the pioneering specialty chocolate brands in the Philippines run by Mr. and Mrs. Ricardo Polot.[178] When their daughter, Dalareich, graduated from college, she was selected to study at the Cacaolab of Ghent University in Belgium as a scholar, where she learned from the top chocolatiers in the world. After taking over the business from her parents, Dalareich aims to develop a globally recognized line of bean-to-bar chocolates made from cacao grown by smallholder Bohol farmers. However, the pandemic dealt a heavy blow to the tourism-reliant business when international travel came to a standstill. Sales decreased significantly as hotels and resorts were closed. At the same time, products could not be transported outside of Bohol due to travel bans, resulting in supply chain bottlenecks.

With some computer know-how, Dalareich migrated her business online and set up an online website to sell chocolates. After creating a free account on Business Profile, her business became more visible to customers and generated leads that could potentially stimulate growth. This resulted in business partnerships with overseas companies which found Dalareich Chocolate House on Google Search. Dalareich was also able to leverage data from the Business Profile to know how customers discovered the business, the type of products they had bought and customer demographics to further optimize the website. Moreover, customer reviews provided a better understanding of what customers were looking for and inspired Dalareich to keep improving the business. With the initial online success, Dalareich is planning to expand her brand's reach to merchant partners in Australia and Japan.

Anito's Dried Pork

Beltran Aldmendral is a proud Igorot, one of the ethnic groups in the mountains of northern Luzon, Philippines, from Bontoc who sells dried pork, otherwise known as "Etag" in the local language. After attending his first trade fair in Alabang, he was surprised that many patrons loved his product and one customer had bought ten kilograms of "Etag" from him.[179] The success of his dried pork business led Beltran to create a free account on Business Profile as "Anito's Dried Pork" to expand his customer base. Being online helped businesses like Anito's Dried Pork, particularly those located in rural areas, gain more publicity. Customers from across the globe would travel to his shop because they were intrigued by the preservation process and being online also allowed Beltran to correct common misconceptions on preservation methods, which further boosted the visibility of his business.

178. Laptrinhx (2021), "Inspiring entrepreneurs turn limitations into opportunities".
Available at: https://laptrinhx.com/news/inspiring-entrepreneurs-turn-limitations-into-opportunities-2K3mL38/amp/
179. Manilastandard.net (2020), "Google spices up chili oil maker's business". Available at: https://manilastandard.net/mobile/article/319092

GOOGLE'S ECONOMIC IMPACT IN THE PHILIPPINES

BUSINESS BENEFITS

Google supports
PHP363.4 BILLION (USD7.4 BILLION)
in annual benefits to businesses in the Philippines[1]

Google Search saves the average employee in the Philippines about
4.9 DAYS PER YEAR
through almost instantaneous access to information online

CONSUMER BENEFITS

Google supports
PHP214.5 BILLION (USD4.3 BILLION)
in annual benefits to consumers in the Philippines[2]

The average **Google Search** user in the Philippines saves
4.9 DAYS A YEAR
looking for answers, as compared to traditional offline methods

According to AlphaBeta research,
OVER 40%
of **YouTube** users in the Philippines say they use online video services to learn advanced digital skills

SOCIETAL BENEFITS

By enabling businesses to unlock new revenue streams and expand their businesses, Google indirectly supports **over 110,000 jobs** in the Philippines

Through the **"Digiskarteng Pinay"** online event, Google partnered with NGOs and YouTube creators, who contributed videos ranging from family nutrition to coding skills, to support female entrepreneurs

1. Business benefits refer to the estimated economic impact from the following products: Google Search; Google Ads; AdSense; YouTube; Google Play.
2. Consumer benefits refer to the estimated economic impact from the following products: Google Search; Google Maps; Google Drive; Docs, Sheets and Photos; Google Play.
Note: All data is based on AlphaBeta analysis using a range of original and third party sources. See Appendix in report for detailed methodology. Figures are estimated based on the latest available annual data as at time of research in 2020.

3.2 BENEFITS OF GOOGLE'S SERVICES TO BUSINESSES, CONSUMERS AND SOCIETY

Google's services, such as Google Search, Google Ads, and Google Maps, bring about substantial economic benefits in the Philippines. This study finds that the annual economic value presented by Google's applications and platforms are worth PHP363.4 billion (USD7.4 billion) for businesses and PHP214.5 billion (USD4.3 billion) for consumers.[180] An overview of the assessed economic benefits of Google services to businesses and consumers in the Philippines is provided in Exhibit 6. It is important to note that these benefits relate to direct economic benefits received, and do not include the flow-on economic effects generated (see Box 10 for further details). In addition, Google also supports benefits to the wider society in the Philippines. These include indirectly supporting over 110,000 jobs in its economy,[181] as well as other intangible benefits through its programs, such as providing skilling and income opportunities for female entrepreneurs and promoting safe Internet usage in the Philippines.

BENEFITS TO BUSINESSES

GOOGLE HELPS BUSINESSES BOOST THEIR REVENUES

Google applications broaden the reach of businesses in the Philippines to new customers and markets. Online advertising platforms such as **Google Ads** and **YouTube** allow businesses to conduct targeted advertising, bringing their products and services to the right audiences and growing their customer base. **Google Ads** is estimated to generate PHP358.9 billion (USD7.3 billion) annually in the form of net returns to businesses in the Philippines from advertising on Google Search results of relevant keywords. Beyond search advertising, businesses in the Philippines also benefit from displaying advertisements on Google's network of publisher sites such as websites, blogs, and forums through AdSense. These net returns are estimated at PHP901 million (USD18.2 million) annually. Meanwhile, by leveraging the various formats of advertisements enabled by **YouTube**, businesses are estimated to achieve PHP3.2 billion (USD64.7 million) net advertising returns annually.

In addition, Google provides new sources of income for content creators in the Philippines. By allowing content creators such as online journalists, media sites, bloggers, and writers to earn income by hosting advertisements on their sites, **AdSense** helps content creators in the Philippines monetize space on their websites and generate income. YouTube also benefits video content creators in the Philippines who earn revenue through placing advertisements on their videos.

Google's digital product distribution system, **Google Play**, as well as its operating system, **Android**, have resulted in a variety of benefits to app developers in the Philippines. App developers are estimated to earn an annual income of about PHP384 million (USD7.8 million) from Google Play in both the domestic and international markets.[182] Further, through the Android operating system, app developers in the Philippines can readily

180. The products included in these estimations include Google Search, Google Ads, AdSense, Google Play, Google Maps, YouTube, Google Drive, and Google Docs, Sheets and Photos.
181. Jobs supported refer to new jobs that may have been created through a business' use of Google's platforms, as well as ongoing employment of jobs that previously existed.
182. Google Play is a digital distribution service operated and developed by Google. It serves as the official app store for the Android operating system, which refers to the mobile operating system developed by Google for touchscreen mobile devices such as smartphones and tablets. Google Play users are able to browse and download applications developed with the Android software development kit.

EXHIBIT 6:
OVERVIEW OF ANNUAL BENEFITS SUPPORTED BY GOOGLE IN THE PHILIPPINES

TYPE OF BENEFIT	EASE OF ACCESS TO INFORMATION	ENTERTAINMENT AND ENRICHMENT
RELEVANT PRODUCT/S	**Google Search**	**YouTube, Google Play & Android**
BUSINESS BENEFITS	• By allowing for almost instantaneous access to information online, Google Search helps businesses save **4.9 days** a year per worker	• App developers in the Philippines earn about **PHP384 million (USD7.8 million)** in revenue from both the domestic and international markets through the Google Play platform per year • Android enables app developers to save up to **25%** of development time and target more than **1 billion** users worldwide
CONSUMER BENEFITS	• Google Search saved consumers about **4.9 days** seeking information online per year • The total annual consumer benefits derived from Google Search are estimated at **PHP52.3 billion (USD1.1 billion)**	• Consumers can choose from over **3.5 million** apps available on the Android ecosystem[1] • By gaining access to a range of digital entertainment options through Google Play and YouTube, the consumer surplus benefits of this platform to consumers in the Philippines are estimated at **PHP94.2 billion (USD1.9 billion)** annually

1. App Annie (2017), "Top Predictions for the App Economy in 2018". Available at: https://www.appannie.com/en/insights/market-data/predictions-app-economy-2018/
2. Net advertising benefits refer to additional revenue earned from advertising less the advertising cost.
Note: Figures are estimated based on the latest available annual data as at time of research in 2020.
SOURCE: AlphaBeta analysis

	INCREASED PRODUCTIVITY AND CONVENIENCE	ADVERTISING BENEFITS	TOTAL BENEFITS:
	Google Maps, Drive, Photos, Docs & Sheets	**YouTube, Google Ads & AdSense**	
	• The Business Profile, formerly known as Google My Business, function in Google Maps allows customers to discover local businesses. Globally, the additional revenue earned by small and medium-sized businesses as a result of Business Profile has been estimated to be between **USD212-250** per year	• Google Search and Ads bring about **PHP358.9 billion (USD7.3 billion)** in net advertising benefits to businesses in the Philippines annually[2] • Advertisers in the Philippines gain **PHP4.1 billion (USD82.9 million)** in net advertising benefits annually from displaying advertisements on websites and videos using AdSense and YouTube[2]	**PHP363.4 BILLION (USD7.4 BILLION)**
	• The total annual consumer benefits derived from Google Maps, Drive, Photos, Docs, and Sheets that enhance productivity through enabling collaboration and increase convenience in wayfinding are estimated at **PHP68 billion (USD1.4 billion)**	Nil	**PHP214.5 BILLION (USD4.3 BILLION)**

BOX 10.
MEASURING THE BENEFITS OF GOOGLE'S PRODUCTS TO BUSINESSES AND CONSUMERS

The benefits of Google's products to businesses and consumers estimated in this research focus on the direct economic impact received by them. Because of the different nature of the benefits experienced from the products, different approaches were utilized for businesses and consumers. The business benefits supported by Google include the gross revenue, income or savings generated by businesses using Google products. It is important to note that these benefits do not include the flow-on economic effects generated, such as further purchases from their suppliers, or the economic activity generated by the employees of these businesses who spend their wages in the broader economy (indirect or induced spend). This is because of the intention to gauge the direct impacts that business users of Google's products receive. On the other hand, for benefits to consumers, it is important to note that these are challenging to measure and calculate because individuals typically do not pay for the services. In the absence of price indicators, the economic "willingness to pay" principle was used to estimate the value of consumer benefits by asking individuals how much they value specific products. Time savings accrued to consumers from their use of Google Search (which increases the efficiency of information gathering) were also measured to derive a measure of the convenience these products bring to them. Appendix B shows a detailed methodological explanation of how the benefit of each product was sized.

reach more than one billion users globally.[183] It was additionally found that Android app developers can save up to 25 percent in development time from not having to port their apps across different operating systems. Exhibit 7 summarizes the estimated annual business benefits in the form of revenue gains experienced by businesses in the Philippines from Google Search and Ads, AdSense, YouTube, and Google Play.

GOOGLE HELPS BUSINESSES INCREASE PRODUCTIVITY AND SAVE TIME

Google helps businesses save time by enhancing employees' productivity by improving the speed and ease of access to information and research. In particular, Google Search minimizes the time for businesses to acquire information by arranging and simplifying the vast array of content on the Internet. The ability to rapidly find relevant data and information provides tremendous productivity benefits for employees, with each employee saving on average about 4.9 days annually.

GOOGLE SUPPORTS BUSINESSES AND WORKERS DURING THE COVID-19 PANDEMIC

Box 11 shows examples of how Google's applications and initiatives have supported the government, businesses and students in weathering the effects of the COVID-19 pandemic.

EXHIBIT 7:
GOOGLE IS ESTIMATED TO BRING ABOUT PHP363.4 BILLION (USD7.4 BILLION) WORTH OF ANNUAL BENEFITS TO BUSINESSES IN THE PHILIPPINES

PRODUCT	DESCRIPTION OF BENEFITS	ESTIMATED ANNUAL BENEFITS
Google Search & Ads	Net advertising benefits for businesses[1]	PHP358.9 billion (USD7.3 billion)
AdSense	Net advertising benefits for businesses[1]	PHP901 million (USD18.2 million)
YouTube	Net advertising benefits for businesses[1]	PHP3.2 billion (USD64.7 million)
Google Play	Income generated by app developers in the Philippines from both the domestic and international markets through Google Play	PHP384 million (USD7.8 million)
TOTAL ANNUAL BUSINESS BENEFITS IN THE PHILIPPINES:		**PHP363.4 BILLION (USD7.4 BILLION)**

Net advertising benefits refer to additional revenue earned from advertising less the advertising cost.
Note: Figures are estimated based on the latest available annual data as at time of research in 2020.
SOURCE: AlphaBeta analysis

183. AlphaBeta (2018), "AlphaBeta research brief: The estimated economic impact from Android across five Asian markets". Available at: https://www.alphabeta.com/wp-content/uploads/2017/08/180820-Android-Economic-Impact.pdf

BOX 11.
GOOGLE CONTRIBUTES TO THE COVID-19 ECONOMIC RECOVERY EFFORTS IN THE PHILIPPINES

Government and society: Safeguarding public health and enabling efficient information delivery

During the pandemic, Google supports the government's COVID-19 response efforts by providing authoritative information across its products and introducing helpful solutions like **Exposure Notifications technology**. The Exposure Notifications technology supports public health authorities in their contact tracing efforts by exchanging privacy-preserving random identifiers (IDs) via Bluetooth between users and periodically checking the user's identity against a list of positive COVID-19 cases. Apps created by the Department of Health (DOH) can leverage this technology to notify users who might have been exposed to an individual tested positive for COVID-19 and provide instructions on the next steps to slow the spread of the virus in the community.[184]

To ensure that citizens can easily access important public health announcements, Google donated USD5 million (PHP251.4 million) worth of ad credits to the Philippine Government in 2020, including the DTI.[185] These free **Google Ads** credits supported government agencies in surfacing critical information for Filipinos. Google has also developed a **dedicated COVID-19 website** for users to access helpful and credible public health information gathered from the DOH, as well as additional helpful content for distance learning and small businesses.[186] The website features videos from local content creators, such as "How to manage your energy for your daily tasks" by Bianca Gonzalez and "Learning from home" with Team Lyqa. Moreover, users can access the latest COVID-19 news updates from authoritative sources and news publications by clicking on the **Google News** tab. **YouTube News Shelf** houses breaking news on the latest developments of the pandemic. YouTube videos that

184. Google The Keyword (2020), "Exposure Notification API launches to support public health agencies".
Available at: https://blog.google/inside-google/company-announcements/apple-google-exposure-notification-api-launches/
185. GMA News Online (2020), "Google donates $5M in ad credits to Philippine govt's COVID-19 information efforts."
Available at:https://www.gmanetwork.com/news/money/companies/732964/google-donates-5m-in-ad-credits-to-philippine-govt-s-covid-19-information-efforts/story/
186. Adobo Magazine (2020), "Digital: How Google is connecting Filipinos to relevant and credible COVID-19 information with YouTube Shelves and SOS Alerts".
Available at: https://www.adobomagazine.com/digital-news/digital-how-google-is-connecting-filipinos-to-relevant-and-credible-covid-19-information-with-youtube-shelves-and-sos-alerts/

are related to COVID-19 also feature links to local government websites on the YouTube Information Panel to remind users to always consult local credible sources. By launching SOS Alerts on **Google Search**, Filipino users can gain immediate access to the latest developments about the pandemic.

Google has also donated USD20,000 (PHP987,850) to the TOWNS Foundation to acquire over 1,000 Personal Protective Equipment (PPE) kits for medical frontline workers at the Philippines General Hospital. These full-suite PPE kits contain N95 masks, surgical gloves, masks, face shields, disposable non-woven gowns, hoods and shoe covers. During the enforcement of the Luzon-wide ECQ, Google partnered with the Department of Transportation (DOTr) to map free hospital shuttle services on **Google Maps** for medical front liners to find the best routes in getting to their respective medical facilities.[187] Certified testing centers are also available on Google Maps, allowing individuals to find the nearest medical facility and verify their eligibility to avoid being turned away or causing additional strain on the local healthcare system.[188]

Business: Enabling remote working arrangements during the pandemic

As more businesses adjust to work-from-home arrangements during the COVID-19 pandemic, the **Google Meet** video-conferencing software's advanced capabilities (i.e., allowed larger meetings of up to 250 participants per call) were made available free of charge to all businesses in the Philippines that use Google Workspace. This allowed companies to stay connected and work remotely from anywhere on the globe.[189]

Students: Enabling students to learn from home

Google's philanthropic arm, Google.org, supported INCO, a non-profit organization supporting education, with a USD250,000 (PHP12.1 million) grant to build a transition strategy for distance learning and provide capacity-building support for virtual classes and online materials.[190] Together with Google Cloud and Education Partner, Q Software Research Corp (QSR), Google Educator Group (GEG) organized a series of free webinars for teachers on remote education. These webinars covered topics varying from the basics of using Google Workspace for Education to using augmented reality (AR) and virtual reality (VR) for learning and sustaining social-emotional development among students during remote education. To increase accessibility to distance learning tools, Google and QSR are offering free email domains for educational institutions to set up their Google Workspace for Education accounts.

187. Department of Transportation (2020), "Good News: DOTr free ride for health workers routes now available on Google Maps".
Available at: https://dotr.gov.ph/2014-09-02-05-03-02/55-dotrnews/1110-good-news-dotr-free-ride-for-health-workers-routes-now-available-on-google-maps.html
188. Google The Keyword (2020), "Get around safely with these new Google Maps features".
Available at: https://blog.google/products/maps/get-around-safely-these-new-google-maps-features/
189. Google Cloud (2020), "Helping businesses and schools stay connected in response to coronavirus."
Available at: https://cloud.google.com/blog/products/g-suite/helping-businesses-and-schools-stay-connected-in-response-to-coronavirus
190. NewsBytes (2020), "Google gives P12.1-M grant for distance learning in PH".
Available at: https://newsbytes.ph/2020/08/20/google-gives-p12-1-m-grant-for-distance-learning-in-ph/#:~:text=1%2DM%20grant%20for%20distance%20learning%20in%20PH,-Bim%20Santos&text=Google%20has%20made%20a%20%24250%2C000,in%20a%20virtual%20online%20classroom.

BENEFITS TO CONSUMERS

CONSUMERS IN THE PHILIPPINES EXPERIENCE ANNUAL BENEFITS WORTH PHP214.5 BILLION (USD4.3 BILLION) FROM GOOGLE'S SERVICES

The consumer benefits supported by Google are challenging to measure and calculate because individuals typically do not pay for the services. In the absence of price indicators, the economic "willingness to pay" principle was adopted to estimate the value of consumer benefits by asking individuals how much they value specific products (see Box 10). Taken together, Google Search, Google Maps, YouTube, Google Play, Drive, Photos, Docs, and Sheets are estimated to bring about total annual consumer benefits worth PHP214.5 billion (USD4.3 billion). This value includes three main categories of benefits provided by Google applications: ease of access to information (Google Search), entertainment and enrichment (Google Play and YouTube), and enhanced productivity and convenience (Google Maps, Drive, Photos, Docs, and Sheets). Exhibit 8 shows the breakdown of consumer surplus by category.

GOOGLE PROVIDES CONSUMERS IN THE PHILIPPINES BETTER ACCESS TO INFORMATION

Google provides benefits to consumers in the Philippines by allowing them to instantly access a vast array of information online. The total annual consumer surplus brought about by Google Search is estimated at PHP52.3 billion (USD1.1 billion) (Exhibit 8). Based on an international study showing that a search for a piece of information that takes 21 minutes in the library takes only seven minutes online, it is estimated that Google Search saves consumers in the Philippines an average of 4.9 days per year.[191]

EXHIBIT 8:

GOOGLE IS ESTIMATED TO SUPPORT A TOTAL PHP214.5 BILLION (USD4.3 BILLION) WORTH OF ANNUAL CONSUMER SURPLUS IN THE PHILIPPINES

ESTIMATED ANNUAL CONSUMER SURPLUS OF GOOGLE PRODUCTS IN THE PHILIPPINES
CONSUMER SURPLUS (PHP)

TYPE OF BENEFIT	PRODUCT	ANNUAL CONSUMER SURPLUS
Ease of access to information	Google Search	PHP52.3 billion (USD1.1 billion)
Entertainment and enrichment	Google Play	PHP94.2 billion (USD1.9 billion)
	YouTube	
Enhanced productivity and convenience	Google Maps	PHP68 billion (USD1.4 billion)
	Google Drive, Photos, Docs and Sheets	
	TOTAL ANNUAL CONSUMER SURPLUS:	**PHP214.5 BILLION (USD4.3 BILLION)**

Note: Figures are estimated based on the latest available annual data as at time of research in 2020.
SOURCE: AlphaBeta analysis

191. Yan Chen, Grace Young Joo Jeon and Yong-Mi Kim (2014), A day without a search engine: an experimental study of online and offline search. Experimental Economics. Available at: https://link.springer.com/article/10.1007/s10683-013-9381-9

GOOGLE'S SERVICES ENTERTAIN AND ENRICH CONSUMERS IN THE PHILIPPINES

YouTube has presented substantial benefits to consumers as a source of free entertainment as well as a channel for consumers to learn new skills (e.g., online "how-to" videos) or gain new knowledge (e.g., online documentaries). According to AlphaBeta research, over 40 percent of YouTube users in the Philippines say they used online video services to learn advanced digital skills such as coding, software programming, and mobile application and website development.[192]

Google Play and **Android** have also brought a variety of benefits to consumers in the Philippines. For example, Android enables consumers to choose from over 3.5 million apps available on the Android ecosystem.[193] Meanwhile, Google Play is a convenient platform for consumers to access a range of smartphone applications, as well as digital books, music, and films. YouTube and Google Play are estimated to bring a total consumer surplus of PHP94.2 billion (USD1.9 billion) to consumers in the Philippines annually.[194]

GOOGLE'S SERVICES IMPROVE PRODUCTIVITY AND CONVENIENCE FOR CONSUMERS IN THE PHILIPPINES

By allowing digital data to be stored and accessed through multiple devices, including laptops, tablets, and smartphones, Google's cloud-based services such as **Google Drive, Photos, Docs, and Sheets** provide great convenience to consumers in the Philippines. These services enable them to manage files, folders, music and photos on the fly – without having to retrieve the information from a piece of hardware.

Google Maps brings about productivity in the public transport and driving journeys of consumers in the Philippines through the service's wayfinding and navigation feature, which optimizes these trips using real-time data such as public transport arrival times and road traffic conditions. The total annual consumer benefits derived from productivity-enhancing tools of Google Maps, Drive, Photos, Docs, and Sheets are estimated at PHP68 billion (USD1.4 billion).

192. Google/AlphaBeta Economic Impact Report survey, n = 507. Percent represents use of online video services to learn advanced digital skills amongst consumers in the Philippines for whom YouTube is their most frequently used online video service.
193. App Annie (2017), "Top Predictions for the App Economy in 2018". Available at: https://www.appannie.com/en/insights/market-data/predictions-app-economy-2018/
194. Google/AlphaBeta Economic Impact Report survey, n = 507. The total consumer surplus represents the economic benefits to consumers in the Philippines from using Google Play. See more details in Appendix B for the methodology.

JOB CREATION AND OTHER BENEFITS TO THE BROADER SOCIETY

Google's products also support benefits to the wider society in the Philippines. These include the creation of new jobs in its economy (brought about by business expansions enabled by Google's products), as well as other intangible benefits through its programs.

GOOGLE INDIRECTLY SUPPORTS OVER 110,000 JOBS IN THE PHILIPPINES

At a broader level, Google has facilitated job creation in the economy through its products. Through Google Ads, AdSense and YouTube, Google indirectly supports the creation of over 110,000 jobs in the Philippines.[195] These jobs are created through the use of Google products that lead to businesses expanding their customer bases and increasing revenue. For instance, businesses that expand their reach to new markets through advertising via Google Ads, AdSense and YouTube would require increased labor to meet this additional demand.

YOUTUBE PROVIDES SKILLING AND INCOME-EARNING OPPORTUNITIES FOR FEMALE ENTREPRENEURS

In conjunction with International Women's Day 2021, Google partnered with non-profit organizations, government agencies and YouTube content creators to launch "Digiskarteng Pinay" – an online program that equips women with the skills needed to succeed through YouTube and generate income from creating videos through online videos.[196] These videos range in content, covering family nutrition, financial literacy, and coding skills. Box 12 showcases examples of female content creators who have benefitted from using the platform to learn new skills and create ground-up businesses.

GOOGLE ENSURES SAFE AND SECURE INTERNET USE

As part of Google's broader commitment to ensuring safe and secure Internet use, Google partnered with the Center for Art, New Ventures, and Sustainable Development to launch #YOUTHink, a magazine that aims to minimize misinformation through media literacy education.[197] Moreover, in 2019, Google partnered with the Asian Institute of Journalism and Communication (AIJC) to train 300 high school teachers who will educate nearly 9,000 students in the Philippines on recognizing misinformation and disinformation through news literacy sessions.[198]

Google collaborated with the Teach Peace Build Peace Movement (TPBPM), youth volunteers, YouTube creators and celebrities for the "Cyberpeace: Creating a peaceful Internet together" campaign to promote safe and responsible online practices. This training initiative reached over 416,000 students, teachers, parents, youths and netizens across the country teaching them how to use the Internet in a safer and more responsible way.[199] Google also supported TPBPM to enable its youth volunteers to create a series of spoken word poetry and animated videos on YouTube to make the Cyberpeace campaign scalable, sustainable, and resonate more with young audiences. The videos cover a range of topics, including exhibiting kindness online, Internet safety and security, critical thinking, preventing oversharing, and encouraging netizens to speak up and do the right thing in the digital space.[200]

195. Jobs supported refer to new jobs that may have been created through a business' use of Google's platforms, as well as ongoing employment of jobs that previously existed.
196. Manila Standard (2021), "Upskilling, livelihood opportunities with YouTube in Digiskarteng Pinay."
Available at: https://manilastandard.net/tech/business0/350085/upskilling-livelihood-opportunities-with-youtube-in-digiskarteng-pinay-.html
197. Manila Standard (2021), "Google, CANVAS bring #YOUTHink to help fight misinformation." Available at: https://manilastandard.net/mobile/article/344473
198. Inquirer (2019), "Google partners with journalism institute in combating fake news."
Available at: https://newsinfo.inquirer.net/1189157/google-partners-with-journalism-institute-in-combating-fake-news
199. Backend News (2021), "Google Cyberpeace campaign reaches 416,000 Internet users".
Available at: https://backendnews.net/google-cyberpeace-campaign-reaches-416000-internet-users/
200. Newsbytes (2021), "Google PH uses animations, poetry videos to teach digital responsibility".
Available at: https://newsbytes.ph/2021/02/14/google-ph-uses-animations-poetry-videos-to-teach-digital-responsibility/

BOX 12.
FEMALE CONTENT CREATORS SEIZE INCOME OPPORTUNITIES ON YOUTUBE

Juliette, Province of Bohol

Juliette is a 31-year-old former payroll officer and is now an owner of a home-based cake business where she sells customizable character cakes on social media. After being diagnosed as unfit for work in her previous Business Process Outsourcing (BPO) job in 2019, Juliette flew back to her hometown in Mabini to recuperate and help her sisters in their mini mart business. Unfortunately, the business was badly affected during the COVID-19 pandemic and Juliette had to find alternative sources of income. She started venturing into baking cakes after persistent prodding from her sister who wanted to give her niece a "Strawberry Shortcake" themed birthday cake. Through several weeks of researching, testing, trying and watching multiple YouTube channels, Juliette finally baked her first cake successfully in March 2020 for her niece's birthday. Recognizing the lack of affordable customizable cakes in her neighborhood, she started a cake business "Nenita's Cakes & Pastries" to offer customizable character cakes to her neighbors and relatives. During an interview, Juliette shared, "YouTube makes it very easy for us to learn new things at our own pace. Because it is accessible anywhere and anytime, I had more opportunities to equip myself with the latest techniques in baking … which now translated to sales. It definitely helped me and my family during these challenging times."[201] Due to this business, she is now able to earn USD25 daily to support her family. Five years from now, Juliette hopes to turn her home business into a full-fledged bakery and develop her cake decorating skills with the help of video tutorials and cooking shows on YouTube.

Photo Source: https://www.mommypracticality.com/2021/03/digiskarteng-pinay-youtube-event.html

201. The Manila Times (2021), "Digiskarteng Pinay: Inspire and empower women".
Available at: https://www.manilatimes.net/2021/03/28/business/sunday-business-i-t/digiskarteng-pinay-inspire-and-empower-women/856263/

BOX 12 (CONT'D).
FEMALE CONTENT CREATORS SEIZE INCOME OPPORTUNITIES ON YOUTUBE

Photo Source: https://www.mommypracticality.com/2021/03/digiskarteng-pinay-youtube-event.html

Dielian, Province of Rizal

Dielian is a third-year student studying at the National Polytechnic College of Science and Technology. Before the pandemic, she was a part-time call center agent to fund her studies. When the pandemic struck, she lost her job and had to immediately look for an alternative source of income. Inspired by her favorite snack, she went on YouTube and chanced upon channels like The Sauce and Gravy Channel, Epoy's Kitchen, among others to research different chicken wings recipes and learned how to prepare them.[202] With support from her family and boyfriend, she started her own chicken wings business named "Hot Chicks". Her uncle helped out in the kitchen while her boyfriend delivered orders. After months of taking online orders and accumulating sufficient savings, she managed to own a brick-and-mortar store and offers unlimited chicken wings for only PHP199 (USD4). With all her research on YouTube and perseverance, her daily average earning of USD30 doubled in a few weeks. Two years from now, Dielian hopes to graduate from college and expand her business to open more shops in Makati and Tarlac.

Tinmay, Province of Masbate

Tinmay is a lifestyle vlogger who graduated from Cebu Doctors' University with a degree in physical therapy. During the COVID-19 pandemic, she realized that it was more important for her to share her knowledge on business management and provide guidance for people searching for alternative sources of income. She considered herself lucky when her family business in the poultry farm and pungko-pungko (or street food stalls) tided through the pandemic and was left relatively unscathed. Thus, Tinmay shifted her focus from lifestyle content to providing business and money management tips, and accumulated over 40,000 subscribers to date.[203]

202. The Manila Times (2021), "Digiskarteng Pinay: Inspire and empower women".
Available at: https://www.manilatimes.net/2021/03/28/business/sunday-business-i-t/digiskarteng-pinay-inspire-and-empower-women/856263/
203. Manila Standard (2021), "Upskilling, livelihood opportunities with YouTube in Digiskarteng Pinay."
Available at: https://manilastandard.net/tech/business0/350085/upskilling-livelihood-opportunities-with-youtube-in-digiskarteng-pinay-.html

APPENDIX: METHODOLOGY

A: SIZING THE ECONOMIC VALUE OF DIGITAL TECHNOLOGIES

This document provides the detailed methodology, assumptions and sources of information used to quantify the future 2030 potential economic impact of digital technologies for the Philippines in 2030.

APPENDIX A1: OVERALL APPROACH

A four-step methodology was used to understand the potential economic impact created by digital technologies in 2030 (Exhibit A1).

STEP 1: IDENTIFY DIGITAL TECHNOLOGIES

Several existing research reports on current and emerging digital technologies were reviewed to identify the most relevant technologies to focus on for this analysis in terms of their potential economic impact. There was a large body of research by academics, development practitioners, non-for-profits as well as the private and public sector on the interaction between technologies and economic development. In 2013, McKinsey Global Institute identified 12 disruptive trends that would transform life, business and the global economy.[204] Of these trends, seven were considered digital in nature: mobile Internet; automation of knowledge; IoT which was often combined with geospatial and satellite technology (e.g., remote sensing); cloud technology; advanced robotics; autonomous and near autonomous vehicles; and additive manufacturing (more commonly known as 3D printing).

Since 2013, several technologies have been added to this list due to potentially transformational economic and social impact. For example, the UK-based international development network, Bond, noted rapid changes in the technologies shaping international development between 2016 and 2019. Emerging technologies included big data, financial technology (FinTech), machine learning and even blockchain. These technologies were in no way mutually exclusive and the line between what constituted a different technology versus an application of a technology could be blurred. For example, AI utilized big data which often relied on cloud computing technology to provide the storage and computational horsepower to run machine learning algorithms and other analytics. Similarly, autonomous vehicles contained a multitude of sensors, many of which were internet-enabled i.e., IoT. Exhibit 1 in Chapter 1 provides an overview of eight key digital technologies with significant implications for economic development.

STEP 2: ALIGN ON FOCUS SECTORS

To understand the current and potential economic output of these digital technologies, a set of focus sectors have been identified. These sectors were selected based on two steps:

- Clustering industries, at the ISIC 1 digit level, into broader sectors for convenient analysis.[205]

204. McKinsey Global Institute (2013), Disruptive technologies: Advances that will transform life, business, and the global economy. Available at: https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/disruptive-technologies

205. These sectors uniquely match to the relevant International Standard Industrial Classification of All Economic Activities (ISIC) with the exception of "Consumer, retail and hospitality", combining ISIC Sector G: Wholesale and retail trade; repair of motor vehicles and motorcycles and Sector I: Accommodation and food service activities; "Infrastructure", which combines ISIC Sectors F: Construction and L: Real estate activities; and "Resources", combining the ISIC Sector B: Mining and quarrying; Sector D: Electricity; gas, steam and air conditioning supply and Sector E: Water supply, sewerage, waste management and remediation activities.

This was guided by the individual industry's relevance for digital technologies (based on past research quantifying the potential industry benefits of these digital technologies).[206]

- Prioritizing the sectors based on their importance for Gross Domestic Product (GDP), proxied by the sector's share of national GDP. Each selected sector must represent more than 1.5 percent of the national GDP.

The Information and Communication Technology (ICT) industry classification was excluded due to its value-added to the economy being almost entirely driven by technology and most of the value from digital technologies in this sector would have been captured in other sectors as an input to production.

Based on these steps, ten sectors were selected.[207] These sectors consisted of Agriculture and food (including food manufacturing); Consumer, retail and hospitality services; Education and training; Financial services; Government; Health; Infrastructure (including utilities such as energy and water); Manufacturing; Resources (including mining and oil as well as gas), and Transport services.

STEP 3: IDENTIFY RELEVANT TECHNOLOGY APPLICATIONS IN FOCUS SECTORS

Relevant technology applications in the focus sectors and their sources of value (e.g., reduced wastage in production, enhanced consumer offerings) were identified based on a detailed review of the academic literature for each of the eight focus technologies.

EXHIBIT A1:

A FOUR-STEP METHODOLOGY WAS USED TO UNDERSTAND HOW DIGITAL TECHNOLOGIES COULD TRANSFORM ECONOMIC DEVELOPMENT

	STEP 1 Identify digital technologies	STEP 2 Align on focus sectors	STEP 3 Identify relevant technology applications in focus sectors	STEP 4 Size the value in 2030
Activities	Identify key digital technologies that academic literature has shown to be important for driving business and consumer value	Identify key sectors of the economy, based on relevance of those technologies and their importance for overall jobs and GDP	Understand relevant technology applications in focus sectors, including sources of value	Estimate the value (in local currency terms) of these technology applications in each sector in 2030 based on full adoption scenario
Methodology	Industry reports – e.g., McKinsey Global Institute, World Economic Forum	Technology reports to identify sector-impact of technologies; local country data for importance of sectors to GDP, jobs	Review of sector-level technology reports	Case studies, with top-down "sanity check" based on comparison to other research reports on overall value of technologies

206. This was based on a range of reports. See for example, McKinsey Global Institute (2014), Southeast Asia at the crossroads: Three paths to prosperity. Available at: https://www.mckinsey.com/~/media/McKinsey/Featured%20Insights/Asia%20Pacific/Three%20paths%20to%20sustained%20economic%20growth%20in%20Southeast%20Asia/MGI%20SE%20Asia_Executive%20summary_November%202014.pdf; and McKinsey Global Institute (2014), India's tech opportunity: Transforming work, empowering people. Available at:https://www.mckinsey.com/~/media/mckinsey/industries/technology%20media%20and%20telecommunications/high%20tech/our%20insights/indias%20tech%20opportunity%20transforming%20work%20empowering%20people/mgi%20india%20tech_executive%20summary_december%202014.pdf

207. In the Philippines, all ten sectors have fulfilled the criterion in Step 2.

These technology applications included tangible drivers of business value, such as the use of remote patient monitoring to enable hospital-level care in homes using advanced sensors, smart medical devices, and robotics. A list of these technology applications, categorized by sector and key digital technology, is shown in Exhibit 2 in Chapter 1. Several emerging digital technologies such as blockchain were considered but not analyzed as they were still in the nascent stages and economic impact estimates were difficult to obtain.

STEP 4: SIZE THE VALUE IN 2030

The value (in local currency terms) of these technology applications in each sector was then quantified in 2030 (based on assessed potential linked to benchmarks).

The **"Full adoption" scenario** was analyzed. In this scenario, the country was assumed to achieve full digital adoption (100 percent) in the 43 digital technology applications across ten sectors. This scenario was modeled to frame the maximum achievable opportunity. A series of international and country-specific case studies were used for each technology application in the sizing. A "sanity check" of the results was then done by comparing the overall sector and economy-wide estimates with other research reports. **These estimates do not represent GDP or market size (revenue), but rather economic impact such as productivity gains, increased revenues and cost savings.**

APPENDIX A2: SPECIFIC APPROACHES, ASSUMPTIONS AND SOURCES

Table 1 summarizes the key metrics and sources used commonly across the sizing of the economic opportunities of digital technology applications.

The specific assumptions and sources of information used to size each digital technology application in each sector are shown below. These assumptions were used to estimate the "Full adoption" scenario in 2030.

TABLE 1: KEY METRICS AND SOURCES FOR SIZING ECONOMIC OPPORTUNITIES

METRICS	SOURCE
GDP / GDP per capita	• World Bank GDP statistics • International Monetary Fund (IMF) Real GDP growth estimates • Philippine Statistics Authority
Population	• United Nations Department of Economic and Social Affairs Population datasets
Labor Force	• International Labour Organisation (ILO) • World Bank Labor Force statistics • Philippine Statistics Authority
Wage	• Philippine Statistics Authority
Exchange rates	• OFX

AGRICULTURE AND FOOD

DESCRIPTION	SIZING ASSUMPTIONS	SOURCE
1. PRECISION FARMING TECHNOLOGIES		**PRODUCTIVITY GAINS/COST SAVINGS**
Data-driven optimization of crop and meat production	Sized based on the productivity gains from increased yield, as well as cost savings from the use of fewer resources in farming. The Filipino Agricultural Research and Development Institute (2019) found that precision agriculture saved 17 percent of total fertilization cost and increased production efficiency by 20 percent over conventional fertilization methods. Country-level estimate was derived based on the effectiveness of the technology within the context of the country's agricultural landscape and its agricultural sector GDP.	• Filipino Agricultural Research and Development Institute (2019)[208] • World Bank[209]
2. IOT-ENABLED INVENTORY MANAGEMENT		**INCREASED REVENUES**
IoT technology to help reduce food waste in supply chain	Sized based on the additional revenues from reduced food losses that occur in the supply chain. McKinsey Global Institute (2014) estimated that ten percent to 15 percent of all food waste throughout the supply chain were recoverable from technology-enabled supply chain management. Country-level estimate was derived based on annual food waste from the supply chain which was assumed to grow at constant rates.	• McKinsey Global Institute (2014)[210] • Food and Land Use Coalition[211]
3. FOOD SAFETY TECHNOLOGIES		**COST SAVINGS**
Using sensors, data monitoring and analysis techniques to ensure the biosecurity of food products and predict when concerns may arise	Sized based on cost savings from reduced food contamination losses. Fast Company (2017) reported that improving food traceability via sensing, tracking and data monitoring technologies could improve the percentage of food arriving at the retailers' premises with target freshness, from 30 percent to 90 percent. PricewaterhouseCoopers (2015) estimated the global cost of food fraud, proxied by lost sales due to adverse health consequences, to be between USD30 billion to USD40 billion a year. Growth in cost of food fraud was derived based on FAO's estimate of global food demand growth. Country-level estimate of food contamination losses was derived based on the relative share of global GDP.	• Fast Company (2017)[212] • PricewaterhouseCoopers (2015)[213] • Food and Agriculture Organisation of the United Nations[214]
4. REAL-TIME MARKET INFORMATION		**INCREASED REVENUES**
Provision of real-time market information on prices	Sized based on increased farmers' revenues from access to real-time information. McKinsey Global Institute (2014) estimated this positive impact to be equivalent to ten percent to 15 percent of agricultural GDP. Country-level estimate was derived based on the country's agriculture sector GDP.	• McKinsey Global Institute (2014)[215]

208. The Philippines Agricultural Research and Development Institute (2019). "Precision Agriculture in the Philippines". Available at: https://ap.fftc.org.tw/article/1417
209. World Bank (2018). Available at: https://blogs.worldbank.org/opendata/new-country-classifications
210. McKinsey Global Institute (2014), Southeast Asia at the crossroads: Three paths to prosperity. Available at: https://www.mckinsey.com/featured-insights/asia-pacific/three-paths-to-sustained-economic-growth-in-southeast-asia
211. Food and Land Use Coalition (2019), Reducing Food Loss and Waste. Available at: https://www.foodandlandusecoalition.org/wp-content/uploads/2019/09/Critical-Transitions-6-Reducing-Food-Loss-and-Waste.pdf
212. Fast Company (2017), "These high-tech sensors track exactly how fresh our produce is so we stop wasting food." Available at: https://www.fastcompany.com/40424163/these-high-tech-sensors-track-exactly-how-fresh-our-produce-is-so-we-stop-wasting-food
213. PricewaterhouseCoopers (2015), Food fraud vulnerability assessment. Available at: https://www.pwc.com/sg/en/industries/assets/food-fraud-vulnerability-assessment.pdf
214. Food and Agriculture Organisation of the United Nations (2002), "World agriculture 2030: Main findings." Available at: http://www.fao.org/english/newsroom/news/2002/7833-en.html
215. McKinsey Global Institute (2014), "Southeast Asia at the crossroads: Three paths to prosperity". Available at: https://www.mckinsey.com/featured-insights/asia-pacific/three-paths-to-sustained-economic-growth-in-southeast-asia

CONSUMER, RETAIL AND HOSPITALITY

DESCRIPTION	SIZING ASSUMPTIONS	SOURCE
1. DIGITAL RETAIL SALES AND MARKETING CHANNELS		**PRODUCTIVITY GAINS**
Productivity gains from delivering retail goods through digital channel reducing labor, inventory, and real estate costs	Sized based on productivity gains from delivering goods digitally. McKinsey Global Institute (2013) estimated that productivity gains from selling goods through digital channels ranged from six percent to 15 percent, based on reduced labor requirements, inventory efficiencies and lower real estate costs. Country-level estimate was derived based on domestic e-commerce retail sales and operating costs (assuming constant growth rates).	• McKinsey Global Institute (2013)[216]
2. IOT-ENABLED INVENTORY MANAGEMENT		**INCREASED REVENUES**
Use of IoT to reduce stock outs	Sized based on increase in revenues from capturing sales potentially lost due to stock outs. McKinsey Global Institute (2013) estimated that four percent of retail sales were lost due to stock outs, and that 35 percent to 40 percent of this value may be recaptured using IoT. Country-level estimate was derived based on domestic retail sales.	• McKinsey Global Institute (2013)[217]
3. AUTOMATION AND AI CUSTOMER SERVICE IN HOTELS		**INCREASED REVENUES**
Use of AI and automated services for remote check-ins at hotels	Sized based on increased revenues from higher efficiency in hotel verification procedures. Colliers International (2019) estimates that hotel revenues could increase by ten percent through AI. The Vulcan Post reported that each hotel verification procedure typically took ten minutes. The Singapore Tourism Board estimated that the E-visitor Authentication system could eliminate manual processes and reduce check-in time by up to 70 percent. Country-level estimate was derived based on hotel revenue.	• Colliers International (2018)[218] • The Vulcan Post (2018)[219] • Singapore Tourism Board (2019)[220]
4. DATA ANALYTICS ON TRAVEL PATTERNS		**INCREASED REVENUES**
Use of big data analytics in predicting consumer behavior	Sized based on increased revenues from better targeted promotions to tourists. Boston Consulting Group (2020) estimated that brands experienced a revenue uplift of six to ten percent from integrating proprietary data to create personalized experiences. Country-level estimate was derived based on tourism revenue.	• Boston Consulting Group (2020)[221]

216. McKinsey Global Institute (2013), Disruptive technologies: Advances that will transform life, business, and the global economy.
Available at: https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/disruptive-technologies
217. McKinsey Global Institute (2013), Disruptive technologies: Advances that will transform life, business, and the global economy.
Available at: https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/disruptive-technologies
218. Colliers International (2018), "AI and automation to increase hotel revenues by 10%."
Available at: https://www.hoteliermiddleeast.com/34362-ai-and-automation-to-increase-hotel-revenues-by-10
219. The Vulcan Post (2018), "No Queues, No Forms: this S'pore Startup Lets You Quickly Check To Hotels With A Selfie."
Available at: https://vulcanpost.com/704429/gtriip-digital-hotel-check-in-singapore/
220. Singapore Tourism Board (2019), "Industry-wide initiatives to transform hotels for sustainable growth."
Available at: https://www.stb.gov.sg/content/stb/en/media-centre/media-releases/industry-wide-initiativestotransformhotelsforsustainablegrowth.html
221. Boston Consulting Group (2020), "Bionic Revenue Management in Travel and Tourism."
Available at: https://www.bcg.com/publications/2020/bionic-revenue-management-travel-tourism

CONSUMER, RETAIL AND HOSPITALITY (CONT'D)

DESCRIPTION	SIZING ASSUMPTIONS	SOURCE
5. ONLINE F&B DELIVERY SERVICES		**INCREASED REVENUES**
Use of online delivery service	Sized based on increase in revenues from capturing F&B orders placed online. The Straits Times (2017) reported that restaurants have seen revenues rise by 15 percent after partnering food delivery firms. Country-level estimate was derived based on domestic F&B revenue.	• The Straits Times (2017)[222]

EDUCATION AND TRAINING

DESCRIPTION	SIZING ASSUMPTIONS	SOURCE
1. E-CAREER CENTERS AND DIGITAL JOBS PLATFORM		**GDP INCREMENTS**
Use of online job listing platforms and matching of candidate profiles to available jobs based on algorithms	Sized based on GDP contributions from higher employment rate. McKinsey Global Institute (2015) estimated the impact on employment rates on different countries, stating that these were different for each country, depending on its labor market characteristics, education and income levels and demographic trends. Country-level estimate was derived based on national employment rate, labor force and GDP per capita.	• McKinsey Global Institute (2015)[223]
2. PERSONALIZED LEARNING		**GDP INCREMENTS**
Use of digital technologies to provide personalized and remote learning opportunities for students	Sized based on increase in GDP from higher employment rate. McKinsey Global Institute (2018) estimated that personalized learning would increase employment rate by 0.5 percent in high-income countries, and 0.9 percent in other countries. Classification of the country's income level was based on the World Bank's definition. Country-level estimate was derived based on national employment rate, labor force and GDP per capita.	• McKinsey Global Institute (2018)[224] • World Bank[225]
3. ONLINE RETRAINING PROGRAMS		**GDP INCREMENTS**
Lifelong learning opportunities delivered in digital format helped individuals gain new skills	Sized based on increase in GDP from higher employment rate. McKinsey Global Institute (2018) estimated that online retraining programs would increase employment rate by 0.1 percent in "high income" countries, and 0.3 percent in "middle-income" countries. Country-level estimate was derived based on national employment rate, labor force and GDP per capita.	• McKinsey Global Institute (2018)[226] • World Bank[227]

222. The Straits Times (2017), "Delivery sales drive up eateries' revenues." Available at: https://www.straitstimes.com/business/delivery-sales-drive-up-eateries-revenues
223. McKinsey Global Institute (2015), A labour market that works: Connecting talent with opportunity in the digital age. Available at: https://www.mckinsey.com/featured-insights/employment-and-growth/connecting-talent-with-opportunity-in-the-digital-age
224. McKinsey Global Institute (2018), Smart cities: Digital solutions for a more liveable future. Available at: https://www.mckinsey.com/industries/capital-projects-and-infrastructure/our-insights/smart-cities-digital-solutions-for-a-more-livable-future
225. World Bank (2018). Available at: https://blogs.worldbank.org/opendata/new-country-classifications
226. McKinsey Global Institute (2018), Smart cities: Digital solutions for a more liveable future. Available at: https://www.mckinsey.com/industries/capital-projects-and-infrastructure/our-insights/smart-cities-digital-solutions-for-a-more-livable-future
227. World Bank (2018). Available at: https://blogs.worldbank.org/opendata/new-country-classifications

FINANCIAL SERVICES

DESCRIPTION	SIZING ASSUMPTIONS	SOURCE
1. BIG DATA ANALYTICS		**INCREASED REVENUES**
Increased lending to SMEs at higher margins due to big data	Sized based on additional revenue generated from increased lending to SMEs at higher margins. McKinsey Global Institute (2014) estimated that lending to SMEs would increase by 16 percent to 33 percent due to big data analytics, with increased margins between 1.4 percent to 1.8 percent. Country-level estimate was derived based on annual total lending to SMEs.	• McKinsey Global Institute (2014)[228]
2. MOBILE MONEY WALLETS		**INCREASED WAGES**
Use of Mobile Internet to support digital financial inclusion	Sized based on the number of persons who became financially included due to mobile money as of 2030 based on projections from 2014 and 2017 estimates (at historical growth rates). McKinsey Global Institute (2014) estimated that individuals would experience a 15 percent increase in wages due to financial inclusion, with this wage being gauged at the country's minimum wage rate as such individuals typically come from lower-income backgrounds. Country-level estimate was derived based on the proportion of the country's population (ages 15+) who were financially included, the proportion of them who became financially included due to mobile money, and annual minimum wage. Classification of the country's income level was based on World Bank's definition.	• World Bank Global Findex Database[229] • McKinsey Global Institute (2014)[230]
3. DIGITAL BANKING SERVICES		**COST SAVINGS**
Use of Internet and mobile technologies to reduce operational and risk costs, and improve service delivery	Sized based on the cost savings from digitization such as the electronic onboarding of clients, leveraging machine learning and robotics to create operational improvements and the use of public cloud infrastructure to reduce processing capacity. McKinsey Global Institute (2017) estimated that the potential savings from retail banking operational costs and risk costs ranged from 20 percent to 30 percent and ten percent to 30 percent, respectively. Country-level cost savings was derived based on domestic banking sector operating costs.	• McKinsey Global Institute (2017)[231]
4. REG TECH		**COST SAVINGS**
Use of AI and machine learning to automate document review, risk analysis and other repetitive compliance tasks	Sized based on the cost savings in compliance expenditure due to improvement in efficiency brought about by these technologies. Juniper Research (2017) estimated that up to 50 percent of compliance expenditure could be eliminated from adopting these technologies. KPMG (2013) indicated that compliance expenditure contributed to ten percent of banks' operating costs on average. Country-level estimate of efficiency savings was derived based on domestic banking sector costs.	• Juniper Research (2017)[232] • KPMG (2013)[233]

228. McKinsey Global Institute (2014), China's digital transformation: The Internet's impact on productivity and growth. Available at: https://www.mckinsey.com/industries/high-tech/our-insights/chinas-digital-transformation
229. World Bank Global Findex Database. Available at: https://globalfindex.worldbank.org/
230. McKinsey Global Institute (2014), India's technology opportunity: Transforming work, empowering people. Available at: https://www.mckinsey.com/industries/high-tech/our-insights/indias-tech-opportunity-transforming-work-empowering-people
231. McKinsey Global Institute (2017), Digital Australia: Seizing opportunities from the fourth industrial revolution. Available at: https://www.mckinsey.com/featured-insights/asia-pacific/digital-australia-seizing-opportunity-from-the-fourth-industrial-revolution
232. Juniper Research (2017), How Reg Tech can save banks billions. Available at: https://www.juniperresearch.com/document-library/white-papers/how-regtech-can-save-banks-billions
233. KPMG (2013), The cost of compliance. Available at: https://home.kpmg.com/content/dam/kpmg/pdf/2014/07/Cost-of-Compliance.pdf

GOVERNMENT

DESCRIPTION	SIZING ASSUMPTIONS	SOURCE
1. CLOUD COMPUTING		**COST SAVINGS**
Use of cloud-based software to reduce costs	Sized based on the estimated savings from cloud computing, specifically in the reduction in hardware costs. InfoWorld (2019) reported that companies experienced between 25 percent to 55 percent cost savings after migrating to the cloud. Country-level estimate was derived based on government ICT expenditure and hardware costs.	• InfoWorld (2019)[234]
2. GOVERNMENT E-SERVICES		**COST SAVINGS**
Reduction in operating expenditure from using e-services	Sized based on the reduction in operating expenditure from moving services online, pre-filing of tax forms, data availability and performance dashboards. McKinsey Global Institute (2011) estimated that between 15 percent to 20 percent of operating expenditure was eliminated in Europe after moving to e-services. The study also reported that the addressable base for such a reduction was about 20 percent to 25 percent of government expenditure. Country-level estimate was derived based on government operating expenditure.	• McKinsey Global Institute (2011)[235]
3. E-PROCUREMENT		**COST SAVINGS**
Cost savings from using e-procurement channels	Sized based on the reduction in transaction costs from shifting to e-procurement for government projects. In South Korea, the Public Procurement Service estimated that the government saved USD8 billion in transaction costs annually through reduced labor costs, reduced lead-time and a more streamlined process. Country-level estimate was derived based on public procurement volumes.	• Public Procurement Service[236]
4. GEOGRAPHIC INFORMATION SYSTEM ENABLED TAX COLLECTION		**INCREASED TAX COLLECTION**
Use of big data and location-based information to improve tax collection	Sized based on the increase in tax collected from using big data and GIS-enabled services. In Brazil, the government managed to raise its Federal Tax collection by about 13 percent through adopting big data in audit corporate tax declaration. Country-level estimate was derived based on the country's tax evasion rate as a percentage of GDP relative to Brazil's.	• Bill & Melinda Gates Foundation and AlphaBeta (2018)[237]

234. InfoWorld (2019), "Can the cloud save you money? These companies say yes".
Available at: https://www.infoworld.com/article/3445206/can-the-cloud-save-you-money-these-companies-say-yes.html
235. McKinsey Global Institute (2011), Big data: The next frontier for innovation, competition, and productivity. Available at: https://www.mckinsey.com/~/media/McKinsey/Business%20Functions/McKinsey%20Digital/Our%20Insights/Big%20data%20The%20next%20frontier%20for%20innovation/McKinsey Global Institute_big_data_full_report.ashx
236. Public Procurement Service (2012), e-Procurement Experience in Korea: Implementation and Impact.
Available at: https://www.europarl.europa.eu/document/activities/cont/201207/20120710ATT48620/20120710ATT48620EN.pdf
237. Bill & Melinda Gates Foundation and AlphaBeta (2018), Digital Innovation in Public Financial Management (PFM): Opportunities and implications for low-income countries.
Available at: https://www.alphabeta.com/wp-content/uploads/2018/07/pfm-technology-paper-long-version.pdf

GOVERNMENT (CONT'D)

DESCRIPTION	SIZING ASSUMPTIONS	SOURCE
5. DATA ANALYTICS FOR GOVERNMENT TRANSFER PAYMENTS		**COST SAVINGS**
Use of data analytics in government transfer payments	Sized based on reduction in costs from using data analytics in determining eligible recipients of government transfer payments. McKinsey & Company estimated that five to ten percent of government transfer payments globally are improper payments that could be addressed by adopting data analytics. Country-level estimate was derived based on the country's GDP.	• McKinsey & Company (2017)[238]
6. DIGITIZATION OF GOVERNMENT PAYMENTS		**COST SAVINGS**
Use of digital services to distribute payments	Sized based on reduction in costs from using digital services in distributing government payments. The International Monetary Fund (2017) estimated that developing countries could save roughly 0.8 percent to 1.1 percent of GDP from digitalizing government payments. Country-level estimate was derived based on the country's GDP.	• International Monetary Fund (2017)[239]

HEALTH

DESCRIPTION	SIZING ASSUMPTIONS	SOURCE
1. REMOTE PATIENT MONITORING		**COST SAVINGS**
Application of remote monitoring systems to improve patient care	Sized based on cost savings to the healthcare system through reduced hospital visits, length of patients' stays and medical procedures. McKinsey Global Institute (2013) estimated that such systems would reduce hospital visits, length of patients' stays and number of procedures relating to chronic diseases, resulting in ten percent to 20 percent savings for the healthcare system. Country-level estimate was derived from the World Bank's estimate of total healthcare spend and the country's share of spending on chronic diseases.	• McKinsey Global Institute (2013)[240] • World Bank[241]
2. TELEHEALTH APPLICATIONS		**COST SAVINGS**
Use of Internet and mobile technologies for medical consultations	Sized based on cost savings to the healthcare system through reduced doctor visits. Goldman Sachs (2015) estimated that the US healthcare system could save USD100 billion by adopting telehealth. Country-level estimate was derived based on relative national healthcare expenditure.	• Goldman Sachs (2015)[242]

238. McKinsey & Company (2017), Government productivity: Unlocking the $3.5 trillion opportunity. Available at: https://www.mckinsey.com/~/media/McKinsey/Industries/Public%20and%20Social%20Sector/Our%20Insights/The%20opportunity%20in%20government%20productivity/Government-Productivity-Unlocking-the-3-5-Trillion-Opportunity-Full-report.pdf?shouldIndex=false
239. International Monetary Fund eLibrary (2017), Chapter 13: The Value of Digitalizing Government Payments in Developing Economics. Available at: https://www.elibrary.imf.org/view/International Monetary Fund071/24304-9781484315224/24304-9781484315224/ch13.xml?redirect=true&redirect=true
240. McKinsey Global Institute (2013), Disruptive technologies: Advances that will transform life, business, and the global economy. Available at: https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/disruptive-technologies
241. World Bank statistics on current health expenditure. Available at: https://data.worldbank.org/indicator/SH.XPD.CHEX.GD.ZS
242. Goldman Sachs (2015), The digital revolution comes to US healthcare. Available at: https://www.wur.nl/upload_mm/0/f/3/8fe8684c-2a84-4965-9dce-50584aae48c_Internet%20of%20Things%205%20-%20Digital%20Revolution%20Comes%20to%20US%20Healtcare.pdf

HEALTH (CONT'D)

DESCRIPTION	SIZING ASSUMPTIONS	SOURCE
3. DATA-BASED PUBLIC HEALTH INTERVENTIONS		**GDP INCREMENTS**
Use of analytics to direct highly targeted health interventions for at-risk populations	Sized based on the economic value of reduced disability-adjusted life years (DALYs) due to timely public health interventions. McKinsey Global Institute (2018) indicated that the most significant and measurable impacts were on maternal and child health, as well as public sanitation and hygiene. It estimated a 0.4 percent reduction in DALYs for "high-income" countries, and 1.5 percent for other countries. Income of countries classified based on the World Bank's definition. Economic value was taken to be this multiplied by GDP per capita, and was estimated based on the proportion of the population suffering from chronic diseases. Country-level estimate was derived based on national population sizes and GDP per capita.	• McKinsey Global Institute (2018)[243] • UN Population Division (2018)[244] • World Bank[245]
4. DETECTION OF COUNTERFEIT PHARMACEUTICAL DRUGS		**COST SAVINGS**
Use of IoT and advanced analytics to detect counterfeit drugs	Sized based on cost savings from reduced counterfeit pharmaceutical drugs in the country due to higher detection rates. EU IPO (2016) estimated that the annual cost of counterfeit pharmaceutical drugs to Europe's pharmaceutical industry was EUR10 billion. McKinsey Global Institute (2013) assessed that 30 percent to 50 percent of all drugs sold were addressable by this technology, and that its success rate was between 80 percent and 100 percent. Country-level estimate on the national cost of counterfeit drugs was derived based on the country's relative healthcare expenditure.	• EU Intellectual Property Office (2016)[246] • McKinsey Global Institute (2013)[247]
5. SMART MEDICAL DEVICES AND WEARABLES		**GDP INCREMENTS**
Analyzing data across connected implants, smart medical devices and wearables in personalized and predictive care	Sized based on the economic value of reduced disability-adjusted life years (DALYs) due to health improvement measures prompted by data from such devices. McKinsey Global Institute (2018) estimated that smart medical devices reduced DALYs by one percent reduction in high-income countries, and 0.6 percent in other countries. The economic value was taken to be this multiplied by GDP per capita. Classification of the country's income level was based on the World Bank's definition. Country-level estimate was derived based on national population sizes and GDP per capita, and was estimated based on the proportion of the population suffering from chronic diseases.	• McKinsey Global Institute (2018)[248] • UN Population Division (2018)[249] • World Bank[250]

243. McKinsey Global Institute (2018), Smart cities: Digital solutions for a more liveable future. Available at: https://www.mckinsey.com/industries/capital-projects-and-infrastructure/our-insights/smart-cities-digital-solutions-for-a-more-livable-future
244. UN Population Division (2018). Available at: https://esa.un.org/unpd/wpp/DataQuery/
245. World Bank (2018). Available at: https://blogs.worldbank.org/opendata/new-country-classifications
246. EU Intellectual Property Office (2016), The economic cost of IPR infringement in the pharmaceutical industry. Available at: https://euipo.europa.eu/ohimportal/en/web/observatory/ipr-infringement-pharmaceutical-sector
247. McKinsey Global Institute (2013), Disruptive technologies: Advances that will transform life, business, and the global economy. Available at: https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/disruptive-technologies
248. McKinsey Global Institute (2018), Smart cities: Digital solutions for a more liveable future. Available at: https://www.mckinsey.com/industries/capital-projects-and-infrastructure/our-insights/smart-cities-digital-solutions-for-a-more-livable-future
249. UN Population Division (2018). Available at: https://esa.un.org/unpd/wpp/DataQuery/
250. World Bank (2018). Available at: https://blogs.worldbank.org/opendata/new-country-classifications

HEALTH (CONT'D)

DESCRIPTION	SIZING ASSUMPTIONS	SOURCE
6. ELECTRONIC MEDICAL RECORDS		**COST SAVINGS**
Use of cloud-based electronic medical record systems	Sized based on the cumulative savings (such as saving of physician and nursing time) from adopting electronic health records (EHR). McKinsey Global Institute (2014) estimated that widespread adoption of electronic medical records could increase India's annual economic value by USD3 billion. The global economic impact of EHR was estimated based on India's share of the global healthcare expenditure. Country-level estimate was derived based on its relative national healthcare expenditure according to World Bank data and the global EHR market growth rates.	• McKinsey Global Institute (2014)[251] • World Bank[252] • Transparency Market Research[253]

INFRASTRUCTURE

DESCRIPTION	SIZING ASSUMPTIONS	SOURCE
1. SMART GRIDS		**COST SAVINGS**
Use of digital communications technology in detecting and optimizing electricity networks	Sized based on cost savings from energy savings due to lower consumption and efficiency improvements. Smart Energy Consumer Collaborative (2018) estimated five to ten percent energy could be saved from using smart grids. Country-level estimate was derived based on total electricity consumption. Business and Sustainable Development Commission (2017) estimated that the global average wholesale price of electricity was USD100/Mwh.	• Smart Energy Consumer Collaborative[254] • World Bank[255] • Business and Sustainable Development Commission (2017)[256]
2. 5D BIM AND PROJECT MANAGEMENT TECHNOLOGIES		**COST SAVINGS**
Use of integrated modeling platforms to simulate construction cost and timeline impacts of decisions in project planning, design, construction, operations, and maintenance	Sized based on cost reductions from improved coordination between different development parameters, as well as the continuous insight provided on project costs. McKinsey Global Institute (2013) estimated that streamlining project delivery could bring about 15 percent savings to infrastructure cost, with 15 percent to 25 percent of these savings coming from 5D BIM technologies. Country-level estimate was derived based on domestic construction sector costs.	• McKinsey Global Institute (2013)[257] • Global infrastructure Outlook[258]

251. McKinsey Global Institute (2014), India's technology opportunity: Transforming work, empowering people. Available at: https://www.mckinsey.com/~/media/McKinsey/Industries/Technology%20Media%20and%20Telecommunications/High%20Tech/Our%20Insights/Indias%20tech%20opportunity%20Transforming%20work%20empowering%20people/McKinsey Global Institute%20India%20tech_Executive%20summary_December%202014.ashx
252. World Bank statistics on current health expenditure. Available at: https://data.worldbank.org/indicator/SH.XPD.CHEX.GD.ZS
253. Transparency Market Research (2018), "Electronic Health Records Market". Available at: https://www.transparencymarketresearch.com/electronic-health-records-market.html
254. Smart Energy Consumer Collaborative. Available at: http://www.whatissmartgrid.org/faqs/what-are-the-benefits-of-the-smart-grid
255. World Bank statistics on electric power consumption. Available at: https://data.worldbank.org/indicator/EG.USE.ELEC.KH.PC
256. Business and Sustainable Development Commission (2017), Valuing the SDG prize: Unlocking business opportunities to accelerate sustainable and inclusive growth. Available at: http://businesscommission.org/our-work/valuing-the-sdg-prize-unlocking-business-opportunities-to-accelerate-sustainable-and-inclusive-growth
257. McKinsey Global Institute (2013), Infrastructure productivity: How to save NZ$1 trillion a year. Available at: https://www.mckinsey.com/industries/capital-projects-and-infrastructure/our-insights/infrastructure-productivity
258. Global Infrastructure Outlook on forecasting infrastructure investment needs and gaps. Available at: https://outlook.gihub.org/

INFRASTRUCTURE (CONT'D)

DESCRIPTION	SIZING ASSUMPTIONS	SOURCE
3. PREDICTIVE MAINTENANCE TECHNOLOGIES		**COST SAVINGS**
Using data from sensors to ensure prompt and predictive maintenance, minimizing downtime	Sized based on the economic value of benefits from sizeable applications including the predictive maintenance of public transit systems and water leakage detection and control. McKinsey Global Institute (2018) estimated a 2.3 percent reduction in average commuting time from predictive transit for "high-income" countries, and 1.4 percent for other countries. On water leakage detection and control, McKinsey Global Institute (2018) estimated a 1.4 percent reduction in water consumption for "high-income" countries, and country-level estimates were used in other countries. Classification of the country's income level was based on the World Bank's definition. The Business and Sustainable Development Commission (2017) estimated that the global average price of water was USD0.90/m3. Country-level estimate was derived based on the country's average commuting time, population, GDP per capita and domestic water consumption.	• McKinsey Global Institute (2018)[259] • World Bank[260] • UNESCO-IHE (2011)[261] • Business and Sustainable Development Commission (2017)[262]
4. SMART BUILDINGS		**COST SAVINGS**
Use of physical sensor networks, energy storage and data analytics to improve resource efficiency of buildings and reduce energy and water consumption, as well as carbon emissions	Sized based on the economic value of the reduction in greenhouse gas emissions (GHG) and water consumption by building automation systems. McKinsey Global Institute (2018) estimated a 2.9 percent reduction in GHG emissions and a 1.7 percent reduction in water consumption for "high-income" countries. The corresponding figures for other countries were 1.4 percent and 1.1 percent. Classification of the country's income level was based on the World Bank's definition. Country-level estimate was derived based on its greenhouse gas emissions and water consumption from buildings. Business and Sustainable Development Commission (2017) estimated that the global average price of water was USD0.90/m3 and GHG price was valued at USD50/tonne (a global proxy price equating roughly to the financial incentives needed to achieve carbon emissions consistent with a two-degree pathway).	• McKinsey Global Institute (2018)[263] • IPCC[264] • World Bank[265] • Business and Sustainable Development Commission (2017)[266]

259. McKinsey Global Institute (2018), Smart cities: Digital solutions for a more liveable future. Available at: https://www.mckinsey.com/industries/capital-projects-and-infrastructure/our-insights/smart-cities-digital-solutions-for-a-more-livable-future
260. World Bank (2018). Available at: https://blogs.worldbank.org/opendata/new-country-classifications
261. UNESCO-IHE (2011), National Water Footprint Accounts. Available at: https://waterfootprint.org/media/downloads/Report50-NationalWaterFootprints-Vol1.pdf
262. Business and Sustainable Development Commission (2017), Valuing the SDG prize: Unlocking business opportunities to accelerate sustainable and inclusive growth.
263. McKinsey Global Institute (2018), Smart cities: Digital solutions for a more liveable future. Available at: https://www.mckinsey.com/industries/capital-projects-and-infrastructure/our-insights/smart-cities-digital-solutions-for-a-more-livable-future
264. IPCC estimates on global greenhouse gas emissions. Available at: https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data
265. World Bank (2018). Available at: https://blogs.worldbank.org/opendata/new-country-classifications
266. Business and Sustainable Development Commission (2017), Valuing the SDG prize: Unlocking business opportunities to accelerate sustainable and inclusive growth.

MANUFACTURING

DESCRIPTION	SIZING ASSUMPTIONS	SOURCE
1. BIG DATA ANALYTICS	**INCREASED REVENUES**	
Use of big data analytics in demand forecasting and supply planning	Sized based on increase in revenue from more accurate demand-supply matching leading to higher sales. McKinsey Global Institute (2011) estimated a 2.5 percent to three percent increase in profit margin from big data analytics in manufacturing. Country-level estimate was derived based on domestic manufacturing sector GDP.	• McKinsey Global Institute (2011)[267]
2. ADDITIVE MANUFACTURING	**PRODUCTIVITY GAINS/COST SAVINGS**	
Use of dynamic, resource efficient 3D printing and related technologies to enable 'on-time' manufacturing & rapid manufacturing	Sized based on the incremental economic value of faster time-to-market due to quicker prototyping and design adjustments, reduced production time, higher material productivity as well as more efficient sales process due to product customization. McKinsey & Company (2017) estimated that the global economic value of this technology could reach between USD100 billion and USD250 billion by 2025. Current economic value was calculated based on today's global manufacturing sector GDP, and assuming a constant growth rate for the 2030 forecast. Country-level estimate was derived based on the domestic manufacturing sector GDP as a share of the global figure.	• McKinsey & Company (2017)[268]
3. IOT-ENABLED SUPPLY CHAIN MANAGEMENT	**COST SAVINGS**	
Savings in operating costs from IoT-enabled supply chain management and distribution network management	Sized based on reduction in operating costs from adopting IoT-enabled supply chain management and distribution network management. McKinsey Global Institute (2011) estimated a 2.5 percent to five percent savings in distribution and supply chain operating costs could amount to two percent to six percent of manufacturing sales. Country-level estimate was derived based on domestic manufacturing sector operating costs.	• McKinsey Global Institute (2011)[269]
4. AUTOMATION AND ROBOTICS	**PRODUCTIVITY GAINS**	
Productivity boost from automating mundane and repetitive production tasks	Sized based on productivity boost to manufacturing processes from robots performing mundane and repetitive tasks. McKinsey & Company (2017) estimated that automation and robotics could improve productivity ranging from 0.8 to 1.4 percent of global GDP annually from 2015 to 2065. Country-level estimate was derived based on domestic manufacturing sales.	• McKinsey & Company (2017)[270]

267. McKinsey Global Institute (2011), Big data: The next frontier for innovation, competition and productivity. Available at: https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/big-data-the-next-frontier-for-innovation
268. McKinsey & Company (2017), Additive manufacturing: A long-term game changer for manufacturers. Available at: https://www.mckinsey.com/business-functions/operations/our-insights/additive-manufacturing-a-long-term-game-changer-for-manufacturers
269. McKinsey Global Institute (2011), Big data: The next frontier for innovation, competition and productivity. Available at: https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/big-data-the-next-frontier-for-innovation
270. McKinsey & Company (2017), A future that works: Automation, employment, and productivity. Available at: https://www.mckinsey.com/~/media/mckinsey/featured%20insights/digital%20disruption/harnessing%20automation%20for%20a%20future%20that%20works/a-future-that-works-executive-summary-mgi-january-2017.ashx

RESOURCES

DESCRIPTION	SIZING ASSUMPTIONS	SOURCE
1. SMART EXPLORATION AND AUTOMATION IN MINING OPERATIONS	**PRODUCTIVITY GAINS / COST SAVINGS**	
Use of big data to analyze geoscience and drilling data to locate probable deposits proactively and efficiently, and automate extraction and transport	Sized based on the potential global economic value of such technologies in mining. McKinsey & Company (2015) estimated big data to generate USD250 billion in economic value, based on an 80 percent adoption rate scenario. Country-level estimate was derived based on the country's relative share of global mining sector GDP, proxied by the country's share of global mineral rents.	• McKinsey & Company (2015)[271]
2. PREDICTIVE SAFETY TECHNOLOGIES	**PRODUCTIVITY GAINS/COST SAVINGS**	
Technologies that improve productivity and safety such as wearables with in-built sensors that monitor fatigue, location, atmosphere and vitals, and augmented reality interfaces that improve human-machine interaction	Sized based on the potential global economic value of such technologies in mining. McKinsey & Company (2015) estimated the economic value to be USD15 billion, based on a 100 percent adoption rate scenario. Country-level estimate was derived based on the country's relative share of global mining sector GDP, proxied by the country's share of global mineral rents.	• McKinsey & Company (2015)[272]
3. PREDICTIVE MAINTENANCE TECHNOLOGIES	**PRODUCTIVITY GAINS/COST SAVINGS**	
Use of remote operations centers and data-collecting sensors on mining equipment to improve failure anticipation, reduce unscheduled breakdowns and increase equipment life	Sized based on the potential global economic value of such technologies in mining. McKinsey & Company (2015) estimated the economic value to be USD105 billion, based on a 100 percent adoption rate scenario. Country-level estimate was derived based on the relative share of global mining sector GDP, proxied by the country's share of global mineral rents.	• McKinsey & Company (2015)[273]

271. McKinsey & Company (2015), How digital innovation can improve mining productivity.
Available at: https://www.mckinsey.com/industries/metals-and-mining/our-insights/how-digital-innovation-can-improve-mining-productivity
272. McKinsey & Company (2015), How digital innovation can improve mining productivity.
Available at: https://www.mckinsey.com/industries/metals-and-mining/our-insights/how-digital-innovation-can-improve-mining-productivity
273. McKinsey & Company (2015), How digital innovation can improve mining productivity.
Available at: https://www.mckinsey.com/industries/metals-and-mining/our-insights/how-digital-innovation-can-improve-mining-productivity

TRANSPORT SERVICES

DESCRIPTION	SIZING ASSUMPTIONS	SOURCE
1. SMART ROADS		**TIME SAVINGS**
Use of real-time public transit information, intelligent traffic signals and real-time road navigation to reduce commuting time	Sized based on the economic value of real-time public transit information, intelligent traffic signals and real-time road navigation. McKinsey Global Institute (2018) estimated a 2.2 percent reduction in average commuting time for "high-income" countries, and 5.5 percent for other countries. Classification of the country's income level was based on the World Bank's definition. Country-level estimate was derived based on the average commuting time, population and GDP per capita.	• McKinsey Global Institute (2018)[274] • World Bank[275]
2. SMART PORTS		**COST SAVINGS**
Use of IoT to enhance port efficiency	Sized based on cost savings from reduced logistics costs due to IoT-enabled data collection and monitoring, as well as intelligent decision-making capabilities. Accenture and SIPG (2016) estimated 3.6 percent savings in logistics costs from building smart ports. Country-level estimate was derived based on logistics sector costs (based on indicated percentages of the country's GDP).	• Accenture and SIPG (2016)[276] • Council of Supply Chain Management Professionals (2013)[277] • World Bank (2016)[278]
3. AUTONOMOUS VEHICLES		**COST SAVINGS**
Use of AI and sensors to increase fuel efficiency	Sized based on the projected gains in fuel efficiency, compared to conventional vehicles. McKinsey Global Institute (2013) estimated that autonomous cars could travel more closely together, reducing air resistance and improving fuel efficiency by 15 percent to 20 percent. Country-level estimate was derived based on the number of cars, projected number of autonomous vehicles, annual fuel requirement, and cost of fuel.	• McKinsey Global Institute (2013)[279]
4. GEOSPATIAL SERVICES		**PRODUCTIVITY GAINS/COST SAVINGS**
Productivity impact of using location-based information	Sized based on estimated productivity impact geospatial services in the transport sector (land, sea and air). AlphaBeta (2017) estimated that geospatial services could improve productivity of land, sea and air transport by 2.5 percent to five percent. These benefits include reduced logistics costs, improved network design and management. Country-level estimate was derived based on the size of the land, sea and air transport sector.	• AlphaBeta (2017)[280]

274. McKinsey Global Institute (2018), Smart cities: Digital solutions for a more liveable future.
Available at: https://www.mckinsey.com/industries/capital-projects-and-infrastructure/our-insights/smart-cities-digital-solutions-for-a-more-livable-future
275. World Bank (2018). Available at: https://blogs.worldbank.org/opendata/new-country-classifications
276. Accenture and Shanghai International Port Group (2016), Connected ports: Driving future trade.
Available at: https://www.accenture.com/t20161012T003018Z__w__/us-en/_acnmedia/PDF-29/accenture-connected-ports-driving-future-trade.pdf
277. Council of Supply Chain Management Professionals (2013), State of logistics report.
Available at: http://www.scdigest.com/assets/newsviews/13-06-20-2.php?cid=7168&ctype=content
278. World Bank (2016), Logistics performance index: Ranking by countries. Available at: https://lpi.worldbank.org/international/global
279. McKinsey Global Institute (2013), Disruptive technologies: Advances that will transform life, business and the global economy.
Available at: https://www.mckinsey.com/~/media/McKinsey/Business%20Functions/McKinsey%20Digital/Our%20Insights/Disruptive%20technologies/McKinsey Global Institute_Disruptive_technologies_Full_report_May2013.ashx
280. AlphaBeta (2017), The Economic Impact of Geospatial Services: How Consumers, Businesses And Society Benefit from Location-Based Information.
Available at: https://www.alphabeta.com/wp-content/uploads/2017/09/GeoSpatial-Report_Sept-2017.pdf

APPENDIX A3: ECONOMIC IMPACT OF COVID-19 RELEVANT TECHNOLOGY APPLICATIONS

To estimate the economic value of technology applications that could help businesses and organizations manage the long-term economic impacts of the COVID-19 pandemic and future "black swan" events, all the technology applications were assessed for their relevance to COVID-19 and the value from those relevant to COVID-19 was estimated.

Of the 43 technology applications, 23 were assessed to have the potential to manage the economic impacts of "black swan" events in the Philippines' context, through three channels. These are:

- Facilitating customer interactions, transactions and marketing through digital platforms;
- Embracing hybrid work arrangements to enable business continuity; and
- Future-proofing supply chains against global and regional disruptions.

Exhibit A2 shows the list of these 23 COVID-19 relevant technology applications, grouped by their respective sectors and the specific channel through which they deliver COVID-19 relevant impact.

Photo Source: https://www.instagram.com/p/CMg29QMHE-a/

EXHIBIT A2:

OF THE 43 TECHNOLOGY APPLICATIONS SIZED, 23 HAVE THE POTENTIAL TO MITIGATE THE LONG-TERM IMPACTS OF THE COVID-19 PANDEMIC THROUGH 3 CHANNELS

CHANNEL	SECTOR	COVID-19 RELEVANT TECHNOLOGY APPLICATION/S
Facilitating customer interactions, transactions and marketing through digital platforms	Consumer, retail and hospitality	1. Digital retail sales and marketing channels 2. Online F&B delivery services
	Education and training	3. E-career centers and digital jobs platforms 4. Online retraining programs
	Financial services	5. Digital banking services
	Government	6. Digitization of government payments
	Health	7. Telehealth applications
Embracing hybrid work arrangements to enable business continuity	Agriculture & food	8. Precision farming technologies
	Consumer, retail and hospitality	9. IoT-enabled inventory management 10. Automation and AI customer service in hotels
	Government	11. Government e-services 12. E-procurement
	Health	13. Remote patient monitoring 14. Smart medical devices and wearables
	Infrastructure	15. Smart grids 16. 5D BIM and project management technologies 17. Predictive maintenance technologies
	Manufacturing	18. Big data analytics 19. Automation and robotics
	Resources	20. Smart exploration and automation in mining operations
Future-proofing supply chains against global and regional disruptions	Agriculture & food	21. IoT-enabled supply chain management (food)
	Manufacturing	22. IoT-enabled supply chain management (manufacturing)
	Transport services	23. Smart ports

SOURCE: AlphaBeta analysis

B: SIZING GOOGLE'S ECONOMIC IMPACT IN THE PHILIPPINES

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

To estimate **societal benefits**, the resultant revenue gains experienced by Filipino businesses from the use of Google Ads, AdSense, and YouTube was then used to calculate the job creation benefits indirectly supported by Google.

Estimating the **consumer benefits** supported by Google is a challenging task. This is because individuals typically do not have to pay for the Google products that they use. There are several established methodologies for estimating the benefits of free services, including consumer surplus based on the consumer's willingness to pay (how much an individual value a Google product). Primary data used in the analysis was collected from a consumer survey of 507 Internet users in the Philippines. This sample size is statistically significant based on the Philippines' online population, at a 95 percent confidence level (the level typically adopted by researchers). The survey was conducted online, which was deemed suitable given the intention to survey internet users. The sample was also checked for its representativeness of the Filipino Internet population based on demographic variables including age, income level, and the geographical location of respondents. The Google products included in this analysis of consumer benefits include Google Search, Google Play, Google Drive, Photos, Docs, and Sheets.

BUSINESS AND JOB CREATION BENEFITS

The business benefits supported by Google include the gross revenue, income or savings generated by businesses using Google products. These benefits do not include the flow-on economic effects generated, such as further purchases from their suppliers or the economic activity generated by the employees of these businesses who spend their wages in the broader economy. These benefits also do not account for activity that may have been displaced by Google, nor attempt to estimate the incremental impact of Google on the Philippine economy beyond what would be the case if Google did not exist but other companies like it did. Exhibit B1 summarizes the methodology used for sizing the business benefits of Google's products, as well as the job creation benefits.

GOOGLE SEARCH AND ADS

The business benefits of Google Search and Ads were estimated using two methods – a top-down approach and a bottom-up approach. The top-down approach estimated the total size of the search advertising segment in the country and the proportion of this space that Google represents. The bottom-up approach estimated the number of Google searches conducted in the country, the proportion of searches with advertisements, the number of advertisements per search, the average click-through rate (CTR), and the average cost-per-click (CPC).

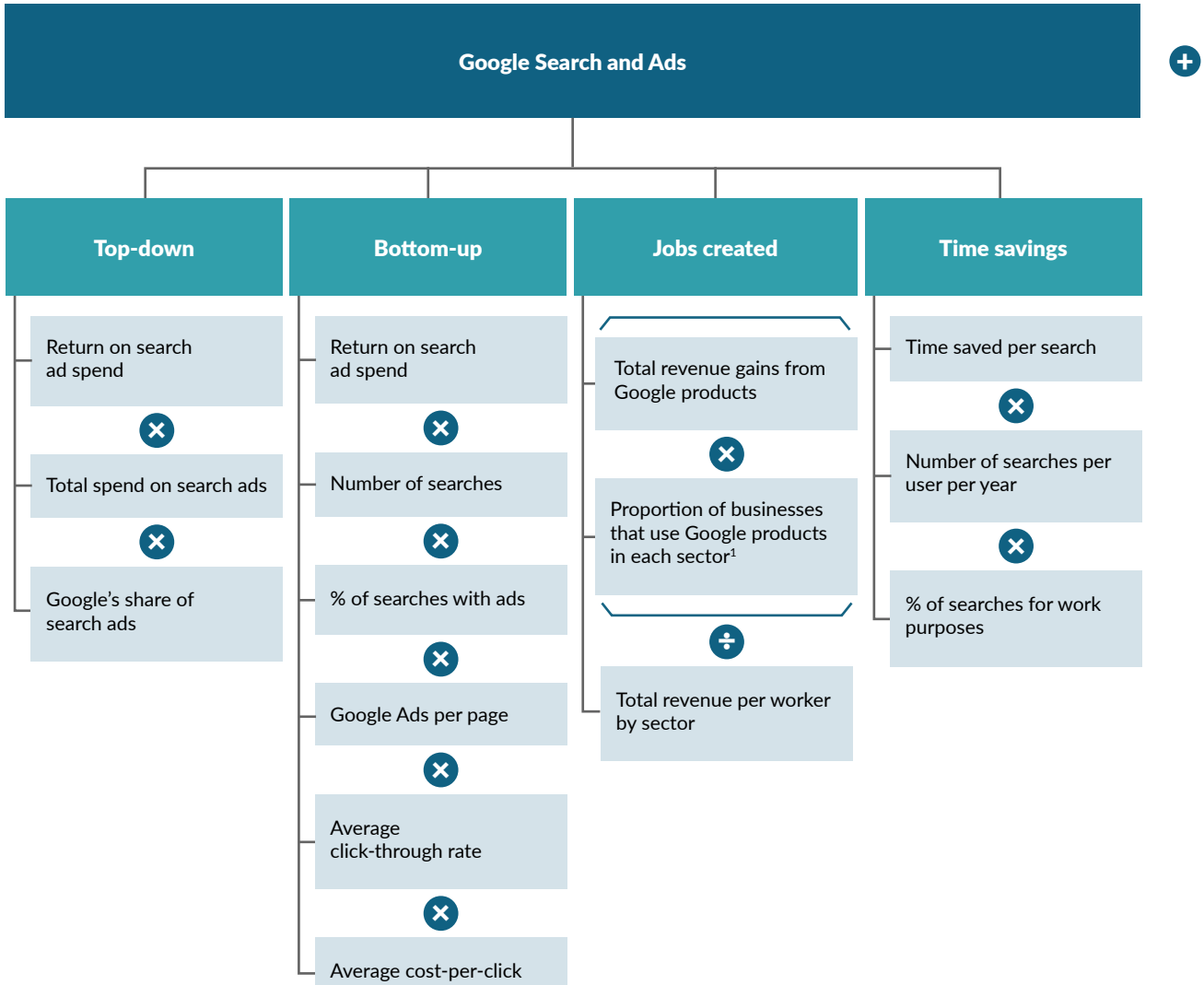
To estimate the income generated by businesses paying for online advertising through Google a return on investment (ROI) ratio range of 3.4 – 8 was applied, and both estimates were reported.[281] This ROI ratio was developed from a few assumptions:

- Using a large sample of proprietary data, Hal Varian, Google's Chief Economist, estimated that businesses received USD2 in revenue for

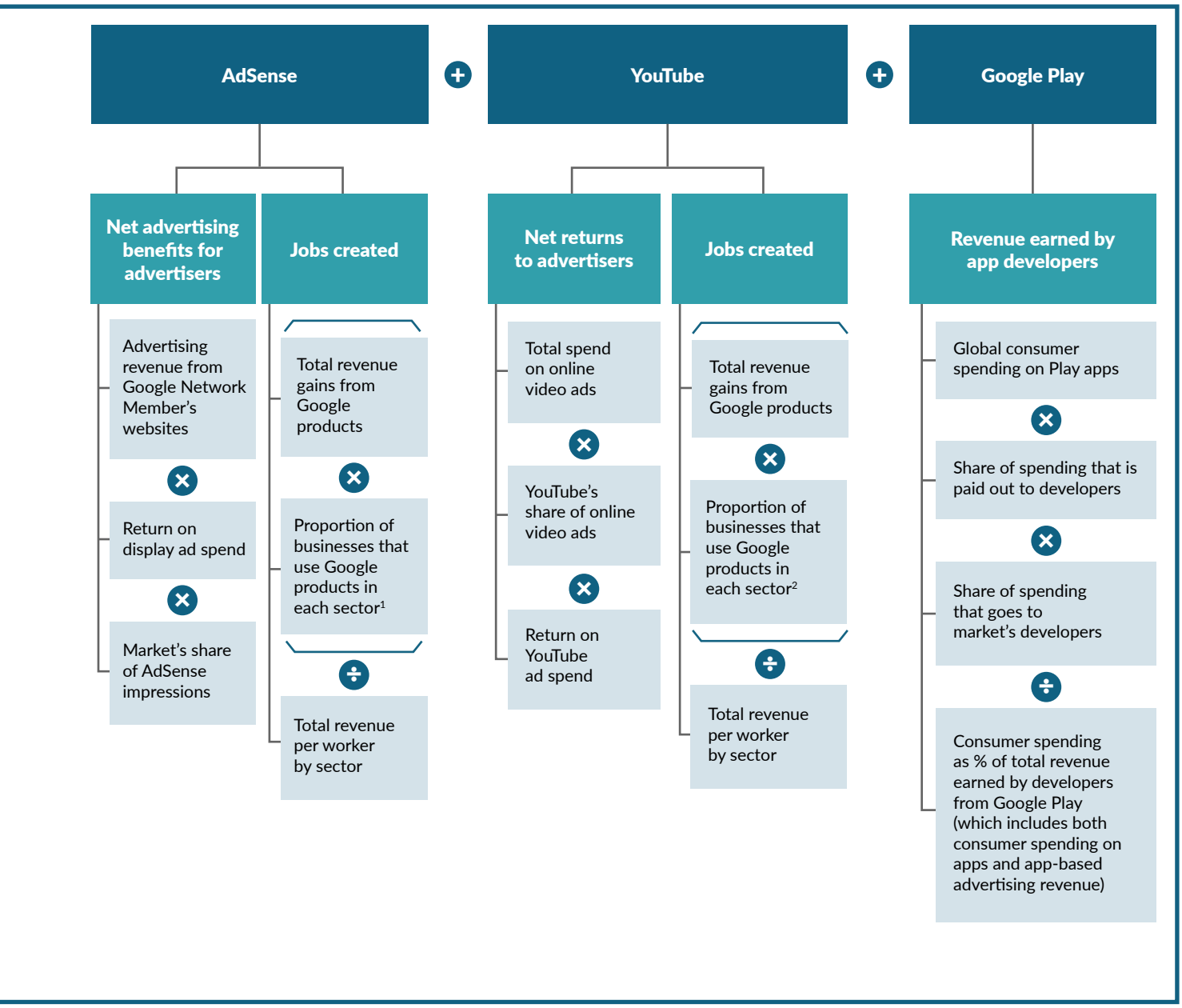
281. ROI reflects the net advertising benefits that businesses receive from online advertising (i.e., total revenue minus online advertising cost).

EXHIBIT B1:

METHODOLOGY FOR SIZING BUSINESS AND JOB CREATION BENEFITS FROM GOOGLE



1. In the absence of such publicly available data, this was proxied based on the proportion of businesses that use websites in each sector. This data is available from Philippine Statistics Authority (2018), "2018 Census of Philippine Business and Industry: Economy-Wide".
Available at: https://psa.gov.ph/content/2018-census-philippine-business-and-industry-economy-wide
2. In the absence of such publicly available data, this was proxied based on the proportion of businesses that use a social media account in each sector. This data is available from Philippine Statistics Authority (2018), "2018 Census of Philippine Business and Industry: Economy-Wide".
Available at: https://psa.gov.ph/content/2018-census-philippine-business-and-industry-economy-wide
Note: This report's methodology for measuring Google's economic impact is consistent with the methodology used in the Google Economic and Social Impact South Korea and New Zealand 2021 reports.
SOURCE: AlphaBeta analysis


AdSense
YouTube
Google Play
Net advertising benefits for advertisers
Jobs created
Net returns to advertisers
Jobs created
Revenue earned by app developers
Advertising revenue from Google Network Member's websites
Return on display ad spend
Market's share of AdSense impressions
Total revenue gains from Google products
Proportion of businesses that use Google products in each sector[1]
Total revenue per worker by sector
Total spend on online video ads
YouTube's share of online video ads
Return on YouTube ad spend
Total revenue gains from Google products
Proportion of businesses that use Google products in each sector[2]
Total revenue per worker by sector
Global consumer spending on Play apps
Share of spending that is paid out to developers
Share of spending that goes to market's developers
Consumer spending as % of total revenue earned by developers from Google Play (which includes both consumer spending on apps and app-based advertising revenue)

every USD1 spent on advertising. This finding was published in the American Economic Review in 2009.

- Businesses also receive free clicks because of unpaid Google Search. Using research published in the International Journal of Internet Marketing and Advertising in 2009 by Jansen and Spink, the Google US Economic Impact Study assumed that businesses receive five clicks for every click on a paid advertisement.

- Unpaid clicks are not considered as commercially valuable, so the US Economic Impact Study assumed their value at 70 percent of paid clicks.

- Because of these assumptions, an ROI ratio of 8 was estimated. This ROI ratio was taken as an upper bound. To derive a lower bound, we built on the academic findings detailed in the Google UK Economic Impact Study to set a lower bound of 3.4.

Table 2 shows the inputs and sources used for estimating the business benefits of Google Search and Ads.

ADSENSE

The direct business benefits from AdSense were estimated as the net advertising benefits generated by businesses placing advertisements on publisher sites such as websites, blogs, and forums.[282] We estimated this figure using Google's published global advertising revenue from Google network's websites and multiplied this by the country's share of global AdSense impressions.[283] In addition, we applied an ROI ratio that advertisers earn using display advertising, derived from academic literature.

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

TIME SAVINGS BENEFITS OF GOOGLE SEARCH

We estimated the time saving benefits that businesses gained from using Google Search based on the amount of time saved per search, the number of searches conducted per worker, and the share of searches that were conducted for work purposes.

Table 4 shows the inputs and sources used for estimating the time savings benefits of Google Search.

YOUTUBE

We estimated the direct benefits of YouTube to video advertisers in the country based on the total video advertising spend in the country and YouTube's share of that market. This estimate was then multiplied with the ROI ratios for YouTube advertisement.

Table 5 shows the inputs and sources used for estimating the business benefits of YouTube.

JOB CREATION BENEFITS FROM GOOGLE PRODUCTS

We estimated the number of jobs that are indirectly supported through revenue gains experienced by Filipino businesses from the use of Google's products for advertising. These include revenue gains from Google Ads, AdSense and YouTube. The underlying principle here is that as businesses gain increased revenue as they market their goods and services more effectively through the use of these Google services, their businesses expand and they will need to hire more employees to support the increased demand. This is a conservative estimate as it does not include "spillover jobs" such as new jobs that get created in the supply chain - e.g., supplier companies that also require to hire more as they sell an increased level of raw materials or component services to these businesses. To estimate the job creation impacts robustly, these were computed at the sectoral level, based on the breakdown of Google-supported revenue gains by sector, and revenue per worker in each sector. The breakdown of these Google-supported revenue gains by sector was estimated based on the average of the following two metrics: 1) share of businesses using websites (to proxy for the use of Google Ads and AdSense) or the share of businesses with social media accounts (to proxy for the use of YouTube) by sector; and 2) revenues of businesses in each

282. This refers to the increase in revenues and sales that can be directly attributed to advertising minus the related advertising expenditure.
283. This methodology does not account for price differences across countries due to the lack of availability of reliable data on cost per impression by country.

sector. The total revenue gains supported by Google's advertising products in each sector was then divided by the respective revenue per worker figures for each sector to obtain the number of jobs indirectly supported by Google in each sector. The total number of jobs indirectly supported by Google in the Philippines' economy was taken as a sum of the estimated job creation benefits across all sectors.

Table 6 summarizes the inputs and sources.

TABLE 2: INPUTS AND SOURCES FOR CALCULATING BUSINESS BENEFITS OF GOOGLE SEARCH AND ADS

APPROACH	METRIC	SOURCE
Top down approach	Total market expenditure on search advertising	• Statista (2019)[284]
	Google Search's market share	• StatCounter (2019)[285]
Bottom-up approach	Google Search traffic data	• AlphaBeta Consumer Survey (2020)
	% pages that display advertisements	• Varian (2009)[286], Jansen & Spink (2009)[287] • Deloitte (2015)[288]
	Advertisements per page on average	• Varian (2009)[289], Jansen & Spink (2009)[290] • Deloitte (2015)[291]
	CTR for Search (Estimate)	• Word Stream (2019)[292] • BannerTag (2019)[293]
	Average CPC for Search (Estimate)	• Word Stream (2018)[294] • Adstage (2019)[295]
Both Methods	ROI ratio Lower and Upper Bound	• Varian (2009)[296], Jansen & Spink (2009)[297] • Deloitte (2015)[298]

284. Statista (2020), "Search advertising – Philippines". Available at: https://www.statista.com/outlook/219/123/search-advertising/philippines
285. StatCounter (2020), "Search engine market share Philippines". Available at: https://gs.statcounter.com/search-engine-market-share/all/philippines/#yearly-2019-2019-bar
286. Varian, H. R. (2009), "Online Ad Auctions". The American Economic Review, Vol. 99, No. 2, pp. 430-434. Available at: https://www.aeaweb.org/articles?id=10.1257/aer.99.2.430
287. Jansen, B. J., & Spink, A. (2009), "Investigating customer click through behaviour with integrated sponsored and non-sponsored results." International Journal of Internet Marketing and Advertising, Vol. 5, No. 1-2, pp. 74-94. Available at: https://pennstate.pure.elsevier.com/en/publications/investigating-customer-click-through-behaviour-with-integrated-sp
288. Deloitte (2015), Google's Economic Impact United Kingdom. Available at: https://drive.google.com/file/d/0B9xmjQ1MUCjpNXBJZExHY1NqQlU/view
289. Varian, H. R. (2009), "Online Ad Auctions". The American Economic Review, Vol. 99, No. 2, pp. 430-434. Available at: https://www.aeaweb.org/articles?id=10.1257/aer.99.2.430
290. Jansen, B. J., & Spink, A. (2009), "Investigating customer click through behaviour with integrated sponsored and non-sponsored results." International Journal of Internet Marketing and Advertising, Vol. 5, No. 1-2, pp. 74-94. Available at: https://pennstate.pure.elsevier.com/en/publications/investigating-customer-click-through-behaviour-with-integrated-sp
291. Deloitte (2015), Google's Economic Impact United Kingdom. Available at: https://drive.google.com/file/d/0B9xmjQ1MUCjpNXBJZExHY1NqQlU/view
292. Laubenstein, C. (2019), "What's a Good Click-Through Rate (CTR) for Google Ads?". Word Stream. Available at: https://www.wordstream.com/blog/ws/2010/04/26/good-click-through-rate
293. Karlštrems, A. (2019), "Google AdSense CPM Rates 2019". BannerTag. Available at: https://www.bannertag.com/google-adsense-cpm-rates/
294. Irvine, M. (2018), "Average Cost per Click by Country: Where in the World Are the Highest CPCs?" Word Stream. Available at: http://www.wordstream.com/blog/ws/2015/07/06/average-cost-per-click
295. Adstage (Q3 2019), Paid media - benchmark report. Available at: https://cdn2.hubspot.net/hubfs/4350015/Benchmark%20Report/Q3%202019%20Paid%20Media%20Benchmark%20Report.pdf
296. Varian, H. R. (2009), "Online Ad Auctions". The American Economic Review, Vol. 99, No. 2, pp. 430-434. Available at: https://www.aeaweb.org/articles?id=10.1257/aer.99.2.430
297. Jansen, B. J., & Spink, A. (2009), "Investigating customer click through behaviour with integrated sponsored and non-sponsored results." International Journal of Internet Marketing and Advertising, Vol. 5, No. 1-2, pp. 74-94. Available at: https://pennstate.pure.elsevier.com/en/publications/investigating-customer-click-through-behaviour-with-integrated-sp
298. Deloitte (2015), Google's Economic Impact United Kingdom. Available at: https://drive.google.com/file/d/0B9xmjQ1MUCjpNXBJZExHY1NqQlU/view

TABLE 3: INPUTS AND SOURCES FOR CALCULATING BUSINESS BENEFITS OF ADSENSE

ESTIMATION	METRIC	SOURCE
Net advertising benefits for advertisers	Advertising revenue from Google Network Member's websites	• Alphabet (2019)[299]
	ROI ratio	• Gupta et al. (2015)[300]
Both estimates	Country share of global impressions on AdSense (Estimate)	• DoubleClick (2012)[301] • Internet World Stats (2019)[302]

TABLE 4: INPUTS AND SOURCES FOR CALCULATING TIME SAVING BENEFITS OF GOOGLE SEARCH

METRIC	SOURCE
Time saved per search	• Varian (2014)[303] • Chen et al. (2014)[304]
Average daily searches per worker	• AlphaBeta Consumer Survey (2020)
% of searches for work purposes	• AlphaBeta Consumer Survey (2020)

TABLE 5: INPUTS AND SOURCES FOR CALCULATING BUSINESS BENEFITS OF YOUTUBE

METRIC	SOURCE
Total video advertising spend in country	• Statista (2019)[305]
YouTube's market share	• AlphaBeta Consumer Survey (2020)
YouTube ROI ratio	• Business Insider (2014)[306]

TABLE 6: INPUTS AND SOURCES FOR CALCULATING JOB IMPACT

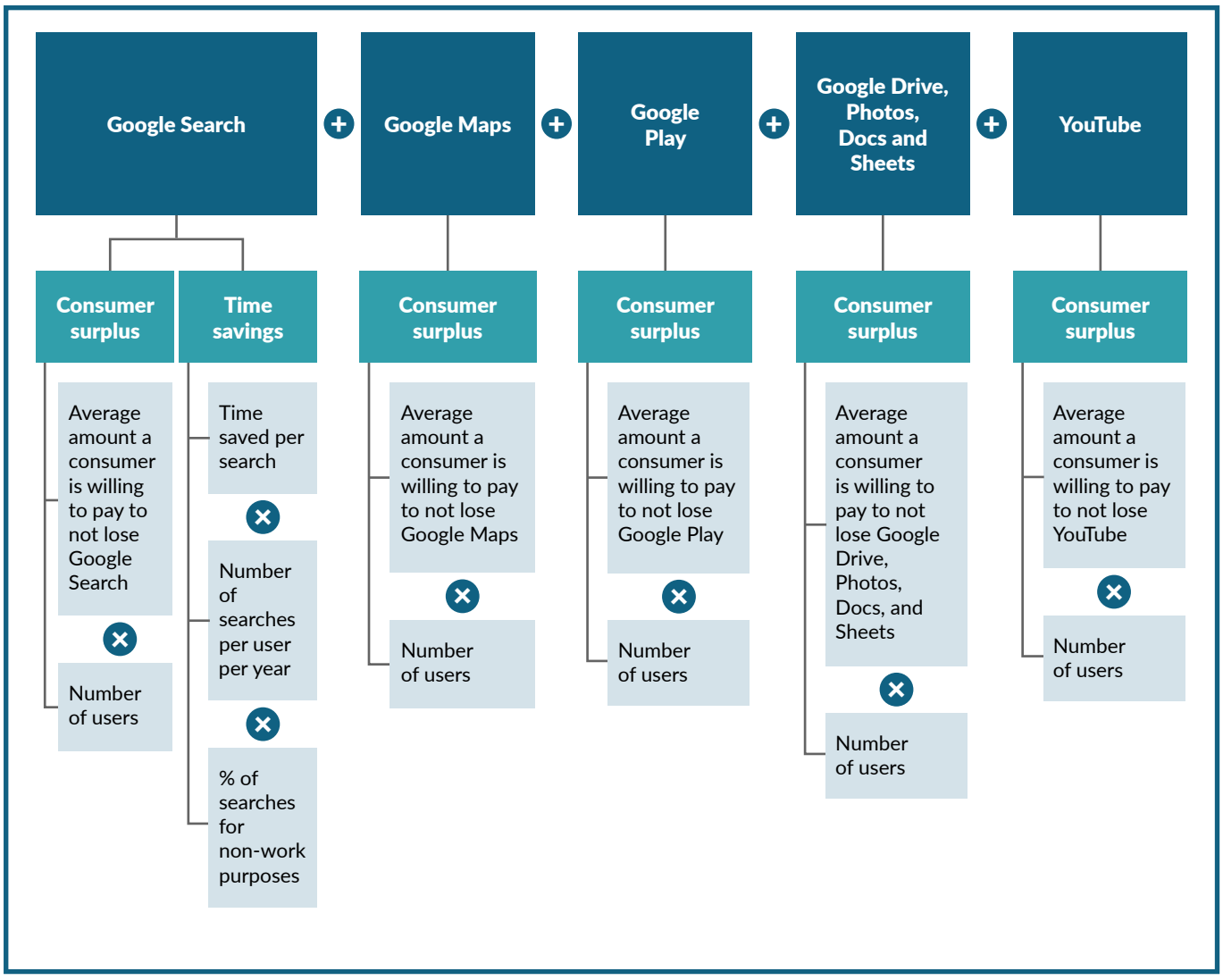
APPROACH	METRIC	SOURCE
Revenue per worker by sector	Number of employees in the Philippines by sector	• Philippine Statistics Authority (2018)[307]
	Total revenue by sector	• Philippine Statistics Authority (2018)[308]
Breakdown of business benefits for Google Ads, AdSense and YouTube	Businesses using a website from each sector as % of total	• Philippine Statistics Authority (2017)[309]
	Businesses with a social media account as % of total	

299. Alphabet (2019). Form 10-K for fiscal year ended December 31, 2019 - Submission to US SEC.
Available at: https://www.sec.gov/Archives/edgar/data/1652044/000165204420000008/goog10-k2019.htm
300. Gupta, S., Pauwels, K., & Kireyev, P. (2015), Do display ads influence search? Attribution and dynamics in online advertising. International Journal of Research in Marketing.
Available at: http://www.sciencedirect.com/science/article/pii/S0167811615001159
301. Google DoubleClick (2012). What's trending in display for publishers?. Available at: https://www.slideshare.net/RFONNIER/display-business-trends-publisher-edition-google-2012
302. Internet World Stats (2019), "Asia Marketing Research, Internet Usage, Population Statistics and Facebook Subscribers". Available at: https://www.internetworldstats.com/asia.htm
303. Hal Varian (2014), "Economic value of Google" (Presentation).
Available at: http://cdn.oreillystatic.com/en/assets/1/event/57/The%20Economic%20Impact%20of%20Google%20Presentation.pdf
304. Chen, Y., YoungJoo Jeon, G., & Kim, Y.-M. (2014), "A day without a search engine: an experimental study of online and offline searches". Experimental Economics, Vol 17, Issue 4, pp 512-536. Available at: http://download.springer.com/static/pdf/906/art%253A10.1007%252Fs10683-013-9381-9.pdf?originUrl=http%3A%2F%2Flink.springer.com%2Farticle%2F10.1007%2Fs10683-013-9381-9&token2=exp=1458798858~acl=%2Fstatic%2Fpdf%2F906%2Fart%25253A10.1007%25252Fs10683-013-938
305. Statista (2020), "Video advertising – Philippines". Available at: https://www.statista.com/outlook/218/123/video-advertising/philippines
306. Business Insider Singapore (2016), "Google attacks TV".
Available at: http://www.businessinsider.sg/youtube-ads-have-better-roi-than-tv-according-to-google-2016-4/?r=US&IR=T#mL3ZFqo0vlab2xq2.97
307. Philippine Statistics Authority (2018), "2018 Census of Philippine Business and Industry: Economy-Wide".
Available at: https://psa.gov.ph/content/2018-census-philippine-business-and-industry-economy-wide
308. Philippine Statistics Authority (2018), "2018 Census of Philippine Business and Industry: Economy-Wide".
Available at: https://psa.gov.ph/content/2018-census-philippine-business-and-industry-economy-wide
309. Philippine Statistics Authority (2017), 2017 Survey on Information and Communication Technology.
Available at: https://psa.gov.ph/sites/default/files/2017%20SICT%20Publication_signed.pdf

CONSUMER BENEFITS

The consumer benefits supported by Google are challenging to measure and calculate because individuals typically do not pay for the services. In the absence of price indicators, we adopted the economic "willingness to pay" principle to estimate the value of consumer benefits by asking individuals how much they value specific products – also known as consumer surplus. We also calculated the time savings accrued to consumers from their use of Google Search (which increases the efficiency of information gathering). Exhibit B2 summarizes the methodology used for sizing consumer surplus and time savings of relevant products.

EXHIBIT B2:
METHODOLOGY FOR SIZING BENEFITS TO CONSUMERS FROM GOOGLE



Note: This report's methodology for measuring Google's economic impact is consistent with the methodology used in the Google Economic and Social Impact New Zealand 2021 report.
SOURCE: AlphaBeta analysis

GOOGLE SEARCH

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

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

To calculate time savings, we applied time saving estimates from an experiment that measured the time taken to conduct a search online versus a search at the library.[310] This study found that a search that takes 21 minutes in the library takes seven 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 the country by using Google Search.

The share of Google Search users in the country who have made use of Google Search for self-enrichment purposes such as learning new skills or acquiring knowledge in a new topic was also estimated using the consumer survey.

Table 7 shows the inputs and sources used for calculating the consumer benefits of Google Search.

GOOGLE MAPS

We sized the benefits of Google Maps to consumers using willingness to pay, where consumers were asked to value their favorite online maps service. To calculate the consumer surplus for Google Maps, we multiplied the number of Google Maps users with the average willingness to pay obtained from the consumer survey.

Table 8 shows the inputs and sources used for calculating the consumer benefits of Google Maps.

GOOGLE PLAY

We calculated the benefits of Google Play to consumers using willingness to pay, where consumers were asked to value their favorite online distribution platform for digital products. Results from the survey of the country's online population were used.

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

GOOGLE DRIVE, PHOTOS, DOCS, AND SHEETS

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

Table 10 shows the inputs and sources used for calculating the consumer benefits of Google Drive, Photos, Docs, and Sheets.

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 survey of the country's online population were used.

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

310. Yan Chen, Grace Young Joo Jeon and Yong-Mi Kim (2014), A day without a search engine: an experimental study of online and offline search. Experimental Economics. Available at: https://link.springer.com/article/10.1007/s10683-013-9381-9

TABLE 7: INPUTS AND SOURCES FOR CALCULATING CONSUMER BENEFITS OF GOOGLE SEARCH

ESTIMATION	METRIC	SOURCE
Consumer surplus	Amount that consumers value product per year (WTP)	• AlphaBeta Consumer Survey (2020)
	Online Population (OP)	• Internet World Stats (2019)[311]
	Search users as % of OP	• AlphaBeta Consumer Survey (2020)
Time saved per user	Time saved per search	• Varian (2014)[312] • Chen et al. (2014)[313]
	Average daily searches per user	• AlphaBeta Consumer Survey (2020)
	% of searches for non-work purposes	• AlphaBeta Consumer Survey (2020)
Share of Search users who have made use of Search for self-enrichment purposes	% of Search users in country who made use of Search for self-enrichment purposes	• AlphaBeta Consumer Survey (2020)

TABLE 8: INPUTS AND SOURCES FOR CALCULATING CONSUMER BENEFITS OF GOOGLE MAPS

ESTIMATION	METRIC	SOURCE
Consumer surplus	Amount that consumers value product per year (WTP)	• AlphaBeta Consumer Survey (2020)
	Online Population (OP)	• Internet World Stats (2019)[314]
	Map users as % of OP	• AlphaBeta Consumer Survey (2020)

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

ESTIMATION	METRIC	SOURCE
Consumer surplus	Amount that consumers value product per year (WTP)	• AlphaBeta Consumer Survey (2020)
	Online Population (OP)	• Internet World Stats (2019)[315]
	Google Play users as % of OP	• AlphaBeta Consumer Survey (2020)

311. Internet World Stats (2019), "Asia Marketing Research, Internet Usage, Population Statistics and Facebook Subscribers".
Available at: https://www.internetworldstats.com/asia.htm
312. Hal Varian (2014), "Economic value of Google" (Presentation).
Available at: http://cdn.oreillystatic.com/en/assets/1/event/57/The%20Economic%20Impact%20of%20Google%20Presentation.pdf
313. Chen, Y., YoungJoo Jeon, G., & Kim, Y.-M. (2014), "A day without a search engine: an experimental study of online and offline searches". Experimental Economics, Vol 17, Issue 4, pp 512-536. http://download.springer.com/static/pdf/906/art%253A10.1007%252Fs10683-013-9381-9.pdf?originUrl=http%3A%2F%2Flink.springer.com%2Farticle%2F10.1007%2Fs10683-013-9381-9&token2=exp=1458798858~acl=%2Fstatic%2Fpdf%2F906%2Fart%25253A10.1007%25252Fs10683-013-938
314. Internet World Stats (2019), "Asia Marketing Research, Internet Usage, Population Statistics and Facebook Subscribers".
Available at: https://www.internetworldstats.com/asia.htm
315. Internet World Stats (2019), "Asia Marketing Research, Internet Usage, Population Statistics and Facebook Subscribers".
Available at: https://www.internetworldstats.com/asia.htm

TABLE 10: INPUTS AND SOURCES FOR CALCULATING CONSUMER BENEFITS OF GOOGLE DRIVE, PHOTOS, DOCS, AND SHEETS

ESTIMATION	METRIC	SOURCE
Consumer surplus	Amount that consumers value product per year (WTP)	• AlphaBeta Consumer Survey (2020)
	Online Population (OP)	• Internet World Stats (2019)[316]
	Google Drive users as % of OP	• AlphaBeta Consumer Survey (2020)

TABLE 11: INPUTS AND SOURCES FOR CALCULATING CONSUMER BENEFITS OF YOUTUBE

ESTIMATION	METRIC	SOURCE
Consumer surplus	Amount that consumers value product per year (WTP)	• AlphaBeta Consumer Survey (2020)
	Online Population (OP)	• Internet World Stats (2019)[317]
	YouTube users as % of OP	• AlphaBeta Consumer Survey (2020)
Share of YouTube users who have made use of YouTube to learn advanced digital skills	% of YouTube users in country who made use of YouTube to learn advanced digital skills	• AlphaBeta Consumer Survey (2020)

316. Internet World Stats (2019), "Asia Marketing Research, Internet Usage, Population Statistics and Facebook Subscribers". Available at: https://www.internetworldstats.com/asia.htm
317. Internet World Stats (2019), "Asia Marketing Research, Internet Usage, Population Statistics and Facebook Subscribers". Available at: https://www.internetworldstats.com/asia.htm

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 non-Google 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 amounts in this report are estimated in both Philippine Pesos (PHP) and United States dollars (USD). The conversion is based on the average exchange rate in 2021, sourced from the IMF database of historical annual exchange rates, which was 1 USD = 49.39 PHP.

αlphaβeta
strategy x economics

AlphaBeta is a strategy and economic advisory business serving clients across Asia and globally. We work with the public sector, corporations, NGOs, not-for-profits and investors to identify opportunities and develop strategies to grow, improve service delivery, support economic prosperity and generate tangible impact.

Prepared by AlphaBeta for Google

αlphaβeta

strategy x economics