POSITIONING MALAYSIA AS A REGIONAL LEADER IN THE DIGITAL ECONOMY:

THE ECONOMIC OPPORTUNITIES OF DIGITAL TRANSFORMATION AND GOOGLE'S CONTRIBUTION

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αlphaβeta
strategy x economics

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UNLOCKING MALAYSIA'S DIGITAL POTENTIAL

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

MYR257.2 BILLION (USD61.3 BILLION)
in annual economic value[1]

72%
of this value[1] could come from technologies that mitigate the impact of the COVID-19 pandemic

THREE PILLARS OF ACTION

1 FACILITATE DIGITALISATION IN BOTH THE PUBLIC AND PRIVATE SECTORS

2 BUILD THE NATION'S DIGITAL TALENT

3 PROMOTE DIGITAL TRADE OPPORTUNITIES

EXAMPLES OF GOOGLE'S CONTRIBUTIONS TO EACH PILLAR

Google's **"MAHIR DIGITAL BERSAMA GOOGLE"** programme offers free workshops to help SMEs learn digital tools and skills to establish and grow their business online

Supported by a USD3.3-million grant from Google.org, The Asia Foundation's **"GO DIGITAL ASEAN"** programme aims to equip 15,000 underemployed and underserved Malaysian youths with digital literacy skills

YOUTUBE supports businesses and content creators in Malaysia by allowing them to reach out to international audiences easily

GOOGLE'S BROADER ECONOMIC BENEFITS

BUSINESSES

Google supports **MYR7.1 BILLION (USD1.7 BILLION)** in annual benefits to businesses in Malaysia[2]

CONSUMERS

Google supports **MYR32.7 BILLION (USD7.8 BILLION)** in annual benefits to consumers in Malaysia[2]

SOCIETY

By enabling businesses to unlock new revenue streams and expand their businesses, Google indirectly supports **OVER 31,000 JOBS** in Malaysia. It also delivers a set of programmes to support communities such as female entrepreneurs, allowing them to benefit from digital technologies

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

Malaysia's digital economy is growing rapidly and has been identified by the government as a key growth area. Between 2015 and 2018, Malaysia's digital economy experienced robust growth of eight percent annually, which was higher than its gross domestic product (GDP) growth of five percent per year during the same period.[1] The e-Conomy SEA 2020 report by Google, Temasek, and Bain & Company finds that Malaysia's Internet economy was worth USD11.4 billion in 2020, and could grow further at 23 percent annually to 2025.[2] To capture the opportunities emerging from its digital economy, also viewed as a key lever of economic growth, the Malaysian Government launched the "Malaysia Digital Economy Blueprint" ("MyDIGITAL") in February 2021.[3] The government's strategy aims to transform the country into a digitally-driven, high-income nation and a regional leader in the digital economy by 2030.

However, digital adoption remains low, and uneven across business sizes and sectors. Broadly, businesses in Malaysia lag in their adoption of digital applications; only one-third of Malaysian businesses have a website, as compared to 44 percent globally.[4] Moreover, digital adoption has been uneven across economic sectors and enterprise sizes. Although the average Internet penetration rate of businesses in the country has reached 73 percent, Internet usage is highly concentrated in the manufacturing sector (90 percent) but lagging in other sectors such as agriculture (61 percent).[5] Unlike large firms, digital adoption among small and medium-sized enterprises (SMEs) is shown to be lower. While almost all SMEs in Malaysia use either a smart device or personal computer, an SME study conducted in June 2018 found that the usage of other ICT technologies, beyond basic computing and statistics, that have an impact on business productivity was less than 20 percent in 2018.[6] Digital skills shortage and the perceived high cost of investment in digital tools were cited by the country's digital economy agency, Malaysia Digital Economy Corporation (MDEC), as key reasons for the low digital adoption rate among SMEs.[7]

The COVID-19 pandemic has amplified the importance of digital transformation in expediting short-term economic recovery and boosting long-term economic resilience. A study has found that, globally, the pandemic has effectively pushed forward the digital revolution

1. Digital economy is defined as economic and social activities that involve the production and use of digital technology by individuals, businesses and government. YCP Solidiance (2018), Accelerating your digital transformation: Are Malaysian companies geared to digitalise?
Available at: https://ycpsolidiance.com/white-paper/accelerating-your-digital-transformation-are-malaysian-companies-geared-to-digitalise#download-white-paper
2. In this research, the value of the Internet economy refers to the Gross Merchandise Value (GMV) of products and services of sectors under 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/Malaysia-e-Conomy_SEA_2020_Country_Insights.pdf
3. Economic Planning Unit, Prime Minister's Department (2018), Malaysia Digital Economy Blueprint.
Available at: https://www.epu.gov.my/sites/default/files/2021-02/Malaysia-digital-economy-blueprint.pdf
4. World Bank Group (2018), Malaysia's Digital Economy: A new driver of development.
Available at: https://openknowledge.worldbank.org/bitstream/handle/10986/30383/129777.pdf
5. Sources include: YCP Solidiance (2018), Accelerating your digital transformation: Are Malaysian companies geared to digitalise? Available at: https://ycpsolidiance.com/white-paper/accelerating-your-digital-transformation-are-malaysian-companies-geared-to-digitalise#download-white-paper; World Bank Group (2018), Malaysia's Digital Economy: A new driver of development. Available at: https://openknowledge.worldbank.org/bitstream/handle/10986/30383/129777.pdf
6. Huawei (2018), Accelerating Malaysian Digital SMEs: Escaping the Computerisation Trap.
Available at: https://www.huawei.com/minisite/accelerating-malaysia-digital-smes/img/sme-corp-malaysia-huawei.pdf
7. The Edge Markets (2020), "Factors hindering digital adoption among SMEs include lack of knowledge, investments and cash flow — MDEC".
Available at: https://www.theedgemarkets.com/article/factors-hindering-digital-adoption-among-smes-include-lack-knowledge-investments-and-cash

by five years,[8] providing an opportunity for Malaysia to ride the next digital wave. Digital transformation will be important to boost Malaysia's economic recovery efforts and enhance the long-term resilience of its economy in the post-pandemic future.

This report finds that, if leveraged fully, digital technologies could create an annual economic value of MYR257.2 billion (USD61.3 billion) by 2030.[9] To put this figure in perspective, this is equivalent to about 17 percent of Malaysia's GDP in 2020.[10]

The key messages of this report include:

- **Eight key technologies hold transformative potential for businesses and workers in Malaysia.** 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 Malaysia.

- **If leveraged fully, digital transformation can unlock MYR257.2 billion (USD61.3 billion) worth of economic value in Malaysia by 2030.** This value refers to productivity gains, revenue boosts, cost savings, and GDP increments for the Malaysian economy. The largest projected beneficiaries are the manufacturing; consumer, retail and hospitality; and education and training sectors.

- **Digital adoption is also crucial to boost economic recovery from the COVID-19 pandemic and build resilience in the post-pandemic future.** By allowing businesses to engage customers digitally, resume business operations, and address logistical bottlenecks, technologies can help businesses manage the severe economic impacts of COVID-19. It is estimated that a substantial 72 percent of Malaysia's digital opportunity – worth MYR184 billion (USD43.9 billion) – could be derived from such technology applications.[11] In the post-pandemic era, digital technologies will continue playing an instrumental role in boosting the competitiveness and resilience of businesses in adapting to the evolving business environment.

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

8. McKinsey & Company (2020), The Next Normal: The recovery will be digital. Available at: https://www.mckinsey.com/~/media/McKinsey/Business Functions/McKinsey Digital/Our Insights/How six companies are using technology and data to transform themselves/The-next-normal-the-recovery-will-be-digital.pdf
9. Economic value refers to GDP increments, productivity gains, cost savings, time savings, increased revenues, increased wages and increased tax collection.
10. Based on AlphaBeta analysis. See Appendix A for details on the methodology.
11. Based on AlphaBeta analysis. See Appendix A for details on the methodology.

The three pillars include:

- First, it is crucial for Malaysia to ***facilitate digitalisation in both the public and private sectors***. The first of the six thrusts outlined in "MyDIGITAL" is to accelerate digital transformation in the public sector. Initiatives to achieve this include appointing Chief Information Officers (CIOs) as "Chief Digital Officers" to spearhead each ministry's digital agenda, digitising 80 percent of end-to-end government services by 2025, introducing digital literacy programmes for civil servants, and selecting four cloud service providers (including Google Cloud)[12] to provide cloud services to Malaysian public sector agencies to support their digital transformation initiatives.[13] These initiatives aim to drive digital transformation in the public sector through its services, people and infrastructure. Malaysia has also been developing a conducive environment to support innovation in the private sector. Outlined in the second thrust of "MyDIGITAL", the Malaysia Competition Commission is reviewing existing competition laws to achieve a level playing field in the digital economy and strengthening its Intellectual Property (IP) framework.[14] While the government has a comprehensive range of policies to digitally transform both the private and public sectors, there is scope for the government to provide further support for private sector businesses, especially SMEs, in accelerating their digital adoption efforts. Given that perceived high cost and lack of access to digital talent were seen as key barriers to digital adoption, more could be done to lower these barriers to digital adoption for SMEs by providing additional subsidies for companies to build up their digital capabilities.[15] To enhance the reliability and speed of Internet connection, there is a need for the country to improve its digital infrastructure and ensure affordable, reliable Internet access for all Malaysians. Over a longer time horizon, Malaysia could embed a stronger focus on digitally transforming traditional business models and investing in emerging technologies to boost business resilience and sustainability post-pandemic. This has been a significant focus in advanced economies; for instance, Germany has taken steps towards facilitating "green recovery" by funding the development of new and emerging technologies to address

12. The Edge Markets (2021), "Google Cloud selected to provide services to Malaysian public sector agencies" Available at: https://www.theedgemarkets.com/article/google-cloud-selected-provide-services-malaysian-public-sector-agencies and Maju Saham (2021), "Google Cloud selected to provide services to Malaysian public sector agencies" Available at: https://majusaham.com/google-cloud-selected-to-provide-services-to-malaysian-public-sector-agencies/
13. The "National Digital Identity" serves as a trusted digital identification service for service providers to verify the identities of individuals in online transactions. Economic Planning Unit, Prime Minister's Department (2018), Malaysia Digital Economy Blueprint.
Available at: https://www.epu.gov.my/sites/default/files/2021-02/Malaysia-digital-economy-blueprint.pdf
14. Economic Planning Unit, Prime Minister's Department (2018), Malaysia Digital Economy Blueprint.
Available at: https://www.epu.gov.my/sites/default/files/2021-02/Malaysia-digital-economy-blueprint.pdf
15. Sources include: Huawei (2018), Accelerating Malaysian Digital SMEs: Escaping the Computerisation Trap. Available at: https://www.huawei.com/minisite/accelerating-malaysia-digital-smes/index.html; New Straits Times (2019), "Why is digital adoption by SMEs not taking off?". Available at: https://www.nst.com.my/opinion/columnists/2019/01/453789/why-digital-adoption-smes-not-taking

climate change such as hydrogen technology and electric vehicles.

- Second, there is scope to further ***build the nation's digital talent***. There is a range of existing public-private digital skilling partnerships in Malaysia, such as the #MyDigitalWorkforce movement, in which MDEC partnered with Coursera, a massive open online course (MOOC) provider, to provide free access to 3,800 courses. These courses support retrenched workers in transitioning to new jobs in the digital economy. Another key initiative is the "Digital Educational Learning Initiative Malaysia" (DELIMa), an effort by the Ministry of Education (MOE) to cater to the hybrid online and offline needs of the country's education system. The DELIMa platform consists of a nationwide rollout of Google Workspace for Education and Google Classroom, along with the ability to accommodate other third parties with a shared, single sign-on. Over 10,000 schools, 370,000 teachers and 2.5 million students have since registered on the DELIMa platform.[16] Nonetheless, there is scope for the country to further upskill the nation's digital talent. Malaysia could complement its digital skills education with a focus on "soft skills", such as problem solving, critical thinking and adaptive learning, which are critical for the future workforce to stay resilient in a landscape of constantly evolving digital skills.[17] In response to the 2020 World Economic Forum (WEF) survey which showed that companies in Malaysia are more inclined to hire new staff with skills relevant to new technologies instead of reskilling existing employees,[18] the country could provide incentives to shift employers' mindset towards "reskilling as a first resort". This refers to prioritising the upskilling of existing employees as opposed to firing and hiring, or outsourcing, and tailoring in-house digital training to employees' needs.[19]

- Third, it is crucial that Malaysia continues to ***promote digital trade opportunities*** for the country. While the Malaysian Government has placed considerable emphasis on creating a regulatory and policy environment that is conducive for businesses in the country to participate in digital trade, there is room to go further. Current efforts by the government include participation in international agreements to promote digital trade in global platforms (such as the "Joint Statement Initiative" negotiations on e-commerce), the development of digital platforms to support SMEs in capturing digital trade opportunities (such as the "Digital Free Trade Zone" initiative which aims to widen global market access for SMEs), and building trusted and secure digital environments to facilitate cross-border data flows (as outlined in the "MyDIGITAL" blueprint to review existing cross-border data transfer regulations). There are further opportunities for Malaysia to maximise the economic opportunities afforded by digital trade. A useful first step for the Malaysian Government would be to ratify the "Comprehensive and Progressive Agreement for Trans-Pacific Partnership" (CPTPP), which could potentially support economic recovery by stimulating trade and investment. As Malaysia reviews its existing cross-border data transfer regulations, the country could also consider aligning its existing data policies with international frameworks, such as Europe's General Data Protection Regulation (GDPR), and participating in the "APEC Cross Border Data Privacy Rules System" (CBPR).[20] There is also room for Malaysia to take a more proactive stance to promote the regional digital trade

16. New Straits Times (2020), "#TECH: MOE launches DELIMa".
Available at: https://www.nst.com.my/lifestyle/bots/2020/06/600934/tech-moe-launches-delima#:~:text=DELIMa%20or%20'Digital%20Educational%20Learning,with%20Google%2C%20Microsoft%20and%20Apple.&text=Called%20DELIMa%2C%20or%20'Digital%20Educational,with%20Google%2C%20Microsoft%20and%20Apple.
17. 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
18. World Economic Forum (2020), The Future of Work. Available at: http://www3.weforum.org/docs/WEF_Future_of_Jobs_2020.pdf
19. 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
20. AlphaBeta (2018), The data revolution: how Malaysia can capture the digital trade opportunity at home and abroad.
Available at: https://research.hinrichfoundation.com/hubfs/Digital%20Trade%20Project/malaysia-hinrich-foundation-digital-trade-report.pdf?__hsfp=85913225&__hssc=251652889.2.1615816368461&__hstc=251652889.93064eec0561399750d048f46d468959.1615816368460.1615816368460.1615816368460.1

agenda, for instance through taking a stronger lead in driving the implementation of regional cross-border data management frameworks such as the Association of Southeast Asian Nations (ASEAN) Data Management Framework (DMF) and Model Contractual Clauses on Cross Border Data Flows (MCCs). Finally, there is also scope for the country to deepen its digital economy collaborations by participating in multilateral digital trade agreements, such as the "Digital Economy Partnership Agreement" (DEPA) signed between Singapore, New Zealand and Chile.[21]

- **Google has been instrumental to advancing the country's digital transformation journey in its contributions to the three pillars.** Through programmes such as "Mahir Digital Bersama Google", Google is offering free workshops to help SMEs learn digital skills and adopt digital tools to establish and grow their online presence. With physical stores shuttered, digital commerce has become a lifeline for retailers. In light of these challenges, Google provides free services for retailers to sell on Google's platforms. Currently, search results on the Google Shopping tab consist primarily of free business listings, helping retailers to better connect with consumers, regardless of whether they advertise on Google. Through programmes such as "Go Digital ASEAN" and "AirAsia Academy", Google is building the nation's digital talent. Google.org, Google's philanthropic arm, supported The Asia Foundation with a USD3.3 million grant to launch the "Go Digital ASEAN" initiative. The initiative aims to close the digital gap in ASEAN countries, including Malaysia, and improve digital literacy among communities in rural regions and underserved areas — including entrepreneurs, underemployed youth, women, indigenous communities, and people with disabilities. To promote digital trade opportunities, YouTube serves as an important platform for local content creators to expand their presence globally and provides an alternative source of income, particularly during the economic downturn due to the COVID-19 pandemic.

- **Google also delivers broader economic benefits to businesses, consumers and the wider society in Malaysia through its products and services.** Google's products and services are estimated to bring about total annual business and consumer benefits **worth MYR7.1 billion (USD1.7 billion)** and **MYR32.7 billion (USD7.8 billion)**, respectively.[22] Taken together, Google is contributing about MYR39.8 billion (USD9.5 billion) in economic value, equivalent to the annual gross output of Malaysia's real estate industry.[23] The products that these benefits were estimated for include: Google Search, Google Ads, AdSense, Google Play, Google Maps, YouTube, Google Drive, and Google Docs, Sheets and Photos. For businesses, such benefits come in the form of improved productivity through time savings, as well as greater revenues as a result of stronger customer outreach and access to new markets. 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 Malaysia. 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 31,000 jobs** in Malaysia.[24] Google also delivers intangible benefits through its programmes, such as extending digital skilling opportunities to female entrepreneurs in Malaysia.

21. 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

22. The Google applications and services included in the analysis of business benefits include Google Search and Ads, AdSense, YouTube, and Google Play. The Google applications and services included in the analysis of consumer benefits include Google Search, Google Maps, YouTube, Google Play, Drive, Photos, Docs, and Sheets.

23. Department of Statistics Malaysia (2019), "The Real Estate Services Recorded Gross Output Value of RM32.8 billion in 2017". Available at: https://www.dosm.gov.my/v1/index.php/index.php?r=column/ctheme&menu_id=b0plV1E3RW40VWRTUkZocEhyZ1pLUT09&bul_id=WXRYYm9jR2RtSnk0UlZoN2ptY2hBUT09#:~:text=REAL%20ESTATE%20SERVICES-,The%20real%20estate%20services%20recorded%20gross%20output%20value%20of%20RM32,2017%20as%20compared%20to%20RM28,&text=1%20billion%20with%20the%20average,billion%20for%20the%20year%202017.

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.

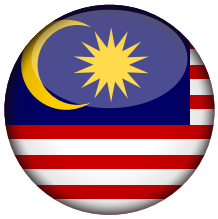
SIZING THE PRIZE — THE ECONOMIC OPPORTUNITY OF DIGITAL TRANSFORMATION IN MALAYSIA

Digital transformation delivers significant benefits 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 MYR257.2 billion (USD61.3 billion) worth of economic value annually by 2030. This is equivalent to about 17 percent of the country's GDP in 2020. The largest economic beneficiary of digital transformation in Malaysia will be its manufacturing sector, which is estimated to account for about 21 percent of the total economic value.

Digital adoption is also crucial for the country to boost economic recovery from the COVID-19 pandemic and develop resilience in the post-pandemic future. By supporting businesses in engaging customers digitally, resuming business operations, and minimising logistical bottlenecks amidst supply chain disruptions, digital technologies can help businesses manage the economic ramifications of the COVID-19 pandemic. It is estimated that 72 percent of Malaysia's digital opportunity – at MYR184 billion (USD43.9 billion) – could be derived from these technology applications. In the post-pandemic era, digital technologies will continue playing an instrumental role in boosting the competitiveness and resilience of businesses in adapting to the evolving business environment.

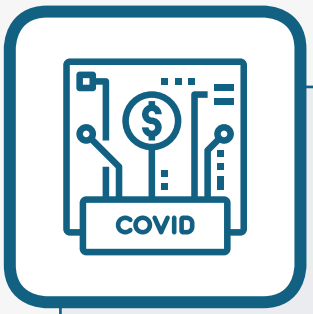
"SIZING THE PRIZE"

THE ECONOMIC VALUE OF DIGITAL TRANSFORMATION



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

MYR257.2 BILLION (USD61.3 BILLION)
in annual economic value[1]



72%
of this value[1] could come from technologies that help mitigate the economic impacts of the COVID-19 pandemic

... IN MALAYSIA BY 2030

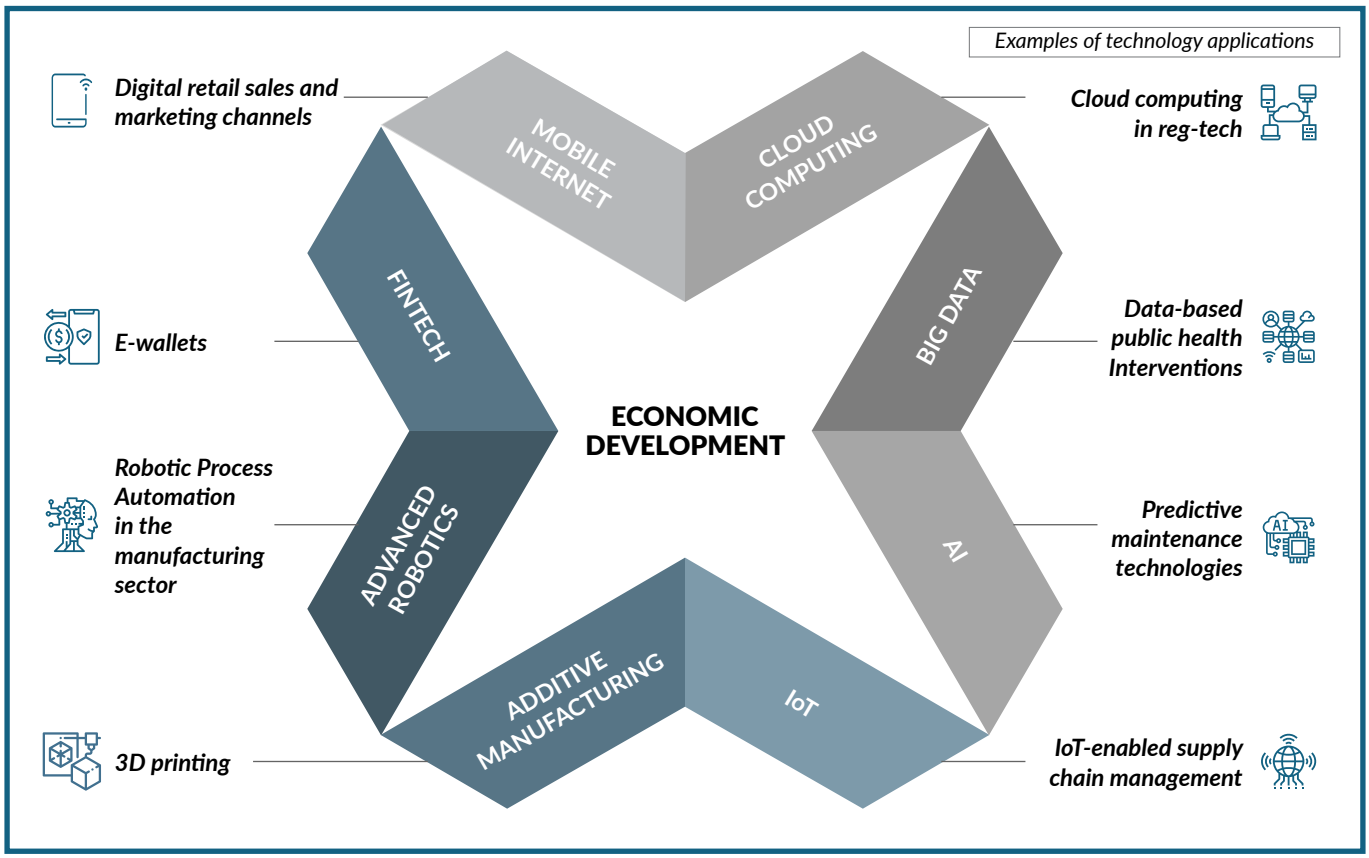
1. Economic value refers to GDP increments, productivity gains, cost savings, time savings, increased revenues, increased wages and increased tax collection.
Note: Estimates are based on AlphaBeta analysis using a range of original and third-party sources. See report's Appendix for methodology.

1.1 DIGITAL TRANSFORMATION CAN UNLOCK UP TO MYR257.2 BILLION (USD61.3 BILLION) WORTH OF ECONOMIC VALUE IN 2030

Digital technologies can unlock significant economic value in Malaysia. 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 to create productivity boosts, cost savings, time savings, GDP increments, increased tax collection, revenues, and wages for the government, businesses and workers in Malaysia. 40 technology applications – each mapping to one of the eight technologies – were identified across ten industry sectors. To assess the economic potential of digital transformation in Malaysia, 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 MALAYSIA

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 Malaysia 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 mobile telehealth applications in the health sector and the use of smartphone-based government e-services to streamline the delivery of public services.

- **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, and data storage and management tools on an as-needed basis. Buying, owning, and maintaining physical data centres and servers can be cost-prohibitive, particularly for SMEs. 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 analyse 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 analyse customer preferences more effectively to increase customer satisfaction. With the information derived from analytics, businesses can also design targeted programmes 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 humans 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. For instance, the adoption of e-wallets (also referred to as "digital wallets") in Malaysia is expected to grow at a compound annual growth rate of 53 percent from 2019 to 2021

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

and overtake cash transactions as one of the most used e-commerce payment methods by 2021.[27] Homegrown e-wallet service provider, Boost, for example, allows SMEs to digitise and receive payments via email or WhatsApp.[28] By facilitating cashless payments, Fintech also drives 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.[29] IoT has a number of 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 optimised in buildings; equipment use can be enhanced; and the health and safety performance of factories improved.

- **Advanced robotics.** While simple robots have increasingly become a staple of factory floors in mature economies like Malaysia, the advent of advanced robotics has allowed for an expanding range of tasks robots can perform. Compared with conventional robots, advanced robots have superior perception, integrability, adaptability, and mobility.[30] 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.[31]

27. JPMorgan (2019), "E-commerce Payments Trends: Malaysia". Available at: https://www.jpmorgan.com/merchant-services/insights/reports/malaysia
28. Malay Mail (2020), "E-wallet service provider Boost helps micro, SMEs move business online". Available at: https://www.malaymail.com/news/money/2020/08/21/e-wallet-service-provider-boost-helps-micro-smes-move-business-online/1895882
29. 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
30. Boston Consulting Group (2019), Advanced robotics in the factory of the future. Available at: https://www.bcg.com/publications/2019/advanced-robotics-factory-future
31. 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:

40 DIGITAL TECHNOLOGY APPLICATIONS ACROSS 10 SECTORS WERE IDENTIFIED TO SIZE MALAYSIA'S ECONOMIC OPPORTUNITY FROM DIGITAL TRANSFORMATION

Agriculture & food
- Precision farming technologies
- IoT-enabled supply chain management
- Food safety technologies

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 centres and digital jobs platforms
- Personalised learning
- Online retraining programmes

Financial services
- Big data analytics
- Reg tech
- Digital banking services

Government
- E-services
- Cloud computing
- E-procurement
- Geographic Info. System enabled tax collection
- Data analytics for government transfer 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 40 technology applications, it is estimated that **digital technologies have the potential to create an annual economic value of MYR257.2 billion (USD61.3 billion) in Malaysia by 2030**.[32] This is equivalent to 17 percent of Malaysia's GDP in 2020 (Exhibit 3).

The manufacturing sector is projected to be technology's largest economic beneficiary in Malaysia. This sector is estimated to gain annual economic benefits of up to MYR45.5 billion (USD10.8 billion) in 2030 – amounting to about 21 percent of the country's total digital opportunity.[33] Other top beneficiaries include the consumer, retail and hospitality sector (MYR44.2 billion or USD10.5 billion), education and training sector (MYR33.4 billion or USD7.9 billion), government (MYR31.7 billion or USD7.5 billion), and infrastructure sector (MYR30.8 billion or USD7.3 billion).

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

- **Manufacturing.** There is vast potential for technology applications such as big data analytics, additive manufacturing, supply chain management, and advanced robotics to create economic value in the manufacturing sector. 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.[34] For example, Pentamaster Corporation, a Malaysian equipment and manufacturing solutions provider, adopted big data analytics that enabled the business to optimise its asset utilisation and detect potential defects early in the production process. As a result, the cost of defective products decreased by 15 percent, while the cost of holding inventory fell by 20 percent.[35]

- **Consumer, retail and hospitality.** Many Malaysian retail, and food and beverage (F&B) businesses are turning to online platforms such as e-commerce marketplaces and mobile applications to digitise their offerings to customers. 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 labour requirements, harness inventory efficiencies, and reducing real estate costs (e.g. rental of store space).[36] For example, the staff at Senheng Electric, a local consumer electronics retailer, previously had to update the company's e-catalogue manually on a daily basis.[37] After digitising its product uploading process, Senheng Electric was able to reflect new products at about 50 percent faster, which enticed international brands to display their products on its e-catalogue, resulting in higher website traffic.

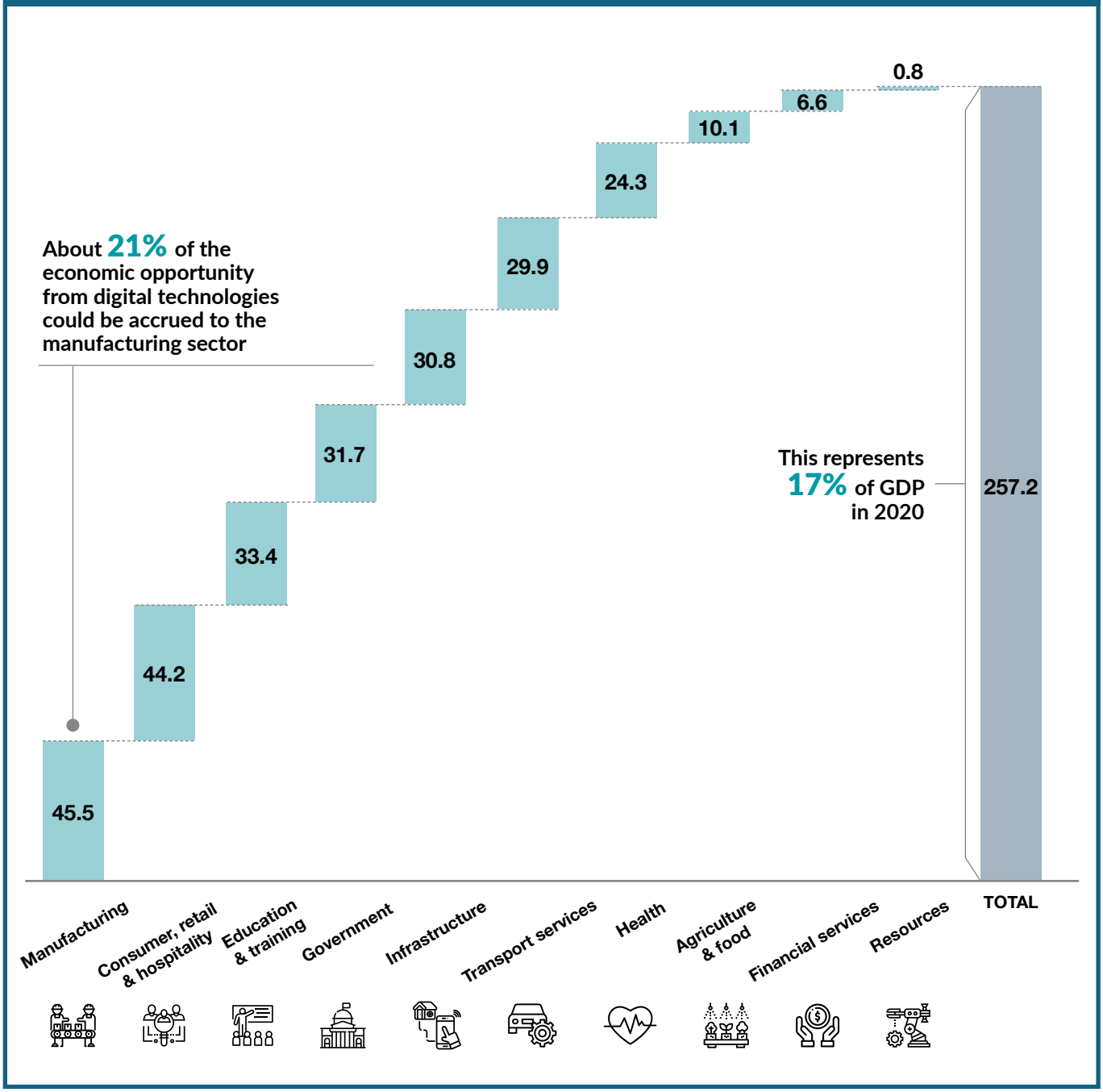
- **Education and training.** Digital technologies hold the promise of improving the quality and reach of education, especially during the COVID-19 pandemic when in-person learning was challenging to undertake. For example, Universiti Sains Islam Malaysia (USIM), a government-owned Islamic university, implemented digital solutions to improve how it runs its education and administration systems.[38] In particular, USIM adopted online cloud services to host and upload learning content, and created online "virtual rooms" for remote learning during the pandemic. In addition, technology can help cater to the unique learning interests and capabilities of students through digital personalised

32. 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.
33. Based on AlphaBeta analysis. See Appendix A for details on the methodology.
34. 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
35. Malaysia Productivity Corporation (2018), The race towards industry 4.0.
Available at: http://www.mpc.gov.my/wp-content/uploads/2018/11/The-Race-Towards-Industry-4.0.pdf
36. 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
37. Malaysia Productivity Corporation (2018), The race towards industry 4.0.
Available at: http://www.mpc.gov.my/wp-content/uploads/2018/11/The-Race-Towards-Industry-4.0.pdf
38. Microsoft (2019), "Using technology to transform higher education in Malaysia."
Available at: https://news.microsoft.com/en-my/2019/01/03/using-technology-to-transform-higher-education-in-malaysia/

EXHIBIT 3:

BY 2030, DIGITAL TECHNOLOGIES COULD SUPPORT UP TO MYR257.2 BILLION (USD61.3 BILLION) OF ANNUAL ECONOMIC IMPACT IN MALAYSIA

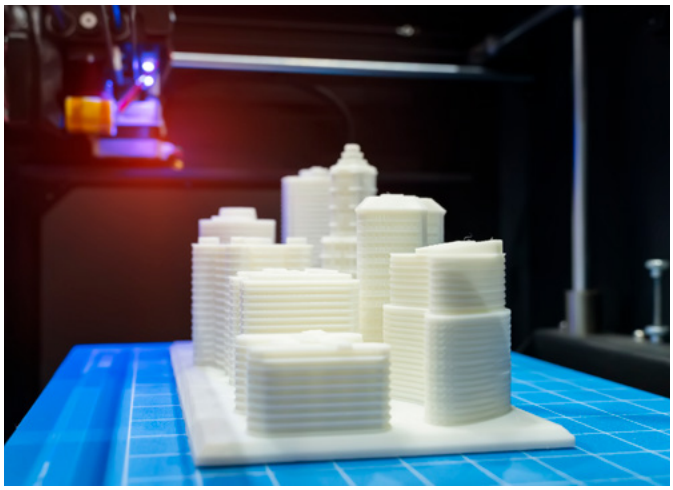
POTENTIAL ANNUAL ECONOMIC VALUE FROM DIGITAL TECHNOLOGIES, BY SECTOR[1]
MYR BILLION, 2030



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, 40 technology applications were considered.

Note: Numbers may not sum due to rounding.

SOURCE: AlphaBeta analysis



learning tools. For example, Classruum is an e-learning platform that runs online lessons, including video tutorials, notes, trial examination, and gamification for children.[39] Beyond the education system, online skilling programmes allow job seekers to upskill themselves and capture new job opportunities. For example, the country's leading online job portal, JobStreet, collaborated with FutureLearn, a British digital education platform, to provide free international courses for Malaysian job seekers.[40]

- **Government.** There is a vast scope for the government to improve service delivery and cost efficiency using digital technologies. Such technologies include digitising 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 between 50 and 80 percent of transaction costs.[41] Malaysia has already taken steps to adopt such technologies. The government developed "ePeroleha", an electronic procurement system that streamlines the government's procurement activities.[42] The government also uses digital channels to deliver public services electronically. For example, Malaysian residents can access MyEG, a digital government service platform, to pay road taxes and renew foreign worker permits, among other services.[43] As for cloud computing, Thrust One of "MyDIGITAL" blueprint laid out plans for the government to reduce the usage of physical storage files and shift towards a "cloud-first" strategy to improve accessibility to data and information.[44]

- **Infrastructure.** Digital technologies, such as Building Information Modelling (BIM) and predictive maintenance, can generate significant cost savings and improve precision in the construction process. The cost-efficiency can arise due to lower resource requirements. Global case studies have shown that 3D printing, modular construction, and BIM can reduce construction and demolition waste by 30 percent, 50 percent, and 45 percent, respectively.[45] The Malaysian Government has taken the lead in accelerating the adoption of such technologies. For example, Malaysia's Public Works Department has set a target for 50 percent of its projects to incorporate the use of BIM by the end of 2021, and for this share to increase to 80 percent by 2025.[46] Private buildings in Malaysia are also at the forefront of the adoption of smart technologies. For instance, the country's landmark buildings, the Petronas Twin Towers, are equipped with energy management systems, security controls, energy and carbon dashboards, and active energy controls to help manage energy consumption and provide improved security control.[47]

39. OpenGovAsia (2020), "Online Platform Helps All Students in Malaysia get an Education."
Available at: https://opengovasia.com/malaysian-entrepreneur-uses-technology-to-help-all-students-get-an-education/
40. MalaysiaKini (2021), "JobStreet teams up with FutureLearn to upskill, reskill Malaysian workforce with free international courses."
Available at: https://www.malaysiakini.com/announcement/565682
41. Organisation for Economic Co-operation and Development [OECD], E-procurment for good governance and development in Italy, North Africa, and the Middle East.
Available at: https://www.oecd.org/mena/governance/39856250.pdf
42. National Archives of Malaysia, e-Government Initiatives in Malaysia and the Role of the National Archives of Malaysia in Digital Records Management.
Available at: http://www.archives.go.jp/english/news/pdf/MrShaidin.pdf
43. eServices Malaysia, "Services." Available at: https://www.eservices.com.my/services
44. Economic Planning Unit, Prime Minister's Department (2018), Malaysia Digital Economy Blueprint.
Available at: https://www.epu.gov.my/sites/default/files/2021-02/Malaysia-digital-economy-blueprint.pdf
45. Sources include: Ghaffar, et al (2018), Additive manufacturing technology and its implementation in construction as an eco-innovative solution.
Available at: https://www.sciencedirect.com/science/article/pii/S0926580517309731; WRAP, Waste Reduction Potential of Offsite Volumetric.
Available at: https://www.howickltd.com/asset/327.pdf; McKinsey & Company (2019), Modular construction: From projects to products. Available at: https://www.mckinsey.com/industries/capital-projects-and-infrastructure/our-insights/modular-construction-from-projects-to-products
46. The Malaysian Reserve (2020), "Govt aims 80% adoption of BIM system by 2025."
Available at: https://themalaysianreserve.com/2020/09/30/govt-aims-80-adoption-of-bim-system-by-2025/
47. iProperty (2016), "Smart building market to reach new heights." Available at: https://www.iproperty.com.my/lifestyle/smart-building-market-to-reach-new-heights/

1.2 TECHNOLOGIES WILL BE CRUCIAL IN ADDRESSING THE ECONOMIC IMPACTS OF COVID-19

Due to the spread of COVID-19 in Malaysia, leading to social distancing measures and border closures, economic activity in Malaysia was significantly curtailed. Key services sectors such as consumer, retail and hospitality were impacted, while manufacturing output took a downturn due to both demand and supply challenges. The construction, mining, and services industries were the most severely impacted, contracting in 2020 by 19.4 percent, ten percent, and 5.5 percent, respectively.[48] Malaysia's GDP contracted by 5.6 percent in the same year, its worst performance since 1998 with the Asian Financial Crisis. The economic downturn has also had a negative impact on the labour market, with Malaysia's unemployment rate rising from 3.2 percent in January 2020 to 4.9 percent in January 2021 – the highest in almost three decades.[49] Technology adoption will be crucial for businesses and workers to manage such impacts.

Of Malaysia's total digital opportunity of MYR257.2 billion (USD61.3 billion), a substantial 72 percent – MYR184 billion (USD43.9 billion) – could be driven by technologies that can help businesses and workers mitigate the impacts of COVID-19 (Exhibit 4).

MYR184 billion (USD43.9 billion) alludes to the combined value of all technology applications that allow businesses to navigate and even flourish during the pandemic and in the post-pandemic future. There are three channels in which technology applications allow for this (Exhibit 5).

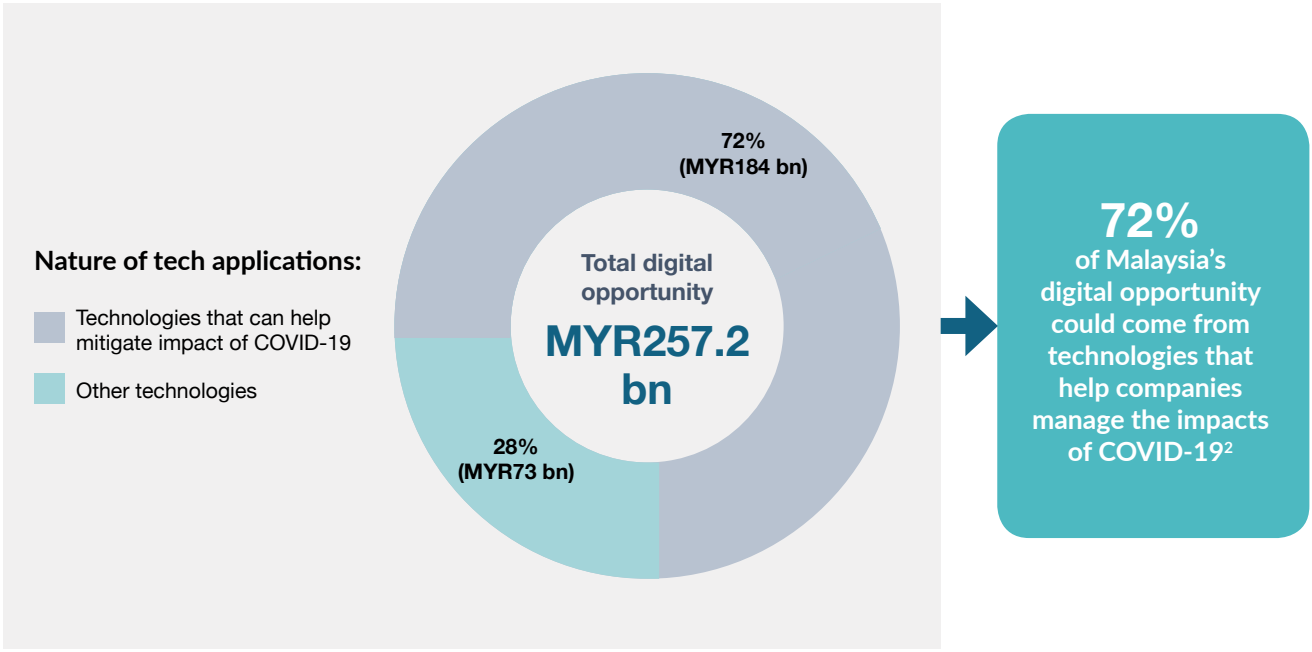
- **Enabling the continuity of business operations amid remote working arrangements.** As precautionary measures are implemented at workplaces to safeguard workers' health and safety, the resultant reduction in on-site employees has decreased operating capacity for many businesses, with some businesses switching to remote working arrangements indefinitely. A range of digital technologies allows for business continuity by facilitating virtual collaboration among co-workers,

48. The Straits Times (2021), "Malaysia's GDP shrinks 5.6% in 2020, worst performance since 1998." Available at: https://www.straitstimes.com/business/economy/malaysias-economy-shrinks-faster-than-expected-in-q4-on-tighter-covid-19-curbs
49. Department of Statistics Malaysia (2021), "Key Statistics of Labour Force in Malaysia, January 2021." Available at: https://www.dosm.gov.my/v1/index.php?r=column/cthemeByCat&cat=124&bul_id=QjdwRnBlSkxBcXczLzhzbHNKVTJRQT09&menu_id=Tm8zcnRjdVRNWWlpWjRlbmtlaDk1UT09

EXHIBIT 4:

OF THE TOTAL DIGITAL OPPORTUNITY, 72% (MYR184 BILLION OR USD43.9 BILLION) 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, 40 technology applications are considered.

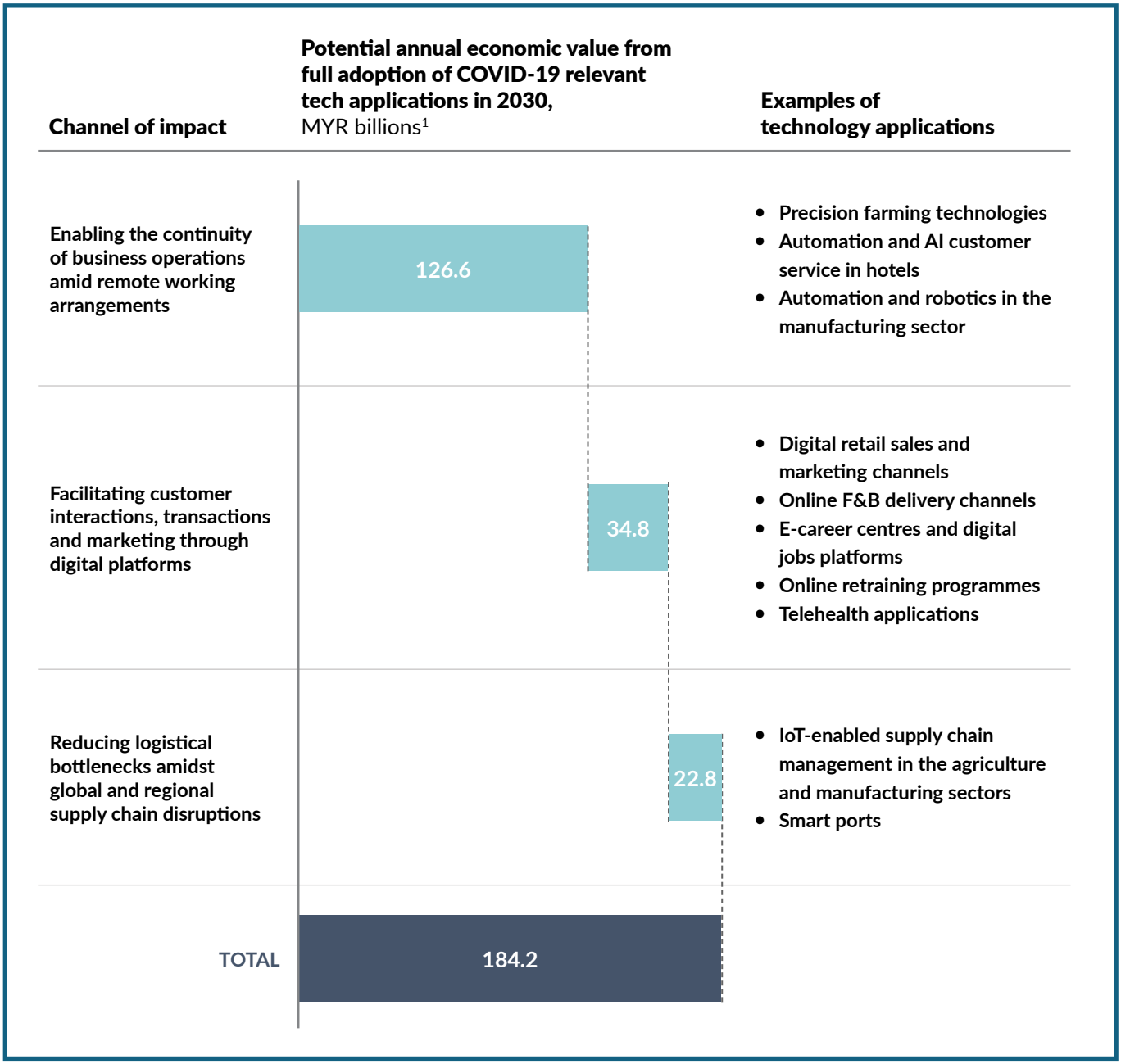
2. These refer to technology applications that enable companies to sustain business continuity and improve business performance despite implications of the COVID-19 pandemic. For example, in the retail sector, the digitisation of retail platforms (e-commerce) enable companies to continue selling their 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 BUSINESS IMPACTS OF COVID-19 CAN GENERATE UP TO MYR184 BILLION (USD43.9 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, 40 technology applications are considered.

Note: Numbers may not sum due to rounding.

SOURCE: AlphaBeta analysis

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. Combined, such technology applications are projected to deliver a total annual economic value of MY126.6 billion (USD30.2 billion) if fully adopted by 2030 (Exhibit 5). For example, in Malaysia, engineers developed a robot to support healthcare workers dealing with the coronavirus outbreak so hospitals can continue their operations while minimising the risk of infection to healthcare workers.[50]

- **Facilitating customer interactions, transactions and marketing through digital platforms.** Social distancing measures targeted at containing the COVID-19 outbreak have restricted customer interactions and transactions for businesses that heavily rely on physical interactions. As customers gravitate towards online marketplaces and services, technologies 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 F&B delivery channels, e-career centres and digital jobs platforms, and telehealth applications. Combined, such technology applications are projected to deliver a total annual economic value of MYR34.8 billion (USD8.3 billion) if fully adopted by 2030 (Exhibit 5). Box 2 highlights an example of how a Malaysian business successfully leveraged digital technologies to digitise its offerings during the COVID-19 crisis. Digital tools ranging from Internet search engines to cloud computing technologies allow enterprises to operate with ease across geographies by connecting with consumers, suppliers, and investors. Box 3 provides more information on how businesses in Malaysia made use of digital tools to sell goods and services in overseas markets.

- **Reducing logistical bottlenecks amidst global and regional supply chain disruptions induced by the pandemic.** Businesses have had to cope with supply chain disruptions when lockdown measures cut the supply of important raw materials and components and resulted in delays to the arrival of key components. These disruptions can be managed by technologies that allow for the remote tracking of goods that cross borders, and that enhance the capabilities of businesses to search and switch to alternative channels or sources. Examples of relevant technology applications include IoT-enabled supply chain management in the agriculture and manufacturing sectors, and smart ports. Combined, such technology applications are projected to deliver a total annual economic value of MYR22.8 billion (USD5.4 billion) if fully adopted by 2030 (Exhibit 5). Embedded in distribution networks, sensor data-driven operations analytics from IoT devices, such as the remote reporting of goods' locations, allow businesses to optimise transportation and improve their distribution management. The adoption of IoT in manufacturing supply chains could reduce distribution and supply chain operating costs by 2.5 to five percent.[51] IoT also has applications in smart ports, where sensor devices can be attached to specific storage containers or to raw materials or products themselves to track the movement of containers. Comprehensive real-time data on cargo schedule and ship positions allow terminal staff to plan anchorage areas and avoid critical berths from being taken out of service by quarantined vessels, reducing bottlenecks and idle time.[52] Besides smart ports, Malaysia is also partnering with Singapore and Thailand to promote open and trusted data sharing on the cross-border supply chain ecosystem. Digitalising the supply chain enables logistics players to increase visibility on the availability of its haulage assets, increase asset usage and efficiency, resulting in an 80 percent reduction in cargo idling time.[53]

50. Arab News (2020), "Robot nurse to help Malaysian doctors on virus frontlines." Available at: https://www.arabnews.com/node/1660726/world
51. 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/MGI_big_data_full_report.pdf
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53. MalaysiaKini (2020), "TUX to boost supply chain resilience in Singapore-Malaysia-Thailand." Available at: https://www.malaysiakini.com/announcement/554793

BOX 2.
MYBURGERLAB: LEVERAGING DIGITAL CHANNELS TO MAINTAIN COMPETITIVENESS DURING COVID-19

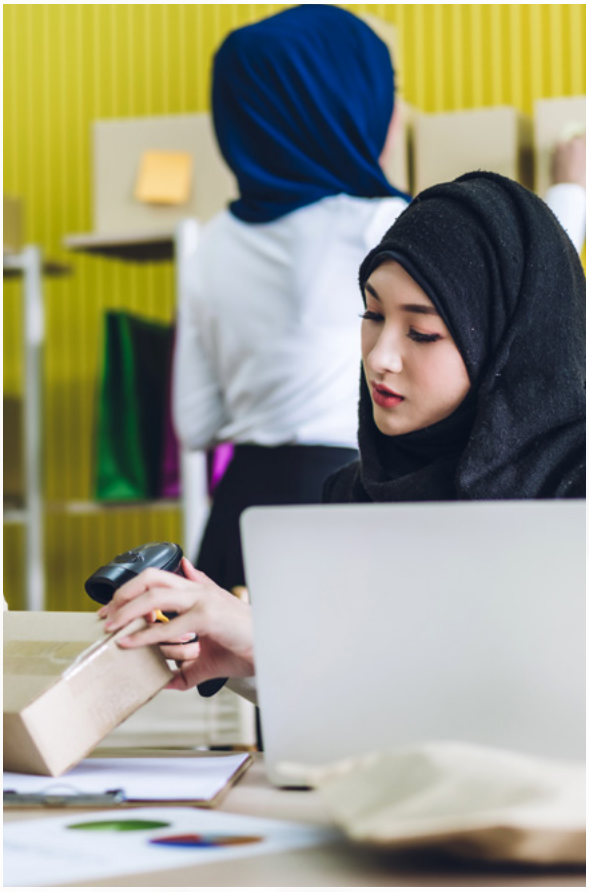
myBurgerLab, a Malaysian F&B company based on the popular US fast-food chain, In-N-Out Burger, relied on dine-in customers as a main source of revenue before the COVID-19 pandemic, with about 65 percent of its revenue coming from them.[54] During Malaysia's nationwide lockdown, the company leveraged digital marketing to initiate targeted discounts and encourage takeaways through its social media channels. The company used digital channels in two ways to bolster its competitiveness. First, it developed new revenue streams online. The company launched a sale of MYR50 (USD12) e-vouchers for accounts registered on its platform after it expanded into a new use-case for its myBurgerLab+ application. This helped the company raise MYR50,000 (USD12,200) within 24 hours, providing it extra short-term liquidity for the crisis. Second, it doubled down on online advertising. myBurgerLab engaged with its customers online through YouTube ads and even a mini campaign on the popular gaming platform "Animal Crossing" to encourage them to order takeaways, which was ten percent more profitable than deliveries.[55]

Photo Source: https://cultiveat.co/myburgerlab-burgers-now-use-cultiveat-lettuce/

54. Free Malaysia Today (2020) "myBurgerLab: still cooking up success despite Covid-19."
Available at: https://www.freemalaysiatoday.com/category/leisure/food/2021/02/02/myburgerlab-still-cooking-up-success-despite-covid-19/
55. iChefPOS (2020), "How 4 Malaysian F&B Players Used the MCO to Their Advantage.".
Available at: https://www.ichefpos.com/en-my/blog/covid-19-how-4-malaysian-fb-players-used-the-mco-to-their-advantage

BOX 3.
DIGITAL TECHNOLOGIES CREATE EXPORT OPPORTUNITIES FOR BUSINESSES IN MALAYSIA

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.[56] 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 continues to rise. Digital trade is, therefore, crucial as a way to increase and diversify sales channels of businesses in Malaysia.



Digital trade especially grew during Malaysia's Movement Control Order (MCO). For example, during the MCO, Malaysian farmers found it challenging to sell their produce due to restrictions on logistics and transportation, and were forced to dump their produce due to storage constraints. To overcome this problem, farmers turned to e-commerce platforms and sold 70 tonnes of produce online within three weeks.[57] E-commerce platforms witnessed significant uptake during this period. Lazada reported that in 2020, it witnessed the fastest-growing month recording a sales uplift of almost 120 percent year-on-year (YoY) and an 80 percent increase YoY in daily active buyers.[58] The number of SMEs that were onboarded on the platform increased by 300 percent from 2019 to 2020. Recognising the importance of such digital transformation, the National eCommerce Strategic Roadmap (NESR) helped nearly 80,000 SMEs adopt e-commerce solutions and supported nearly 8,000 companies to adopt e-commerce for exports from January to June 2020.[59]

Photo Source: https://tmgroup.vn/tmg-in-the-news/thien-minh-group-launches-tmg-go-app.html

56. 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
57. London School of Economics (2020), "The impact of COVID-19 on SME digitalisation in Malaysia." Available at: https://blogs.lse.ac.uk/seac/2020/10/20/the-impact-of-covid-19-on-sme-digitalisation-in-malaysia/
58. The Malaysian Reserve (2021), "The boom of e-commerce in Covid-19 era." Available at: https://themalaysianreserve.com/2021/01/01/the-boom-of-e-commerce-in-covid-19-era/
59. The Edge Markets (2021), "Covid-19 pandemic gives a huge boost to digital adoption — MDEC". Available at: https://www.theedgemarkets.com/article/covid19-pandemic-gives-huge-boost-digital-adoption-%E2%80%94-mdec and MIDA (2021), "Covid-19 pandemic gives a huge boost to digital adoption — MDEC". Available at: https://www.mida.gov.my/mida-news/covid-19-pandemic-gives-a-huge-boost-to-digital-adoption/

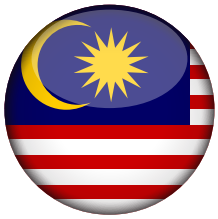
CAPTURING THE PRIZE — THREE PILLARS OF ACTION

To fully capture the digital opportunity, there are three pillars of action that the Malaysian Government will have to take action on: 1) Facilitate digitalisation in both the public and private sectors; 2) Build the nation's digital talent; and 3) Promote digital trade opportunities.

Presently, the Malaysian Government has made significant strides across all three pillars. To facilitate digitalisation in both the public and private sectors, the "MyDIGITAL" blueprint aims to accelerate digital transformation in the public sector through a series of initiatives. These include appointing "Chief Digital Officers" to spearhead each ministry's digital agenda, adopting a paperless work culture, and implementing the "National Digital Identity" programme by 2025. Besides driving digital transformation in the public sector, Malaysia has been developing a conducive environment to support innovation in the private sector by reviewing its existing competition laws to achieve a level playing field as outlined in Thrust Two of "MyDIGITAL". To build the nation's digital talent, the Ministry of Education (MOE) launched a new digital learning platform, known as the "Digital Educational Learning Initiative Malaysia" (DELIMa) that enables students and teachers to access digital tools and learn remotely. To promote digital trade opportunities, Malaysia is currently a signatory to several bilateral and multilateral agreements, such as the "Comprehensive and Progressive Agreement for Trans-Pacific Partnership" (CPTPP).

For Malaysia to fully adopt digital technologies and expedite the digital-led recovery from the impacts of the COVID-19 pandemic, SMEs could benefit from financial and advisory support to accelerate their digital transformation journey. There is

"CAPTURING THE PRIZE"
THREE PILLARS OF ACTION



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

1. Facilitate digitalisation in both the public and private sectors
2. Build the nation's digital talent
3. Promote digital trade opportunities

Significant effort has already been made in the following areas

- Driving digital transformation in the public sector
- Boosting industry competitiveness through digitalisation in the private sector
- Building infrastructure to support nationwide connectivity
- Reskilling and upskilling the current workforce
- Preparing the future workforce for the digital economy
- Extending digital skilling opportunities to underserved communities
- Participating in international agreements that promote digital trade
- Developing digital platforms to support SMEs in capturing digital trade opportunities
- Building trusted and secure digital environments to facilitate cross-border data transfers

However, there are areas in which Malaysia can further strengthen its approach

- Lower the barriers to digital adoption for SMEs
- Improve the reliability and speed of Internet connection
- Facilitate digitally enabled "green recovery" efforts to boost resilience in the post-pandemic era
- Provide incentives to shift employers' mindset towards upskilling existing employees as the top priority
- Increase "soft skills" focus to complement technical education
- Ratify the CPTPP to enhance economic competitiveness
- Align with international frameworks to promote interoperability
- Promote the regional digital trade agenda
- Participate in multilateral digital trade agreements

also scope for the Malaysian Government to provide incentives to shift employers' mindset towards prioritising digitally upskilling their existing employees. Beyond developing students' technical know-how, the current digital skills education could be complemented with a focus on the development of "soft skills", such as problem-solving, critical thinking and adaptive learning. Malaysia would also benefit from ratifying the CPTPP to support economic recovery by stimulating trade and investment, aligning with international frameworks on cross-border data transfer regulation and taking a more proactive stance in promoting the regional digital trade agenda. There is room for the country to deepen its digital economy collaborations with like-minded countries by participating in international digital trade agreements such as the "Digital Economy Partnership Agreement" (DEPA).

2.1 THREE PILLARS OF ACTION ARE REQUIRED TO DELIVER DIGITAL TRANSFORMATION IN MALAYSIA

After consulting various stakeholders, including the ministries and their agencies, the private sector, as well as civil society organisations, the Malaysian Government formulated and released a digital economy blueprint in 2021. Known as "MyDIGITAL", the blueprint outlines efforts and initiatives to transform Malaysia into a digitally enabled and technology-driven high-income nation, and a regional leader in the digital economy. By 2030, the government aims to create 500,000 new jobs, achieve a 30 percent uplift in productivity across all sectors and have 875,000 micro, small, and medium-sized enterprises (MSMEs) adopt e-commerce.[60] To achieve these milestones, Malaysia has set up the "Digital Economy and Fourth Industrial Revolution (4IR) Council", chaired by the Prime Minister, which spearheads the development, implementation of policies and monitors the progress on national initiatives that drive the growth of the country's digital economy.[61] In line with the six strategic thrusts in the "MyDIGITAL" blueprint, this report identifies three pillars of actions required for the country to fully unlock the MYR257.2-billion (USD61.3-billion) digital opportunity. (see Exhibit 6)

60. Economic Planning Unit, Prime Minister's Department (2018), Malaysia Digital Economy Blueprint. Available at: https://www.epu.gov.my/sites/default/files/2021-02/Malaysia-digital-economy-blueprint.pdf
61. New Straits Times (2020), "PM chairs Digital Economy and Fourth Industrial Revolution Council meeting". Available at: https://www.nst.com.my/news/government-public-policy/2020/11/640019/pm-chairs-digital-economy-and-fourth-industrial

EXHIBIT 6:

THE THREE PILLARS OF ACTION REQUIRED FOR DIGITAL TRANSFORMATION CLOSELY RELATE TO THE SIX STRATEGIC THRUSTS UNDER "MYDIGITAL"

	1	2	3
Specific actions	• Drive digital transformation in the public sector • Boost industry competitiveness through digitalisation • Build infrastructure to support connectivity • Improve Internet reliability and speed • Facilitate digitally enabled "green recovery" from COVID-19	• Reskilling and upskilling current workers • Prepare future workers for the digital economy • Digitally skill underserved communities • Incentivise employers to prioritise upskilling • Increase "soft skills" focus to complement technical education	• Participate in multilateral digital trade agreements • Develop digital platforms to support SME in capturing digital trade • Build trusted and secure digital environments • Ratify CPTPP to enhance competitiveness • Promote and regional digital trade agenda and interoperability
Six strategic thrusts outlined in "MyDIGITAL"[1]	• T1: Drive digital transformation in the public sector • T2: Boost economic competitiveness through digitalisation • T3: Build enabling digital infrastructure	• T4: Build agile and competent digital talent • T5: Create an inclusive digital society	• T6: Build trusted, secure and ethical digital environment

1. Economic Planning Unit, Prime Minister's Department (2020), Malaysia Digital Economy Blueprint. Available at: https://www.epu.gov.my/sites/default/files/2021-02/Malaysia-digital-economy-blueprint.pdf

2.2 PILLAR 1: FACILITATE DIGITALISATION IN BOTH THE PUBLIC AND PRIVATE SECTORS

Both public and private stakeholders are crucial in driving the growth of Malaysia's digital economy. The government plays a key enabling role in charting the growth trajectory of the digital economy, developing initiatives, and creating a conducive regulatory environment for businesses and society to embrace digital technology. The private sector capitalises on digital platforms, ecosystems, and marketplaces to create innovative solutions. To facilitate digitalisation in both the public and private sectors, the country is placing a strong focus on the following actions:

- **Driving digital transformation in the public sector.** To accelerate the transformation of the public sector into a digital government, one of the six key thrusts of "MyDIGITAL" focuses on pursuing the public sector digital transformation agenda. Led by the Malaysian Administrative Modernisation and Management Planning Unit (MAMPU), the initiatives under this thrust have been broken down into three phases. The first phase lays the foundation for digital adoption and involves mandating all current CIOs in government agencies to assume the role of a "Chief Digital Officer".[62] The "Chief Digital Officer" leads their own agency's strategic digital agenda and reports the agency's progress on its implementation plans to the Chief Secretary to the Government (KSN). By the end of 2025, the government aims to form a team of in-house experts who will identify and drive the adoption of digital technologies in policy formulation and decision making. In the second phase, the government aims to digitise 80 percent of government services and achieve full implementation of the "National Digital Identity" programme by 2025, which serves as a trusted digital identification service for service providers to verify identities of individuals in online transactions. In the third phase, 85 percent of end-to-end online government services will be integrated onto the one-stop MyGovernment portal by 2030. Beyond these initiatives and targets, MAMPU has also selected four cloud service providers (including Google Cloud) to provide cloud services to Malaysian public sector agencies to support their digital transformation initiatives.[63]

- **Boosting industry competitiveness through digitalisation in the private sector.** Besides accelerating digital adoption in the public sector, the government has plans to create a conducive environment for local innovation, as outlined in the second thrust of "MyDIGITAL". The Malaysia Competition Commission (MyCC) is reviewing existing competition laws to achieve a level playing field in the digital economy and strengthening its IP framework.[64] The Ministry of Domestic Trade and Consumer Affairs (KPDNHEP) aims to review and update existing laws by 2023 to meet the needs of businesses in the digital economy and raise IP ownership to more than 50,000 by 2030. Also, the Ministry of Entrepreneur Development and Cooperatives (MEDAC) aims to develop a "Digital Compass" for all businesses, a technological roadmap tailored to different sectors and businesses of different digital maturity

62. Economic Planning Unit, Prime Minister's Department (2018), Malaysia Digital Economy Blueprint. Available at: https://www.epu.gov.my/sites/default/files/2021-02/Malaysia-digital-economy-blueprint.pdf
63. The Edge Markets (2021), "Google Cloud selected to provide services to Malaysian public sector agencies" Available at: https://www.theedgemarkets.com/article/google-cloud-selected-provide-services-malaysian-public-sector-agencies and Maju Saham (2021), "Google Cloud selected to provide services to Malaysian public sector agencies" Available at: https://majusaham.com/google-cloud-selected-to-provide-services-to-malaysian-public-sector-agencies/
64. Economic Planning Unit, Prime Minister's Department (2018), Malaysia Digital Economy Blueprint. Available at: https://www.epu.gov.my/sites/default/files/2021-02/Malaysia-digital-economy-blueprint.pdf

levels.[65] The Compass raises awareness among businesses on the benefits of IP and recommends digital solutions for enterprises to adopt at different stages of their growth. By the end of 2025, the government aims to have more than 800,000 MSMEs adopt digital tools.

- **Building digital infrastructure to support nationwide connectivity.** Through the "Pelan Jalinan Digital Negara" (JENDELA) initiative, the Malaysian Government aims to provide wider coverage and better-quality broadband experience for the country. The COVID-19 pandemic has revealed a multitude of challenges in Internet connectivity, including a 30 to 40 percent reduction in Internet speeds, and a 40 to 70 percent increase in complaints on poor Internet speed.[66] To improve the country's digital connectivity, the "JENDELA Action Plan" will install fibre connectivity in premises and homes, increase fourth generation (4G) broadband network coverage to 96.9 percent and increase mobile broadband speed from 25.6 Mbps to 35 Mbps.[67]

Despite government initiatives and programmes to encourage digital adoption and innovation of SMEs, many cited difficulties in obtaining the necessary financing to undergo digital transformation. A study conducted in June 2018 found that 50 percent of SMEs cited financing as their key obstacle in adopting digital solutions, and 60 percent said that they were not aware of the financing options available.[68] Furthermore, 34 percent of SMEs believe that cloud computing is expensive. The same study found that the second most commonly cited challenge SMEs face in digitalising is the lack of access to skilled digital talent. Beyond installing systems to digitise processes, digitalisation requires a wide range of digital and business skills to transform business processes, ranging from management and operations to sales and marketing. Thus, Malaysia could consider the following best practices to facilitate greater digital adoption among businesses:

- **Lower the barriers to digital adoption for SMEs.** Unlike large companies with larger budgets and better access to talent, SMEs tend to have lean resources and are more likely to lag in their digital

65. Economic Planning Unit, Prime Minister's Department (2018), Malaysia Digital Economy Blueprint. Available at: https://www.epu.gov.my/sites/default/files/2021-02/Malaysia-digital-economy-blueprint.pdf
66. Jendela (2021), "The situation during COVID-19". Available at: https://myjendela.my/
67. Jendela (2021), 2nd Quarterly Report. Available at: https://myjendela.my/Sitejendela/media/Doc/2nd_Quarterly_Report_of_JENDELA.pdf
68. Huawei (2018), Accelerating Malaysian Digital SMEs: Escaping the Computerisation Trap. Available at: https://www.huawei.com/minisite/accelerating-malaysia-digital-smes/img/sme-corp-malaysia-huawei.pdf

BOX 4.
SINGAPORE GOVERNMENT LOWERS BARRIERS TO DIGITAL ADOPTION FOR SMES UNDERGOING DIGITAL TRANSFORMATION

To support businesses, particularly SMEs, 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.[69] Through the programme, 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 organisation. 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 DIGITALISATION RESOURCES AND ADVISORY

One of the largest hurdles SMEs face in their digital transformation journey is access to talent and skills.[70] To overcome this hurdle, the "Chief Technology Officer-as-a-Service" (CTOaaS) scheme aims to provide SMEs access to relevant digitalisation resources and advisory for free, or at an affordable cost.[71] Through the scheme, existing digitalisation advisory services are consolidated onto a web application that provides a single touchpoint for both digital consultancy and project management services.[72] 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" incentivises both SMEs and larger local companies in commercialising their innovations and diffusing technologies.[73] Through this programme, the government will co-fund the costs of trials and adoption of frontier technologies like fifth generation (5G), AI and blockchain technologies.

69. Infocomm Media Development Authority (2021), "Digital Leaders Programme". Available at: https://www.imda.gov.sg/programme-listing/Digital-Leaders-Programme?utm_medium=qr&utm_source=infographic&utm_campaign=cos-2021&utm_content=dlp
70. 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
71. 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
72. 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
73. 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

transformation journeys.[74] One of the key reasons cited for the low digital adoption rate among SMEs in Malaysia was the perceived high cost of technological adoption.[75] Thus, the government could consider improving access and awareness to funding options available for SMEs. These funds could be channelled to invest in digital talent and enable businesses to seek the appropriate partnerships, technologies and expertise that can help digitally transform their business amid tightening resource constraints. Box 4 illustrates how the Singapore Government is co-funding initiatives that allow SMEs to deepen their digital capabilities and provide a repository of potential technology solution partners to accelerate digital transformation.

- **Improve the reliability and speed of Internet connection.** While Malaysia is a highly connected nation with over 88 percent of the population connected to the Internet in 2020, the quality of network performance trails peers in the region.[76] In February 2018, Malaysia's average download speed was ranked 63rd out of 130 countries.[77] Concerns over Internet speeds have become more prevalent during the COVID-19 pandemic where increased Internet usage during MCO led to slower Internet speeds.[78] Affordable and reliable access to the Internet is crucial to ensuring that Malaysian businesses can take advantage of the opportunities arising from the digital economy. The country should therefore consider how to improve its digital connectivity. Thrust Three of the "MyDIGITAL" blueprint and the JENDELA set out plans in this regard.[79] One notable component of "MyDIGITAL" is its goal for "Malaysia to have the highest number of submarine cable landings in Southeast Asia by 2025."[80] In order to achieve this target – and to ensure affordable, reliable internet access for all Malaysians – it is important for Malaysia to reinstate the "cabotage exemption" to allow speedy repair of critical submarine cables.

74. Ernst and Young (2019), Redesigning for the digital economy.
Available at: https://assets.ey.com/content/dam/ey-sites/ey-com/en_sg/topics/growth/ey-smes-in-southeast-asia-redesigning-for-the-digital-economy.pdf?download
75. New Straits Times (2019), "Why is digital adoption by SMEs not taking off?".
Available at: https://www.nst.com.my/opinion/columnists/2019/01/453789/why-digital-adoption-smes-not-taking
76. Malaysian Communications and Multimedia Commission (2020), Internet Users Survey 2020.
Available at: https://www.mcmc.gov.my/skmmgovmy/media/General/pdf/IUS-2020-Report.pdf
77. World Bank (2018), "Malaysia's Digital Economy". Available at: https://openknowledge.worldbank.org/bitstream/handle/10986/30383/129777.pdf
78. Malay Mail (2020), "MCMC: Slower internet speed in Malaysia due to surge in bandwidth demand".
Available at: https://www.malaymail.com/news/malaysia/2020/04/09/mcmc-slower-internet-speed-in-malaysia-due-to-surge-in-bandwidth-demand/1854970
79. Sources include: Jendela (2021), 2nd Quarterly Report. Available at: https://myjendela.my/Sitejendela/media/Doc/2nd_Quarterly_Report_of_JENDELA.pdf; Economic Planning Unit, Prime Minister's Department (2018), Malaysia Digital Economy Blueprint. Available at: https://www.epu.gov.my/sites/default/files/2021-02/Malaysia-digital-economy-blueprint.pdf
80. Economic Planning Unit, Prime Minister's Department (2018), Malaysia Digital Economy Blueprint.
Available at: https://www.epu.gov.my/sites/default/files/2021-02/Malaysia-digital-economy-blueprint.pdf

- **Facilitate digitally enabled "green recovery" efforts to boost resilience in the post-pandemic era.** Beyond the short-term challenges of the pandemic, it is crucial for businesses in Malaysia to develop new digital capabilities to build resilience against future unforeseen events. During the COVID-19 pandemic, many businesses have had to expedite their digitalisation efforts and pivot towards online business models. While some of these efforts have enabled businesses to stay afloat, many of these changes were introduced in haste. To bolster the digital capabilities of businesses and future-proof business models, Malaysia can consider supporting the development and adoption of digital solutions that bring about more environmentally sustainable outcomes.[81] There are several promising practices currently being implemented in other countries that Malaysia could consider, like Germany, which has structured its economic recovery packages with a climate-friendly focus. Germany's EUR130-billion (USD157-billion) COVID-19 recovery stimulus package includes funding for the development of new and emerging technologies to address climate change such as hydrogen technology and electric vehicles.[82] This entails subsidies for electric vehicles, funding for the proposed installation of low-carbon energy and heating systems to improve building energy efficiency, as well as for state-of-the-art hydrogen infrastructure to decarbonise manufacturing. Similarly, the Singapore Government unveiled the "Singapore Green Plan 2030", a "whole-of-nation" movement to advance the national agenda on sustainable development. Under the "Singapore Green Plan 2030", local businesses, particularly SMEs, can receive support in developing products, services and solutions to capture opportunities in the green economy, while the public sector aims to build best-in-class green buildings to see an 80 percent improvement in energy efficiency by 2030.[83]

81. For instance, it has been estimated that smart grid technologies can allow for energy savings of between five to ten percent. Source: Smart Energy Consumer Collaborative. Available at: http://www.whatissmartgrid.org/faqs/what-are-the-benefits-of-the-smart-grid
82. Asian Development Bank (2020), Green financing strategies for post-COVID-19 economic recovery in Southeast Asia. Available at: https://www.adb.org/sites/default/files/publication/639141/green-finance-post-covid-19-southeast-asia.pdf
83. SG Green Plan (2021), "Joint Segment on Sustainability". Available at: https://www.greenplan.gov.sg/cos/

2.3 PILLAR 2: BUILD THE NATION'S DIGITAL TALENT

It is critical to ensure that workers in Malaysia can use digital technologies to access job opportunities, run businesses, and enhance productivity in their work. 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.

Malaysia is already advancing this goal of building digital talent in the following areas:

- **Reskilling and upskilling the current workforce.** Malaysia's gig economy is expanding rapidly, having grown by 31 percent between 2017 and 2018, and employing about 26 percent of the country's working population, at four million freelancers, in 2018.[84] The shift towards remote work arrangements during the COVID-19 pandemic has further spurred the growth of job opportunities with flexible work hours and location. To ride on the momentum of the growing gig economy, the Ministry of Human Resources (MOHR) unveiled the "GigUp" programme which encourages technology companies, start-ups and large corporates to invest in training and employing gig workers.[85] Under this programme, the Human Resources Development Fund (HRDF) subsidises training on online platforms such as Coursera, Udemy, edX and Codeacademy, to enhance the skills and employability of gig workers. At the nationwide level, MDEC launched the #MyDigitalWorkforce movement during the COVID-19 pandemic to reskill and upskill the current workforce to take on emerging job opportunities in the digital economy. As part of the #MyDigitalWorkforce movement, MDEC partnered with Coursera to launch the "Let's learn Digital Campaign". Featuring free access to 3,800 courses, including professional certification courses, the campaign encouraged Malaysians who had been retrenched to take up online digital skilling courses, which supported their transition into new jobs in high demand.[86] To facilitate closer collaboration between the public and private sectors in upskilling the workforce, TalentCorp, a government agency under the MOHR, organised an industry dialogue session on "Workforce dynamics & job creation in overcoming pandemic challenges".[87] The session was attended by the Minister of Human Resources, 11 companies and 20 industry leaders across seven sectors to support the government's agenda of prioritising local workers in the current COVID-19 job market. In response to a greater need for digital talent in areas such as cybersecurity, content creation, data analytics, system integration and AI, the MOHR is partnering with local universities to develop skilling programmes and providing internationally recognised certifications under the "Global Accredited Cybersecurity Education Certification Scheme".[88] By 2025, MOHR aims to train 20,000 cybersecurity specialists and 30,000 data professionals through professional upskilling programmes.

84. The gig economy refers to a general workforce environment in which short-term engagements, temporary contracts, and independent contracting is commonplace. The Malaysian Reserve (2020), "Make full use of gig economy incentives". Available at: https://themalaysianreserve.com/2020/10/05/make-full-use-of-gig-economy-incentives/
85. Economic Planning Unit, Prime Minister's Department (2018), Malaysia Digital Economy Blueprint. Available at: https://www.epu.gov.my/sites/default/files/2021-02/Malaysia-digital-economy-blueprint.pdf
86. Malaysia Digital Economy Corporation (2020), "Let's Learn Digital". Available at: https://mdec.my/digital-economy-initiatives/for-the-people/talent-development/lets-learn-digital/
87. Facebook (2021), "TalentCorp Malaysia". Available at: https://www.facebook.com/TalentCorpMsia/posts/3685131328234625
88. Economic Planning Unit, Prime Minister's Department (2018), Malaysia Digital Economy Blueprint. Available at: https://www.epu.gov.my/sites/default/files/2021-02/Malaysia-digital-economy-blueprint.pdf

- **Preparing the future workforce for the digital economy.** In 2020, MOE launched a national online learning platform, DELIMa, in collaboration with Google, Microsoft and Apple. Over 10,000 schools, 370,000 teachers and 2.5 million students have since registered on the DELIMa platform, which enables students and teachers to access digital tools, such as Google Classroom, Microsoft 365 and Apple Teacher Learning Centre.[89] By forging public-private partnerships, MOE plans to implement a comprehensive range of initiatives from 2021 to 2030 to address the low usage of technology in classrooms and introduce computational thinking in educational curriculums. For example, MOE's "My Device" programme aims to provide every school student with data plans and a digital device by 2025.[90] Educators will also receive professional development training to equip them with digital skills so as to encourage educators to integrate digital technology in their teaching pedagogies as part of the "My Digital Teacher" programme.

- **Extending digital skilling opportunities to underserved communities.** MEDAC is developing a one-stop online platform that provides information and services on growing an online business for vulnerable groups, such as the B40 (i.e. Malaysians whose household income fall in the bottom 40 percent), women, and people with disabilities.[91] The platform not only provides online information on business registration procedures and available government assistance programmes, but also provides counselling and financial literacy programmes required to start or grow an online business so as to help vulnerable groups become digital entrepreneurs. Through this initiative, the government aims to help 875,000 MSMEs go digital by participating in e-commerce by 2025.

However, there remains several workforce and skills-related challenges in Malaysia. In 2020, the International Data Corporation revealed that more than 87 percent of organisations in Malaysia do not have sufficient talent to meet the needs of the digital economy.[92] Despite the talent shortage in the industry, graduates are unable to fill these open positions. Unemployment among graduates has been rising steadily since 2016, increasing by 17 percent from 2016 to 2019.[93] The MOHR attributed the failure to secure jobs to the lack of soft skills among graduates.[94] In particular, 48 percent of SMEs in Malaysia cited the lack of interpersonal, problem solving, and critical thinking skills among job seekers.[95] Malaysia can therefore go further to address the digital skills gap and enhance the digital capabilities of the current and future workforce:

- **Provide incentives to shift employers' mindset towards upskilling existing employees as the top priority.** The Randstad Workmonitor survey conducted in March 2020 showed that 87 percent of respondents in Malaysia saw the need to acquire new skills in order to participate in the digital economy.[96] However, only 63 percent reported that their employers were providing digital skills training to harness digital technology and improve workplace productivity.[97] Another study also found that to maximise profits, employers were reluctant to invest in training their staff and industry experts observed that "talent is being brought

89. New Straits Times (2020), "#TECH: MOE launches DELIMa".
Available at: https://www.nst.com.my/lifestyle/bots/2020/06/600934/tech-moe-launches-delima#:~:text=DELIMa%20or%20'Digital%20Educational%20Learning,with%20Google%2C%20Microsoft%20and%20Apple.&text=Called%20DELIMa%2C%20or%20'Digital%20Educational,with%20Google%2C%20Microsoft%20and%20Apple
90. Economic Planning Unit, Prime Minister's Department (2018), Malaysia Digital Economy Blueprint.
Available at: https://www.epu.gov.my/sites/default/files/2021-02/Malaysia-digital-economy-blueprint.pdf
91. Economic Planning Unit, Prime Minister's Department (2018), Malaysia Digital Economy Blueprint.
Available at: https://www.epu.gov.my/sites/default/files/2021-02/Malaysia-digital-economy-blueprint.pdf
92. The Edge Markets (2020), "Econ 4.0: Trying times for talent?". Available at: https://www.theedgemarkets.com/article/econ-40-trying-times-talent
93. The Edge Markets (2020), "DOSM: Joblessness among graduates rose to 3.9% in 2019".
Available at: https://www.theedgemarkets.com/article/dosm-joblessness-among-graduates-rise-39-2019#:~:text=DOSM%3A%20Joblessness%20among%20graduates%20rose%20to%203.9%25%20in%202019,-Joyce%20Goh&text=KUALA%20LUMPUR%20(July%2016)%3A,were%20outside%20the%20labour%20force.
94. The Rakyat Post (2020), "HR Deputy Minister Says M'sian Graduates' Lack of Soft Skills & Selective Nature Reasons Why They Fail To Secure Jobs".
Available at: https://www.therakyatpost.com/2020/09/15/hr-deputy-minister-says-msian-graduates-lack-of-soft-skills-selective-nature-reasons-why-they-fail-to-secure-jobs/
95. Huawei (2018), Accelerating Malaysian Digital SMEs: Escaping the Computerisation Trap.
Available at: https://www.huawei.com/minisite/accelerating-malaysia-digital-smes/img/sme-corp-malaysia-huawei.pdf
96. The Malaysia Reserve (2020), "87% workers willing to be re-trained to ensure employability".
Available at: https://themalaysianreserve.com/2020/07/06/87-workers-willing-to-be-re-trained-to-ensure-employability/
97. Randstad (2020), "89% of Malaysians need to upskill to work in a digital environment: Randstad Workmonitor Research.".
Available at: https://www.randstad.com.my/about-us/news/89-of-malaysians-need-to-upskill-to-work-in-a-digital-environment-randstad-workmonitor-research/

in from external organisations but not internally developed as this cuts out learning costs".[98] Thus, there is a need to shift the mindsets of firms and workers towards digital upskilling. In particular, rather than relying on hiring external candidates or outsourcing their IT capabilities, there is a need to pivot towards the perspective of "skilling as a first resort" (i.e., upskilling existing employees as the top priority as opposed to firing and hiring, or outsourcing). To do this, Malaysia could explore the development of incentives for companies to develop and utilise in-house digital talents. Firms in Malaysia could benefit from technical assistance in workforce planning and digital skills development that are tailored to their employees' needs, similar to the "Digital Skills Bridge" programme in Luxembourg launched by the Ministry of Labor, Employment and the Social and Solidarity Economy. This programme provides a positive example of how companies could be supported in conducting workforce planning and digital skill training for their employees (see Box 5).

- **Increase "soft skills" focus to complement technical education.** While Malaysia has been making significant efforts in strengthening the digital technical capabilities of its future workforce, it is critical to also prioritise the development of complementary soft skills for the digital era, such as critical thinking, interpersonal skills, and problem-solving.[99] Research has shown that such intrinsically human skills will grow in importance as technologies displace physical tasks.[100] An example of an education system that seeks to cultivate these skills is Finland's, which was ranked first in The Economist's "Worldwide Educating for the Future Index" in 2019 for its effectiveness in preparing students for the demands of work and life in a rapidly changing landscape.[101] Finland introduced the concept of "phenomenon-based teaching and learning" (PBL) to school curriculums in 2017. Intended to equip students with critical thinking skills, PBL lessons are a shift away from learning in silos, towards multidisciplinary learning where students learn about world topics (e.g., climate change) in a holistic manner. Students are involved in planning these lessons and assessing what they learn from them.[102] By breaking down subject-based compartmentalisation of knowledge, phenomenon-based classes explore phenomena that cross subject boundaries. This approach could be used to develop skills that are often cross cutting, such as problem-solving and digital communication and collaboration.

98. Chartered Institute of Personnel and Development (2019), The future of talent in Malaysia 2035. Available at: https://www.cipd.asia/Images/future-of-talent-malaysia-report_tcm23-53251.pdf
99. Microsoft and IDC (2019), "Microsoft-IDC study: Artificial Intelligence to nearly double the rate of innovation in Asia Pacific by 2021". Available at: https://news.microsoft.com/apac/2019/02/20/microsoft-idc-study-artificial-intelligence-to-nearly-double-the-rate-of-innovation-in-asia-pacific-by-2021/#_ftnref1
100. McKinsey Global Institute (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/MGI-A-future-that-works-Executive-summary.ashx
101. The Economist (2019), "The Worldwide Educating for the Future Index 2019". Available at: https://educatingforthefuture.economist.com/?utm_source=PR&utm_medium=Perspectives&utm_campaign=YidanPrize
102. Sources include: World Economic Forum (2017), "Is this Finnish school the perfect design?" Available at: https://www.weforum.org/agenda/2017/10/why-finland-is-tearing-down-walls-in-schools; David Tay (2017), "Finn and fun: lessons from Finland's new school curriculum". The Straits Times. Available at: https://www.straitstimes.com/singapore/education/finn-fun

BOX 5.
BRIDGING DIGITAL SKILLS GAPS IN LUXEMBOURG THROUGH WORKFORCE PLANNING ASSISTANCE AND CUSTOMISED TRAINING AND CAREER SUPPORT

The Ministry of Labor, Employment and the Social and Solidarity Economy of Luxembourg launched the "Digital Skills Bridge" programme between 2018 and 2019 to provide companies with technical assistance in digital skills development that is tailored to their employees' needs. Workers whose jobs were changing due to digital transformation received training on important digital competences, and career advice from a personal coach who supported them throughout the upskilling process to prepare for future skill requirements in their current position or transition into a new position.[103] During the first pilot launched in May 2018, 11 companies and 330 employees participated in the programme, and 90 percent of the staff managed to shift to higher-value tasks, reduce their working time or switch to their desired job roles within the company.[104]

Photo Source: https://adem.public.lu/en/employeurs/futureskills/projet-pilote.html

103. The Luxembourg Government (2020), "The 2018-2019 "Luxembourg Digital Skills Bridge" pilot project". Available at: https://adem.public.lu/en/employeurs/futureskills/projet-pilote.html
104. European Commission (2019), Luxembourg Digital Skills Bridge. Available at: https://ec.europa.eu/social/BlobServlet?docId=21806&langId=en

2.4 PILLAR 3: DEVELOP A CONDUCIVE ENVIRONMENT FOR DIGITAL TRADE

Finally, for Malaysia to fully harness the economic opportunities afforded by digital technologies, it is important that businesses and organisations are able to maximise the use of digital platforms to export their products and services globally. Past research by AlphaBeta and the Hinrich Foundation reflects that digital exports (comprising the export of digitally-enabled goods and services) accounted for about four percent of the country's total export value in 2017, and could potentially grow further by 298 percent by 2030.[105]
To promote digital trade opportunities, Malaysia has placed strong focus on the following actions:

- **Participating in international agreements that promote digital trade.** Under Thrust Two (i.e., boosting economic competitiveness through digitalisation) of "MyDIGITAL", the Ministry of International Trade and Industry (MITI) aims to establish digital economy arrangements and implement frameworks of cooperation with trade partners to lower operating barriers for exporters at bilateral and regional levels. The Malaysian Government is currently engaged in a number of bilateral and multilateral trade deals. For example, in 2018, the government signed "Comprehensive and Progressive Agreement for Trans-Pacific Partnership" (CPTPP) which aims to build trust and confidence in the use of electronic commerce across borders among 11 countries (which collectively account for 13 percent of the global GDP).[106] However, the government has yet to decide whether Malaysia will ratify the agreement and thus, the agreement has not yet entered into force domestically.[107] Malaysia is also engaged in the "Joint Statement Initiative" negotiations on e-commerce among World Trade Organization

105 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 Malaysia can capture the digital trade opportunity at home and abroad. Available at: https://research.hinrichfoundation.com/hubfs/Digital%20Trade%20Project/malaysia-hinrich-foundation-digital-trade-report.pdf?__hsfp=85913225&__hssc=251652889.2.1615816368461&__hstc=251652889.93064eec0561399750d048f46d468959.1615816368460.1615816368460.1615816368460.1
106. Ministry of International Trade and Industry, Malaysia. "Trans-Pacific Partnership Agreement (TPP) & Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP)". Available at: https://fta.miti.gov.my/index.php/pages/view/71
107. Sources include: Malaysian Investment Development Authority (2020), "Ratification of CPTPP can help Malaysia be more competitive, says IDEAS". Available at: https://www.mida.gov.my/mida-news/ratification-of-cptpp-can-help-malaysia-be-more-competitive-says-ideas/#:~:text=Malaysia%20has%20signed%20the%20CPTPP,expressed%20its%20interest%20to%20join.&text=%E2%80%9CMalaysia%27s%20negotiators%20struck%20a%20good,now%20be%20ratified%20and%20implemented; The Edge Markets (2020), "Azmin: Malaysia to address sensitive issues before deciding on CPTPP ratification". Available at: https://www.theedgemarkets.com/article/azmin-malaysia-address-sensitive-issues-deciding-cptpp-ratification

(WTO) members, which will seek to set the baseline for global digital trade.[108] 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 industrialisation objectives for the digital economy.[109] Malaysia's participation is significant given that many other emerging economies have chosen not to engage in these negotiations, stating a preference for first building their domestic regulatory and institutional capacities to pursue development objectives in the digital economy.[110]

- **Developing digital platforms to support SMEs in capturing digital trade opportunities.** In 2017, the Malaysian Government launched the "Digital Free Trade Zone" (DFTZ) initiative to facilitate cross-border e-commerce and widen global market access for SMEs. The DFTZ provides physical and virtual zones aimed to facilitate SMEs to capitalise on the growth of the digital economy and cross-border e-commerce activities. These zones comprise three components: an e-Fulfilment Hub which optimises border clearance and reduces handling time by 50 percent through the adoption of automated guided vehicles in sorting, shelving and packing parcels;[111] a "Satellite Services Hub" which connects SMEs with a network of ecosystem partners offering financing, last-mile fulfilment, insurance, and other services to facilitate cross-border trade;[112] and an "e-Services platform" which allows companies to more efficiently manage all processes related to overseas shipments from procurement, contract signing, customs clearance, to managing online distribution. Moreover, the DFTZ delivers "Smart Marketing" services which aim to help promote domestic products to global buyers, including launching a dedicated "Malaysian Pavilion" on the e-commerce platform, Alibaba.com.[113] In addition to the DFTZ, the "eTRADE Programme 2.0" by the Malaysia External Trade Development Corporation (MATRADE) is another initiative which aims to accelerate exports through cross-border e-commerce platforms. This programme provides grants for businesses undertaking any digital marketing

108. 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
109. 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
110. United Nations Conference on Trade and Development (2021), "Developing countries and trade negotiations on e-commerce". Available at: https://unctad.org/news/developing-countries-and-trade-negotiations-e-commerce
111. Ministry of International Trade and Industry (2018), About Digital Free Trade Zone. Available at: https://www.miti.gov.my/miti/resources/Media%20Release/Fact_Sheet_DFTZ_at_Malaysia_Digital_Economy_2018_SME_Fact_Sheet.pdf
112. Malaysia External Trade Development Corporation (2021), "Digital Free Trade Zone (DFTZ)". Available at: https://www.matrade.gov.my/en/digital-free-trade-zone-dftz
113. Ministry of International Trade and Industry (2018), About Digital Free Trade Zone. Available at: https://www.miti.gov.my/miti/resources/Media%20Release/Fact_Sheet_DFTZ_at_Malaysia_Digital_Economy_2018_SME_Fact_Sheet.pdf

activities, e-commerce training, and onboarding of e-commerce platforms.[114]

- **Building trusted and secure digital environments to facilitate cross-border data transfers.** With an exponential rise in the volume of data moving across geographical borders to support digitally-enabled services, developing mechanisms to facilitate the secure transfer of data across borders is key to mitigating potential frauds. To build a trusted and secure digital environment (Thrust Six of "MyDIGITAL"), the Ministry of Communications and Multimedia (KKMM) and MITI collaborated in a joint initiative to review existing cross-border data transfer regulations in its Personal Data Protection Act (PDPA) by 2025.[115]

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

- **Ratify the CPTPP to enhance economic competitiveness.** Of immediate consideration is the ratification of the CPTPP, especially since the agreement is consistent with Malaysia's present stance on governance, transparency and predictability. According to the non-profit Malaysia-based research institute, the Institute for Democracy and Economic Affairs (IDEAS), ratifying the CPTPP presents an opportunity for Malaysia to strengthen its post-COVID-19 economic recovery process; in particular, it estimates that doing so could boost its GDP by over MYR14 billion, and create 140,000 jobs.[116] These positive economic impacts can take place through three channels. First, as a free trade agreement (FTA) for major economies globally, it can stimulate increased trade and investment without creating additional fiscal pressure in Malaysia. Second, in the wake of the COVID-19 pandemic, the ratification of CPTPP can potentially open up access for businesses in Malaysia to regional markets for goods and services, and increase the resilience of supply chains against future shocks. Third, with digital trade provisions put in place, the CPTPP can promote Malaysia's transition to 4IR and accelerate industry digitalisation, which can help stimulate economic growth.

- **Align with international frameworks to promote interoperability.** To promote interoperability between different regimes and maintain trust in the digital economy, clear and consistent regulations can protect data privacy and support cross-border economic activities. A useful first step would be for Malaysia to align with international frameworks like the "APEC (Asia Pacific Economic Cooperation) Privacy Framework" and International Organization for Standardization (ISO) Standards, such as ISO27018 that specify controls to protect personal data.[117] Malaysia can also strive to be a regional leader in data privacy by joining the "APEC Cross Border Data Privacy Rules" (CBPR), a government-backed data privacy certification that requires participating companies to develop and implement data privacy policies consistent with the "APEC Privacy Framework".[118]

- **Promote the regional digital trade agenda.** Under the backdrop of increasing calls to harmonise data standards, data governance and data protection frameworks, Malaysia could encourage regional trade partners to reconcile different regulatory practices, minimise barriers to cross-border digital

114. Digital News Asia (2021), "Matrade announces second eTrade programme to assist Malaysian SMEs".
Available at: https://www.digitalnewsasia.com/digital-economy/matrade-announces-second-etrade-programme-assist-malaysian-smes
115. Economic Planning Unit, Prime Minister's Department (2018), Malaysia Digital Economy Blueprint.
Available at: https://www.epu.gov.my/sites/default/files/2021-02/Malaysia-digital-economy-blueprint.pdf
116. IDEAS (2020), "IDEA: Ratifying CPTPP will boost Malaysia's economy, especially if Taiwan also joins". Available at: https://www.ideas.org.my/ideas-ratifying-cptpp-will-boost-malaysias-economy-especially-if-taiwan-also-joins/#:~:text=65%2C%20%E2%80%9CMalaysia%2C%20Taiwan%20and,CPTPP%3A%20Economic%20Impact%20Assessment%E2%80%9D.&text=IDEAS%20estimates%20that%20ratifying%20and,140%2C000%20additional%20people%20in%20work.
117. AlphaBeta (2018), The data revolution: how Malaysia can capture the digital trade opportunity at home and abroad.
Available at: https://research.hinrichfoundation.com/hubfs/Digital%20Trade%20Project/malaysia-hinrich-foundation-digital-trade-report.pdf?__hsfp=859132258__hssc=251652889.2.1615816368461&__hstc=251652889.93064eec0561399750d048f46d468959.1615816368460.1615816368460.1615816368460.1
118. Joshua Meltzer and Peter Lovelock (2018), "Regulating for a digital economy: Understanding the importance of cross-border data flows in Asia".
Available at: https://www.brookings.edu/wp-content/uploads/2018/03/digital-economy_meltzer_lovelock_web.pdf

transactions and support the growth of digital economies. While Malaysia is already part of ongoing negotiations under the "Joint Statement Initiative" (JSI) at WTO on e-commerce trade rules (as highlighted above), the country could also consider replicating its traditional FTA strategy to take on a more proactive stance to promote the regional digital trade agenda. Given Malaysia's reliance on its digital economy to promote economic growth, it has much to gain from actively seeking like-minded partners to negotiate and develop digital trade rules.[119] Malaysia could also consider taking a stronger lead in driving the implementation of regional cross-border data management frameworks such as the "ASEAN Data Management Framework" (DMF) and "Model Contractual Clauses on Cross Border Data Flows" (MCCs).[120] Aimed at improving data governance to instil trust in data sharing between organisations and countries in the region, such frameworks will be supportive particularly for businesses treading a fine line between balancing digital initiatives while concurrently managing data protection and customer privacy safeguards.

- **Participate in multilateral digital trade agreements.** With an 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.[121] While Malaysia 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 SMEs overcome the challenges of scale and distance.[122] DEPA includes provisions that streamline trading procedures through digitising 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.[123] 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, SMEs 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.

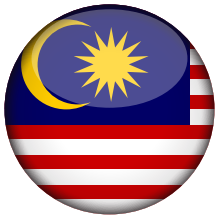
119. New Straits Times (2020), "Malaysia's digital trade takes on greater importance in a post-Covid world".
Available at: https://www.nst.com.my/business/2020/12/647699/malaysias-digital-trade-takes-greater-importance-post-covid-world
120. Personal Data Protection Commission Singapore (2021),"ASEAN Data Management Framework and Model Contractual Clauses on Cross Border Data Flows".
Available at: https://www.pdpc.gov.sg/help-and-resources/2021/01/asean-data-management-framework-and-model-contractual-clauses-on-cross-border-data-flows
121. OECD (2019), Trade in the digital era. Available at: https://www.oecd.org/going-digital/trade-in-the-digital-era.pdf
122. 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
123. Ministry of Trade and Industry Singapore (2020), Singapore substantially concludes negotiations for Digital Economy Partnership Agreement with Chile and New Zealand.
Available at: https://www.mti.gov.sg/-/media/MTI/Newsroom/Press-Releases/2020/01/Joint-press-release---Conclusion-of-Digital-Economy-Partnership-Agreement---21-Jan.pdf

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

Google has made significant contributions in advancing digital transformation in Malaysia across the three pillars outlined in Chapter 2. Through programmes such as "Mahir Digital Bersama Google", Google is facilitating digitalisation in the private sector by offering free workshops to help SMEs learn digital skills and adopt digital tools to establish and grow their online presence. With physical stores shuttered during the COVID-19 pandemic, digital commerce has become a lifeline for retailers. In light of these challenges, Google provides free services for retailers to sell on its platforms. One such service is the provision of free business listings displayed on search results on the Google Shopping tab, which help retailers better connect with consumers regardless of whether they advertise on Google. Through programmes such as "Go Digital ASEAN" and "AirAsia Academy", Google is building the nation's digital talent. Google.org, Google's philanthropic arm, supported The Asia Foundation with a MYR14 million (USD3.3 million) grant to launch the "Go Digital ASEAN" initiative. This initiative aims to close the digital gap in ASEAN countries, including Malaysia, and improve digital literacy among communities in rural regions and underserved areas. To promote digital trade opportunities, YouTube serves as an important platform for local content creators to expand their presence globally and provides an alternative source of income, particularly during the economic downturn due to the COVID-19 pandemic.

In addition, Google's products create various economic benefits for business, consumers and the broader society in Malaysia. Google's products and services are estimated to bring about total annual business and consumer benefits worth MYR7.1 billion (USD1.7 billion) and MYR32.7 billion (USD7.8 billion) respectively. Taken together, Google is contributing about MYR39.8 billion (USD9.5 billion) in economic value, equivalent to the annual gross output of Malaysia's real estate industry.

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



1. Facilitate digitalisation in both the public and private sectors
2. Build the nation's digital talent
3. Promote digital trade opportunities

EXAMPLES OF INITIATIVES BY GOOGLE

- Google's **"Mahir Digital Bersama Google"** programme offers free workshops to help SMEs learn digital tools and skills to establish and grow their business online
- Supported by a USD3.3-million grant from Google.org, The Asia Foundation's **"Go Digital ASEAN"** programme aims to equip 15,000 underemployed and underserved Malaysian youths with digital literacy skills
- **YouTube** supports businesses and content creators in Malaysia by allowing them to reach out to international audiences easily

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

BUSINESSES

Through significant boosts to productivity and customer outreach, Google is estimated to support **MYR7.1 billion (USD1.7 billion)** worth of annual benefits for businesses in Malaysia[1]

CONSUMERS

By helping consumers save time and generating value through their free products, Google is estimated to support **MYR32.7 billion (USD7.8 billion)** worth of annual benefits for consumers in Malaysia[2]

SOCIETY

By enabling businesses to unlock new revenue streams and expand their businesses, Google indirectly supports **over 31,000 jobs** in Malaysia. It also delivers a set of programmes to support communities such as female entrepreneurs, allowing them to benefit from digital technologies

1. Business benefits refer to the estimated economic impact from the following products: Google Search; Google Ads; AdSense; YouTube; and Google Play.
2. Consumer benefits refer to the estimated economic impact from the following products: Google Search; Google Maps; YouTube; 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.

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 improved productivity through time savings, as well as greater revenues as a result of stronger customer outreach and access to new markets. For example, every month in 2020, Google helped drive over 44 million direct connections, including phone calls, requests for directions, messages, bookings, and reviews for Malaysian businesses. 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 Malaysia. 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 31,000 jobs in Malaysia. Google also delivers intangible benefits through its programmes, such as extending digital skilling opportunities to female entrepreneurs in Malaysia.

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

Google has made significant contributions in Malaysia with its programmes, products and services across all the three pillars of action highlighted in Chapter 2. To **facilitate digitalisation in both the public and private sectors (Pillar 1)**, Google has done the following:

- **Supporting small businesses in adopting digital tools.** Google's "Mahir Digital Bersama Google" programme educates and equips Malaysian SMEs on the use of digital tools to bring their businesses online and reach more customers.[124] Through this programme, Google provides free online workshops on the use of digital tools that can help businesses undergo digital transformation. These tools include Business Profile, Google Trends, Google Analytics, among others.[125] To support the recovery of the travel and tourism industry, Google collaborated with the Ministry of Tourism, Arts and Culture (MoTAC), MDEC and the Malaysian Association of Tour and Travel Agents (MATTA) to launch a special webinar series under "Mahir DIgital Bersama Google". Within a month, 286 companies from the travel and tourism industry participated and benefitted from the series. In 2020 alone, more than 11,000 Malaysian small business owners and employees benefitted from the programme.

- **Providing digital tools and services for the private sector to boost industry competitiveness.** Google's tools and resources also support local entrepreneurs in their efforts to go digital, boosting productivity. These tools have been particularly instrumental in helping small businesses capture online demand and thrive despite lower footfall as a result of movement restrictions imposed during MCO. Box 6 provides an example of how a local florist benefitted from utilising Google's tools to increase revenues and diversify its offerings in spite of COVID-19. Apart from supporting small businesses, Google's tools have also enabled healthcare providers to deliver services remotely during COVID-19 (see Box 7).

124. Google, "Mahir Digital Bersama Google." Available at: https://events.withgoogle.com/mahir-digital/
125. Google, "Free tools to help your business grow." Available at: https://events.withgoogle.com/mahir-digital/tools/#content

BOX 6.
BLOOMTHIS: GOOGLE'S TOOLS ENABLE LOCAL FLORIST TO SELL ONLINE DURING MCO

BloomThis is a floral and gifting company in Malaysia that imports flowers from overseas to sell in the domestic market. When MCO was implemented in March, the business was unable to import flowers, affecting 80 percent of its products.[126] Sales were also drastically reduced as a result. Within a week after the implementation of MCO, its revenue fell to zero.

Given the challenging environment, BloomThis decided to diversify its product offerings. It expanded beyond flowers and introduced new gifting bundles to meet consumer demands. Fortunately for BloomThis, the business was familiar with Google Shopping Ads and used the platform to promote its new gifting bundles online through posting visually appealing product images. In addition, it engaged customers through Business Profile by constantly sharing updates on the launch of their latest products, business operating hours, and any ongoing promotions. The use of such tools not only helped BloomThis adapt to the unique needs of the pandemic but also increased its revenues. From March to May in 2020 (MCO period) compared to the same period in the previous year, BloomThis's sales increased by 155 percent, its return on advertising spend increased by 158 percent, and cost per acquisition (CPA) decreased by 68 percent.

126. Google, "From zero to profitable, how BloomThis spurred growth in times of crisis."
Available at: https://services.google.com/fh/files/events/final_economic_recovery_case_study-bloomthis.pdf

BOX 7.
GOOGLE MEET HELPS KPJ HEALTHCARE TRANSITION TOWARD DIGITAL HEALTHCARE

Unable to consult with patients in-person during the COVID-19 pandemic, KPJ Healthcare Bhd, one of Malaysia's largest private healthcare providers, adopted Google Meet to provide virtual teleconsultation services for its patients.[127] Google Meet allowed the company to provide critical healthcare services despite movement restrictions. Apart from facilitating telemedicine, Google's tools also allowed the company to easily comply with internal policies which states that all teleconsultation sessions must be recorded for the protection of both the medical consultant and the patient. Using Google Meet's built-in functions and the unlimited storage offered by Google Workspace, the company was able to effectively record all virtual consultations. Google Meet also provides the necessary security safeguards, such as encrypting customer data, permitting entry to rooms via meeting codes, and supporting a two-step verification process required in healthcare settings with highly personalised patient data handled on a need-to-know basis during patient-doctor consultation sessions.

Google Workspace also helped to boost the internal efficiency of teams. For example, the company's employees used Google products, such as Calendar and Gmail to schedule events; Docs and Sheets for real-time collaboration; and Google Meet for internal and external virtual meetings. Using Google Cloud, the company aims to centralise its data to improve app integration, and therefore increasing its productivity.

Photo Source: https://www.theedgemarkets.com/article/kpj-healthcare-sees-turning-point-2021-after-washout-year

127. Focus Malaysia (2021), "Meet-ing your doctor during lockdown is now just a click away."
Available at: https://focusmalaysia.my/featured/meet-ing-your-doctor-during-lockdown-is-now-just-a-click-away/

To **build the nation's digital talent (Pillar 2)**, Google has launched the following efforts in Malaysia:

- **Reskilling and upskilling of the current workforce.** To help Malaysians adapt to the evolving technological landscape, Google has developed numerous skilling initiatives to benefit the current workforce. One key initiative is its "Grow with Google" online portal which offers Malaysians a wide selection of courses and tools to develop their businesses or careers.[128] These offerings equip entrepreneurs with the know-how and skills to establish an online presence, build customer engagement, and analyse customer behaviour. During the COVID-19 pandemic, Google partnered with Lazada University to provide local small retailers with educational resources to improve their online presence, which was especially crucial during the pandemic. For professionals, they can explore and learn skills in a range of subjects including AI, machine learning, digital marketing, and software development. For example, journalists and media professionals in Malaysia benefitted from the "Google News Initiative" (GNI).[129] Through this programme, Google helped train nearly 2,000 journalists in Malaysia in digital tools, data journalism, and verification tools. In addition, Google organised knowledge sharing sessions like "Think Media by Google" on topics that include how to optimise online presence on Google News, how to use Google Ads, and how to leverage data to boost business. Google also provided targeted support to promising young media companies, which has helped them improve their revenue potential. For example, Malaysiakini, a homegrown news publisher, was selected to be part of the "GNI APAC Subscription Lab", a programme that helped news publishers strengthen their digital subscription capabilities. To incentivise subscriptions, Malaysiakini introduced a point- and award-based system called "Kini Community", which led to an increase

128. Google, "Grow with Google." Available at: https://grow.google/intl/en_my/
129. Google (2020), "Mengimbas Kembali Usaha Google News Initiative Kami di Malaysia." Available at: https://malaysia.googleblog.com/2020/10/mengimbas-kembali-usaha-google-news.html

of 140 percent in subscriptions in the first month after its launch. In a similar vein, Google partnered with AirAsia to launch "AirAsia Academy" that aims to upskill Malaysian professionals across various industries (see Box 8).

- **Providing digital tools to support hybrid online and offline learning.** Beyond skilling initiatives to equip the current workforce with digital skills to leverage cutting-edge technologies, Google is committed to preparing the next generation of workers to navigate these same technologies. To further Malaysia's progress on digital education, and to support hybrid learning methods during the COVID-19 pandemic, Google partnered with the MOE to roll out its free Google Workspace for Education (formerly known as "G Suite for Education") and Google Classroom tools throughout the country. As highlighted in Chapter 2, this partnership helped MOE form DELIMa, a national online learning platform catered to the hybrid online and offline needs of the country's education system. The DELIMa digital learning platform facilitates students' access to all required educational applications and services, such as Google Classroom.[130] In addition, Google launched in partnership with MOE "Teach from Anywhere", a website that aggregates helpful tools and resources for teachers when conducting remote learning.[131] There are also daily webinars to help Malaysian teachers get up to speed with digital tools and learn how to conduct remote learning. Since March 2020, these webinars have garnered more than two million views.

- **Nurturing digital skills of the future workforce.** Google is committed to digital inclusion by equipping the future workforce with the necessary skills to excel in the digital economy. As part of its "CS (Computer Science) First Curriculum" initiative, Google introduced 182 students attending SK Sementa, an elementary school in the State of

130. Microsoft (2020), "Ministry of Education launches new digital learning platform with participation from Google, Microsoft and Apple." Available at: https://news.microsoft.com/en-my/2020/06/15/ministry-of-education-launches-new-digital-learning-platform-with-participation-from-google-microsoft-and-apple/
131. Google, "Teach from Anywhere." Available at: https://teachfromanywhere.google/intl/ms/#for-teachers

BOX 8.
AIRASIA ACADEMY: HELPING WORKERS ADAPT TO THE EVOLVING DIGITAL LANDSCAPE

Located in Kuala Lumpur and built by AirAsia Digital and Google Cloud, "AirAsia Academy" is a learning academy that aims to support the digital transformation of the country by offering courses in areas such as AI, machine learning, cybersecurity, big data, and software engineering.[132] The academy offers both part-time and full-time courses, aiming to groom Malaysian youths. The academy's offerings include "Programmes" that require a time commitment of anywhere between three to nine months, and "Short Courses" that could be completed in nearly four days. Topics covered include core infrastructure, data analytics and engineering, cloud infrastructure, data analytics, digital marketing, user experience (UX) design, and cybersecurity. Participants earn industry-recognised certificates upon the completion of each course, which also boost their employability.[133]

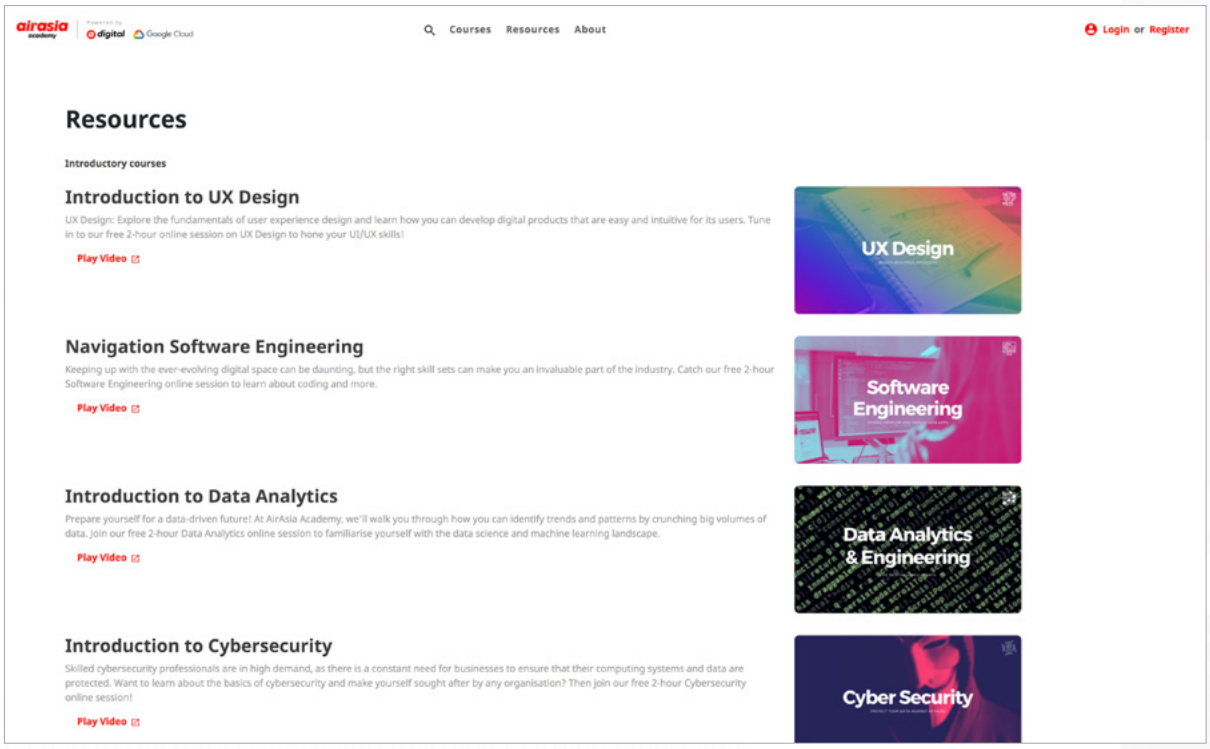


Photo Source: https://redbeatacademy.com/resources

132. Air Asia (2020), "AirAsia Digital and Google join hands to launch Redbeat Academy." Available at: https://newsroom.airasia.com/news/airasia-digital-and-google-join-hands-to-launch-redbeat-academy
133. AirAsia Academy (2021). Available at: https://redbeatacademy.com/

Selangor, to computer science. The curriculum was well received, with all 182 students expressing an interest to join in the next installation of "CS First Curriculum" if given the opportunity. At the same time, Google has successfully trained 26 teachers from MDEC's "#CikguJuaraDigital" programme to deliver the "CS First Curriculum", with 82 percent of these teachers planning to teach "CS First Curriculum" as an extracurricular activity in their schools. As part of the "Celcom Siswapreneur @ Google Bootcamp", organised in partnership with local mobile telecommunications provider, Celcom Axiata Berhad, and MOE, Google trained more than 3,800 university students in a range of job-ready digital skills and tools.[134] These include creating a compelling resume using Google Docs, creating a website using Google Sites, and sharing the fundamentals of using Google Ads. The programme has been running for three years, demonstrating Google's commitment to nurturing digital skills of the future workforce.

- **Extending digital skilling opportunities to underserved communities.** To build digital skills in individuals from underserved communities, Google.org, Google's philanthropic arm, has pledged a grant of more than MYR14 million (USD3.3 million) to The Asia Foundation's "Go Digital ASEAN" initiative. This aims to close the digital skills gap in ASEAN countries including Malaysia, and improve digital literacy among communities in rural regions and underserved areas — including entrepreneurs, underemployed youth, women, indigenous communities, and people with disabilities.[135] In Malaysia, The Asia Foundation partners with local organisations (i.e., International Youth Centre (IYC) and Startup Malaysia) to equip 15,000 youths with digital literacy skills to help them unlock economic opportunities, such as finding a job, or bringing their business online.[136]

134. Celcom (2018), "Celcom and Google gathers 250 undergraduates for digital marketing bootcamp." Available at: https://www.celcom.com.my/sites/default/files/pdf/celcom-news-release-celcom-and-google-gathers-250-undergraduates-for-digital-marketing-bootcamp.pdf
135. Go Digital, "Go Digital ASEAN Malaysia." Available at: https://go-digital.my/#content
136. Sources include: Bernama (2021), "Go Digital ASEAN initiative to train 15,000 youths, micro entrepreneurs in Malaysia." Available at: https://www.bernama.com/en/business/news.php?id=1925345; Go Digital, "Go Digital ASEAN Malaysia." Available at: https://go-digital.my/

BOX 9.
YOUTUBE SUPPORTS INDIVIDUALS IN CREATING VIABLE REVENUE STREAMS, EVEN OPENING UP OPPORTUNITIES AND CAPTURING DEMAND FROM INTERNATIONAL MARKETS

SUGU PAVITHRA

In 2019, Pavithra, a homemaker and mother of two, was actively looking for ways to bolster the family income. Her husband, Sugu, was the sole breadwinner and worked in an oil palm estate. Inspired by their neighbour's success with YouTube, Pavithra and Sugu saw an opportunity to attempt content creation.[137] Using a smartphone and a simple setup, they started uploading cooking videos and snippets of their daily life. Their gentle demeanor and easy-to-follow recipes won the hearts of Malaysians and the support was further amplified during the pandemic as more people turned to online channels for entertainment. Within six months of their YouTube debut, their channel accumulated over 750,000 subscribers, including subscribers from Indonesia, Singapore and Australia. The channel's success also caught the attention of Tan Sri Muhyiddin Yassin, the Prime Minister of Malaysia, who mentioned the couple in his Economic Recovery Plan (PENJANA) address as an example of how Malaysians have shown resilience during the pandemic.

Photo Source: https://www.therakyatpost.com/2020/07/14/sugu-pavithra-officially-receives-silver-play-button-from-youtube/

LES' COPAQUE

Founded in 2005, Malaysian animation studio, Les' Copaque, produces high quality 3D animation for television programmes. Hoping to gain a wider following, the studio established its YouTube channel in 2009. Its iconic animated children's series, "Upin & Ipin", was picked up by Disney Channel Asia and Televisi Pendidikan Indonesia (TPI), and aired in both Bahasa Melayu and English.[138] With the launch of its YouTube channel, the animated series became available globally to fans in Uzbekistan and Europe. The enthusiastic reception of its animated series paved the way for the company's expansion into full-length feature films such as Geng: Pengembaraan which was awarded multiple accolades. In 2020, the YouTube channel hit ten million subscribers, the first YouTube channel in Malaysia to do so, and was awarded the Diamond Play Button Award.[139]

Photo Source: https://www.quake.com.my/latest-update/221-astro-and-les-copaque-collaborate-to-strengthen-local-and-regional-animation-industry

137. Google, "Sugu Pavithra improves their quality of life with YouTube during uncertain times."
Available at: https://services.google.com/fh/files/events/economic_recovery_case_study-sugu-pavithra.pdf
138. Malaysia External Trade Development Corporation (2021), "Les' Copaque Production Sdn Bhd".
Available at: https://www.matrade.gov.my/en/31-malaysian-exporters/going-global-exporters-success-stories/2025-les-copaque-production-sdn-bhd
139. Malay Mail (2020), "'Upin & Ipin' creators Les' Copaque becomes first Malaysian YouTube channel to reach 10 million subscribers".
Available at: https://www.malaymail.com/news/life/2020/06/12/upin-ipin-creators-les-copaque-becomes-first-malaysian-youtube-channel-to-r/1874840

To **promote digital trade opportunities (Pillar 3)**, Google demonstrates its commitment with the following:

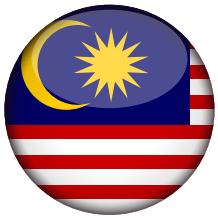
- **Developing digital platforms to promote domestic digital exports.** As one of the most popular video-sharing websites with an international audience, YouTube provides a platform for content creators in Malaysia to expand their presence globally. The platform has played an even more crucial role in supporting individuals to build a ground-up online business during the COVID-19 pandemic, and to capture demand from the overseas market. Box 9 provides examples of Malaysian YouTubers who have benefitted from using the platform to generate an alternative source of income and expand their reach overseas.

- **Promoting security and privacy of data and information.** By instilling trust in data sharing between organisations 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 smart, interoperable, and adaptable data protection regulations, Google is supporting Malaysia's efforts to revise its personal data protection legislation by sharing its "Framework for Responsible Data Protection Regulation".[140] This framework aims to protect individuals and communities from harm and misuse of data, while enabling businesses and consumers to benefit from the benefits of innovative services. It also encourages 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 Malaysian Government can refer to this framework in their efforts to develop smart, interoperable, and adaptable data protection regulations, and potentially leverage it as part of their plan to review existing cross-border data transfer regulations in the Personal Data Protection Act (PDPA) by 2025.[141]

- **Supporting local start-ups in expanding their global network.** Google launched its "Google for Startups Accelerator: Southeast Asia" programme, a three-month online accelerator bootcamp to discover and grow high-potential tech-based start-ups that are solving the region's challenges in the post-pandemic era.[142] As part of this programme, 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. One such local start-up receiving Google's support is MHub Suite, which enables end-to-end property transactions by linking real estate developers, sales teams, real-estate agents, bankers, lawyers, and potential customers on one platform.[143] To date, over USD184 million (MYR755 million) worth of bookings have been made on the MHub platform and the business has forged partnerships with 15 banks.[144]

140. Google (2020), Framework for Responsible Data Protection Regulation. Available at: https://services.google.com/fh/files/blogs/google_framework_responsible_data_protection_regulation.pdf
141. Economic Planning Unit, Prime Minister's Department (2018), Malaysia Digital Economy Blueprint. Available at: https://www.epu.gov.my/sites/default/files/2021-02/Malaysia-digital-economy-blueprint.pdf
142. Google for Start-ups (2020), "Google for Start-ups Accelerator: Southeast Asia". Available at: https://sites.google.com/view/gfs-accelerator-sea/home
143. Mhub (2021), "New Normal, New Standards." Available at: https://apps.mhub.my/#home-1pager__milestones
144. Fintech News (2017), "12 Hottest Fintech Startups in Malaysia". Available at: https://fintechnews.sg/13378/malaysia/12-fintech-startups-in-malaysia-watchlist/

GOOGLE'S ECONOMIC IMPACT IN MALAYSIA



BUSINESS BENEFITS

Google supports
MYR7.1 BILLION (USD1.7 BILLION)
in annual benefits to businesses in Malaysia[1]

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

CONSUMER BENEFITS

Google supports
MYR32.7 BILLION (USD7.8 BILLION)
in annual benefits to consumers in Malaysia[2]

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

According to AlphaBeta research,
OVER 40%
of **YouTube** users in Malaysia 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 31,000 jobs** in Malaysia

In partnership with Nestlé and Maggi, Google launched the **"Wanita Cukup Berani"** programme, which trained **more than 1,000 malaysian women** on how to leverage digital tools in their work and business

1. Business benefits refer to the estimated economic impact from the following products: Google Search; Google Ads; YouTube; AdSense; and Google Play.
2. Consumer benefits refer to the estimated economic impact from the following products: Google Search; Google Maps; YouTube; 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 Malaysia. This study finds that the annual economic values presented by Google's applications and platforms are worth MYR7.1 billion (USD1.7 billion) for businesses and MYR32.7 billion (USD7.8 billion) for consumers. Taken together, Google is contributing a significant MYR39.8 billion (USD9.5 billion) in economic value to Malaysia, an amount that is equivalent to the annual gross output of Malaysia's real estate industry.[145] An overview of the assessed economic benefits to businesses and consumers in Malaysia is provided in Exhibit 7. 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 Malaysia. These include indirectly supporting over 31,000 jobs in its economy,[146] as well as other intangible benefits through its programmes, such as extending digital skilling opportunities to female entrepreneurs in Malaysia.

BENEFITS TO BUSINESSES

GOOGLE HELPS BUSINESSES BOOST THEIR REVENUES

Google applications broaden the reach of businesses in Malaysia 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 MYR5.7 billion (USD1.4 billion) annually in the form of net returns to businesses in Malaysia from advertising on Google Search results of relevant keywords.[147] Beyond search advertising, businesses in Malaysia 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 MYR79 million (USD19 million) annually.[148] Meanwhile, by leveraging the various formats of advertisements enabled by **YouTube**, businesses are estimated to achieve MYR357 million (USD85.2 million) net advertising returns annually.[149]

Box 11 illustrates how local SMEs were able to expand their customer outreach and increase revenue through Google Ads.

Google also provides new sources of income for content creators in Malaysia. By allowing content creators such as online journalists, media sites, bloggers, and writers to earn income by hosting advertisements on their sites, **AdSense** is estimated to have helped content creators in Malaysia monetise space on their websites, and generate a total annual income of MYR245 million (USD58.3 million). **YouTube** also benefits content creators in Malaysia who earn revenue by placing advertisements on their videos. This is estimated to bring content creators in Malaysia a

145. Department of Statistics Malaysia (2019), "The Real Estate Services Recorded Gross Output Value of RM32.8 billion in 2017". Available at: https://www.dosm.gov.my/v1/index.php/index.php?r=column/ctheme&menu_id=b0plV1E3RW40VWRTUkZocEhyZ1pLUT09&bul_id=WXRYYm9jR2RtSnk0UlZoN2ptY2hBUT09#:~:text=REAL%20ESTATE%20SERVICES-,The%20real%20estate%20services%20recorded%20gross%20output%20value%20of%20RM32,2017%20as%20compared%20to%20RM28.&text=1%20billion%20with%20the%20average,billion%20for%20the%20year%202017.

146. 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.

147. This refers to the increase in revenues and sales that can be directly attributed to advertising minus the related advertising expenditure. MYR5.7 billion (USD1.4 billion) refers to the net advertising benefits received by advertisers on Google Search & Ads based on a Return on Investment (ROI) ratio ranging between 3.4 and 8. The gross advertising revenue earned by advertisers is about MYR6.7 billion (USD1.6 billion). See Appendix B for details on the methodology.

148. MYR79 million (USD19 million) refers to the net advertising benefits received by advertisers on AdSense based on a Return on Investment (ROI) ratio of 0.24. The gross advertising revenue earned by advertisers is about MYR330 million (USD78.8 million). See Appendix B for details on the methodology.

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

EXHIBIT 7:
OVERVIEW OF ANNUAL BENEFITS SUPPORTED BY GOOGLE IN MALAYSIA

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 **4.4 days** a year per worker in Malaysia	• App developers in Malaysia earn about **MYR515 million (USD123 million)** in revenue from both 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[1]
CONSUMER BENEFITS	• By providing almost instantaneous access to information, the average Google Search user in Malaysia saves about **4.4 days** looking for answers online each year • The total annual consumer benefits derived from Google Search are estimated at **MYR8 billion (USD1.9 billion)**	• Consumers can choose from over **3.5 million** apps available on the Android ecosystem[2] • 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 Malaysia are estimated at **MYR14.1 billion (USD3.4 billion)** annually

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

2. 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/

3. 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 function in Google Maps allows customers to discover local businesses. Every month in 2020, Google helped drive over **44 million** direct connections, including phone calls, requests for directions, messages, bookings, and reviews for Malaysian businesses.	• Google Search and Ads bring about **MYR5.7 billion (USD1.4 billion)** in net advertising benefits to businesses in Malaysia annually[3] • Web publishers and content creators in Malaysia earn about **MYR390 million (USD92.9 million)** in revenue from AdSense and YouTube annually • Advertises in Malaysia gain **MYR437 million (USD104 million)** in net advertising benefits annually from displaying advertisements on websites and videos using AdSense and YouTube[3]	**MYR7.1 BILLION (USD1.7 BILLION)**
	• The total annual consumer benefits derived from Google Maps, Drive, Photos, Docs, and Sheets that increase productivity and convenience are estimated at **MYR10.6 billion (USD2.5 billion)**	Nil	**MYR32.7 BILLION (USD7.8 BILLION)**

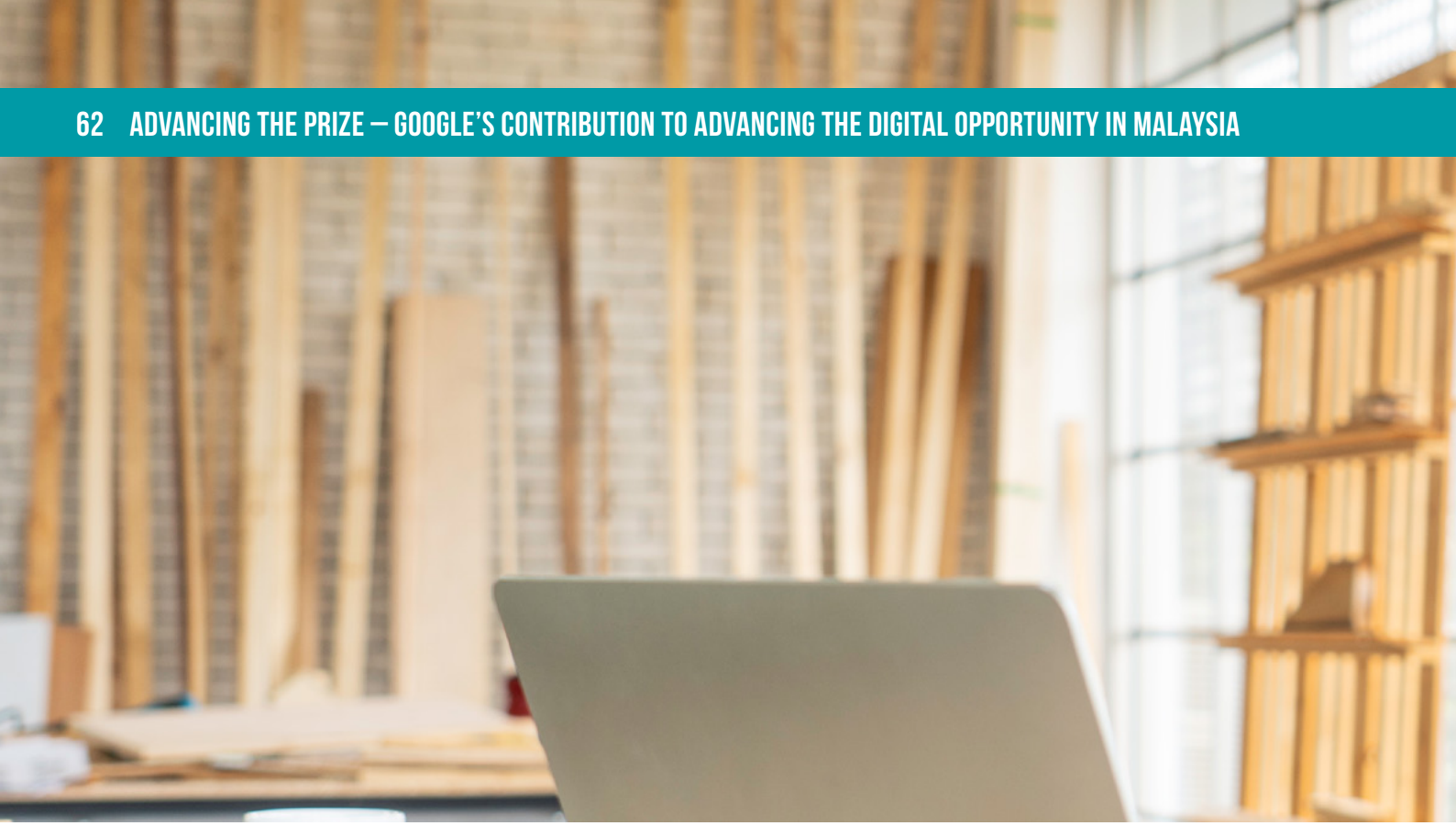
BOX 10.
MEASURING THE BENEFITS OF GOOGLE'S PRODUCTS TO BUSINESSES AND CONSUMERS

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 utilised 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. For consumers, it is important to note that these benefits 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) was 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.

BOX 11.
GOOGLE ADS HELPED AN ENTREPRENEUR GROW HIS BUSINESS DURING THE PANDEMIC

The COVID-19 pandemic forced several Malaysians, including Mohd Zaid, to consider alternative income streams.[150] To support his family, Zaid decided to develop his passion into a business by selling natural soy wax candles infused with scented oils under his brand, Lampu Cherita. However, a sole reliance on word-of-mouth caused him to struggle with scaling his business. Zaid decided to try digital marketing. To do this, Zaid attended the "Mahir Digital Bersama Google," a Grow with Google programme to upskill Malaysian entrepreneurs on digital skills. Through the programme, he realised the need for a more coordinated marketing approach and how Google Ads could facilitate it. With a budget of MYR17 (USD4) per day, Mohd Zaid shared Lampu Cherita's latest promotions with a larger pool of potential customers on Google Search to differentiate his products in a challenging market. By taking advantage of the digital tools, Lampu Cherita managed to grow significantly. Within a month of using Google Ads, Lampu Cherita increased its website traffic by 350 percent and its sales by 70 percent.

150. Astro Awani (2021), "AWANI Pagi: Platform Google bantu PKS kembang perniagaan"
Available at: https://www.astroawani.com/video-malaysia/awani-pagi-platform-google-bantu-pks-kembang-perniagaan-1910611



total of MYR146 million (USD34.7 million) in annual advertising revenue.

Google's digital product distribution system, **Google Play**, as well as operating system, **Android**, have resulted in a variety of benefits to app developers in Malaysia. App developers are estimated to earn an annual income of about MYR515 million (USD123 million) from Google Play in both the domestic and global markets.[151] Further, through the Android operating system, app developers in Malaysia can readily reach more than one billion users globally.[152] 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 8 summarises the estimated annual business benefits in the form of revenue gains experienced by businesses in Malaysia from Google Search and Ads, YouTube, AdSense, 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** minimises 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 4.4 days annually.

GOOGLE SUPPORTS BUSINESSES AND WORKERS DURING THE COVID-19 PANDEMIC

Box 12 shows examples of how Google's applications and initiatives have supported businesses and workers in weathering the effects of the COVID-19 pandemic.

151. 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.
152. 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

EXHIBIT 8:

GOOGLE IS ESTIMATED TO BRING ABOUT MYR7.1 BILLION (USD1.7 BILLION) WORTH OF ANNUAL BENEFITS TO BUSINESSES IN MALAYSIA

PRODUCT	DESCRIPTION OF BENEFITS	ESTIMATED ANNUAL BENEFITS
Google Search & Ads	Net advertising benefits for businesses[1]	MYR5.7 billion (USD1.4 billion)
AdSense	Net advertising benefits for businesses[1]	MYR79 million (USD19 million)
	Income generated by website publishers through AdSense	MYR245 million (USD58.3 million)
YouTube	Net advertising benefits for businesses[1]	MYR357 million (USD85.2 million)
	Advertising revenue earned by YouTube video creators	MYR146 million (USD34.7 million)
Google Play	Income generated by app developers in Malaysia from both the domestic and international markets through Google Play	MYR515 million (USD122.7 million)
TOTAL ANNUAL BUSINESS BENEFITS IN MALAYSIA:		**MYR7.1 BILLION (USD1.7 BILLION)**

1. 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

BOX 12.
GOOGLE'S CONTRIBUTIONS TO THE GOVERNMENT, BUSINESSES AND WORKERS DURING THE COVID-19 PANDEMIC

SAFEGUARDING PUBLIC HEALTH AND ENABLING EFFICIENT INFORMATION DELIVERY

Google's advertising tools have proven to be particularly helpful during the COVID-19 pandemic not only to businesses, but to supporting the government's public health response. To assist in Malaysia's response to COVID-19, Google donated MYR15.5 million (USD3.8 million) in ad grants to help the government provide critical information on how to prevent the spread of COVID-19 and support the vaccine rollout.[153] In addition, Google worked with the Ministry of Health to launch a COVID-19 microsite in both English and Malay.[154] The website contains information covering symptoms, prevention and treatment, as well as links to important public health announcements (e.g., updates on the number of infected cases, lockdown policy changes). Google also provided MYR1.9 million (USD462,700) in **Google Maps** API credits to support the mapping function in the MySejahtera application and ensured that COVID-19 testing centres and vaccination centres were listed and discoverable on Google Maps.

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 Malaysia that use Google Workspace (formerly known as "G Suite"). This allowed companies to stay connected and work remotely from anywhere on the globe.[155]

SUPPORTING BUSINESS CONTINUITY

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** (previously known as Google My Business)

153. Google Ads Bantuan (2020), "COVID-19: Ad credits for Google Ads Small and Medium-sized Businesses". Available at: https://support.google.com/google-ads/answer/9803410?hl=en
154. COVID-19 Information & Resources (2020), Available at: https://www.google.com/intl/en_my/covid19/
155. 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

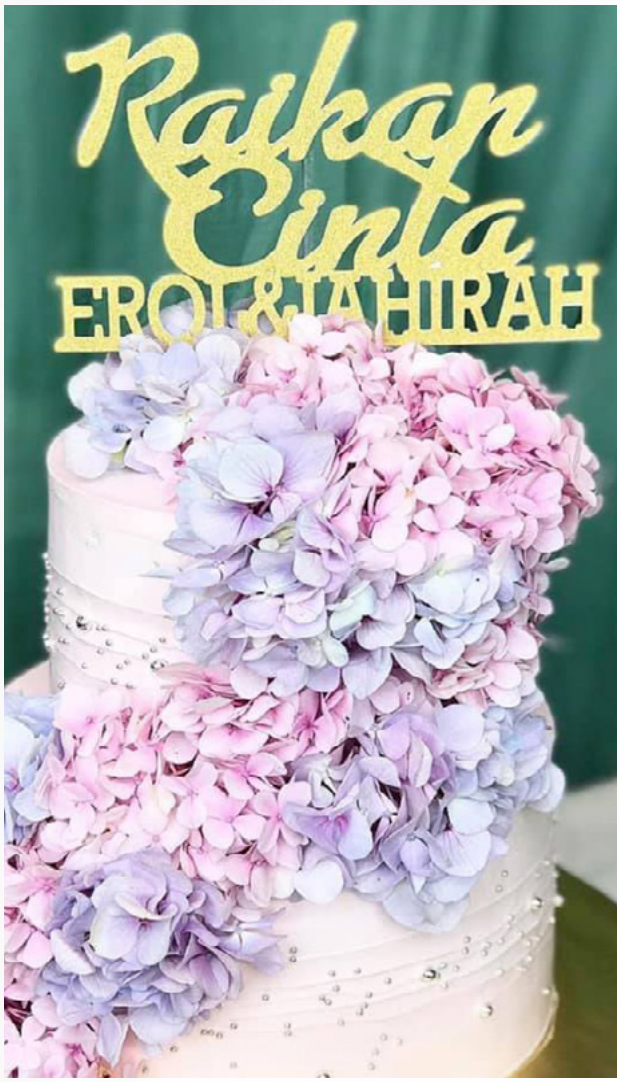


Photo Source: https://www.facebook.com/cookingwithlovebakewithheart/photos/1163963763713 62

was instrumental in creating a digital storefront for businesses to sell online and expand their outreach to gain new customers. Every month in 2020, Google helped drive over 44 million direct connections, including phone calls, requests for directions, messages, bookings, and reviews for Malaysian businesses.[156] For example, Dough By Sara Bakery in Malaysia was able to expand its customer acquisition by 230 percent and increase its sales by 300 percent using the tool. By creating a business listing on Business Profile, potential customers were able to search for local businesses on **Google Search** and **Google Maps**, and find out more about the products and services offered. For SMEs, the free listing enabled businesses to upload their latest business information, connect with their customers digitally, and provide a platform for businesses to continue selling their products and services at no cost.

Besides its free Business Profile, 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 have Business Profiles on Google 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 minimising physical contact. At the same time, businesses could continue operating while abiding by social distancing measures.

In addition, **Google Trends** and **Google Analytics** helped businesses understand customer behaviour better. For example, TheLorry.com, an on-demand logistics platform in Malaysia, used Google Trends to discover that there was a surge in demand for grocery delivery during the pandemic, which prompted the business to shift its business from logistics to fresh groceries and home essentials delivery business called "TheLorry Grocer."[157] Similarly, Langit Collective, a social enterprise that helps farmers based in East Malaysia sell their produce in West Malaysia, used Google Analytics to understand how customers were engaging with their e-commerce platform during the pandemic.[158] This information helped Langit Collective to improve the shopping experience for customers.

156. Based on an interview conducted with Astro Awani in May 2021. YouTube (2021), "Agenda AWANI: Empowering SMEs in the digital era". Available at: https://youtu.be/fCz435t5gv0
157. Google, "From logistics to groceries, TheLorry switches gears to become relevant in uncertain times." Available at: https://services.google.com/fh/files/events/final_economic_recovery_case_study-thelorry.pdf
158. Google, "Langit Collective engages with consumers online by seamlessly blending traditional with digital." Available at: https://services.google.com/fh/files/events/economic_recovery_case_study-langit-collective.pdf

BENEFITS TO CONSUMERS

CONSUMERS IN MALAYSIA EXPERIENCE ANNUAL BENEFITS WORTH MYR32.7 BILLION (USD7.8 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 MYR32.7 billion (USD7.8 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 9 shows the breakdown of consumer surplus by category.

GOOGLE PROVIDES CONSUMERS IN MALAYSIA BETTER ACCESS TO INFORMATION

Google provides benefits to consumers in Malaysia 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 MYR8 billion (USD1.9 billion) (Exhibit 9). 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 Malaysia an average of 4.4 days per year.[159]

159. 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 IMPROVE PRODUCTIVITY AND CONVENIENCE FOR CONSUMERS IN MALAYSIA

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 Malaysia. 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 Malaysia through the service's wayfinding and navigation feature, which optimises 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 MYR10.6 billion (USD2.5 billion).

GOOGLE'S SERVICES ENTERTAIN AND ENRICH CONSUMERS IN MALAYSIA

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 Malaysia say they used online video services to learn advanced digital skills such as coding, software programming, and mobile application and website development.[160]

Google Play and **Android** have also brought a variety of benefits to consumers in Malaysia. For example, Android enables consumers to choose from over 3.5 million apps available on the Android ecosystem.[161] 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 MYR14.1 billion (USD3.4 billion) to consumers in Malaysia annually.[162]

160. Google/AlphaBeta Economic Impact Report survey, n = 547. Percent represents use of online video services to learn advanced digital skills amongst consumers in Malaysia for whom YouTube is their most frequently used online video service.
161. 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/
162. Google/AlphaBeta Economic Impact Report survey, n = 547. The total consumer surplus represents the economic benefits to consumers in Malaysia from using Google Play. See more details in Appendix B for the methodology.

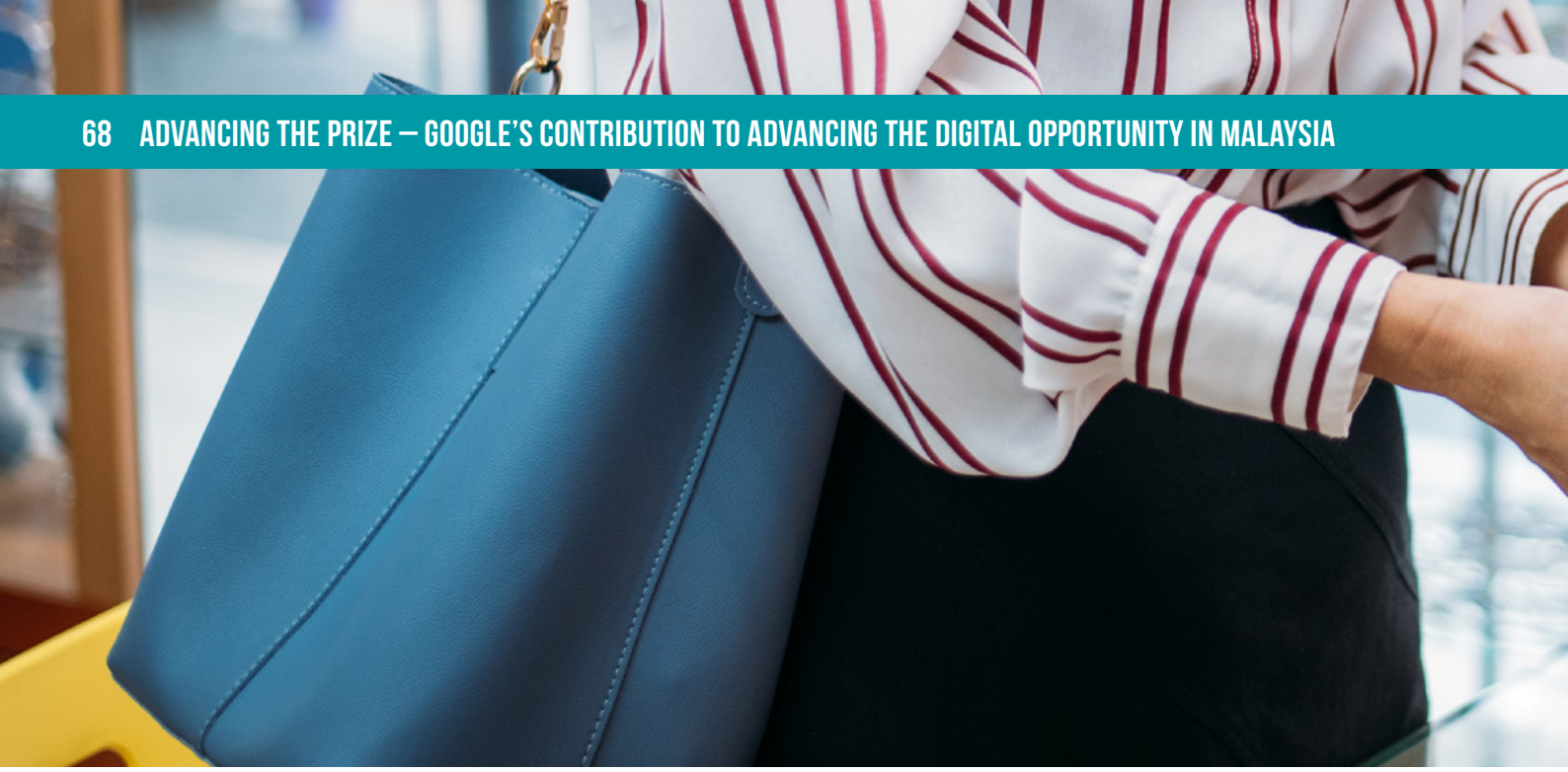


EXHIBIT 9:

GOOGLE IS ESTIMATED TO SUPPORT A TOTAL MYR32.7 BILLION (USD7.8 BILLION) WORTH OF ANNUAL CONSUMER SURPLUS IN MALAYSIA

ESTIMATED ANNUAL CONSUMER SURPLUS OF GOOGLE PRODUCTS IN MALAYSIA
CONSUMER SURPLUS (MYR)

TYPE OF BENEFIT	PRODUCT	ANNUAL CONSUMER SURPLUS
Ease of access to information	Google Search	MYR8 billion (USD1.9 billion)
Entertainment and enrichment	Google Play	MYR14.1 billion (USD3.4 billion)
	YouTube	
Enhanced productivity and convenience	Google Maps	MYR10.6 billion (USD2.5 billion)
	Google Drive, Photos, Docs and Sheets	
	TOTAL ANNUAL CONSUMER SURPLUS:	**MYR32.7 BILLION (USD7.8 BILLION)**

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

JOB CREATION AND OTHER BENEFITS TO THE BROADER SOCIETY

Google's products also support benefits to the wider society in Malaysia. 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 programmes.

GOOGLE INDIRECTLY SUPPORTS OVER 31,000 JOBS IN MALAYSIA

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 31,000 jobs** in Malaysia.[163] These jobs are created through the use of Google products that lead to businesses expanding their customer bases and increasing revenue.[164] For instance, businesses that expand their reach to new markets through advertising via Google Ads, AdSense, and YouTube would require increased labour to meet this additional demand.

GOOGLE EXTENDS DIGITAL SKILLING OPPORTUNITIES TO FEMALE ENTREPRENEURS

In partnership with Nestlé and Maggi, Google launched "Wanita Cukup Berani," which trained more than 1,000 women in Malaysia on how to leverage digital tools in their work and business.[165] The programme included a series of online workshops and one-to-one mentorship. The workshops include modules on how to use digital communication successfully, build confidence, and improve business skills specific to cooking.

GOOGLE ENSURES SAFE AND SECURE INTERNET USE

As part of Google's broader commitment to ensuring safe and secure Internet use, Google launched the "Be Internet Awesome" programme in 2018. The programme is designed for children to learn about the fundamentals of digital citizenship and security so that they can navigate the Internet confidently and safely.[166] Aligning with the "Klik Dengan Bijak" initiative launched by the Malaysian Communication and Multimedia Commission to promote digital safety, Google collaborated with a local communications provider, Maxis Communications, to train over 150 participants on Internet safety.[167] The trained participants would go on to help guide Maxis "eKelas" students, an after-school digital learning initiative for rural and urban students, on the fundamentals of online safety and how to become confident Internet users.

163. Refers to jobs supported by Google Ads, AdSense and YouTube. The job estimate excludes revenue gained by website publishers who use AdSense and YouTube video creators as it may comprise freelancers and individuals who publish websites and videos recreationally, and thus do not fall under any formal industry sector.
164. 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.
165. Kosmo (2020), "Wanita Cukup Berani". Available at: https://www.kosmo.com.my/2020/12/30/wanita-cukup-berani/
166. Google (2021), "Be Internet Awesome." Available at: https://beinternetawesome.withgoogle.com/th_th/
167. Maxis (2018), "Maxis Collaborates With Google To Teach eKelas Students On How To 'Be Internet Awesome'". Available at: https://www.maxis.com.my/en/about-maxis/newsroom/2018/september/maxis-collaborates-with-google-to-teach-ekelas-students-on-how-to-be-internet-awesome1/

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 potential economic impact of digital technologies for Malaysia 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.[168] 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 utilised 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.[169] This was guided by the individual industry's relevance

168. 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

169. 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.

for digital technologies (based on past research quantifying the potential industry benefits of these digital technologies).[170]

- Prioritising 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.[171] 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 & gas); 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

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

170. 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_full%20report_december%202014.pdf).

171. In Malaysia, all ten sectors have fulfilled the criterion in Step 2.

literature for each of the eight focus technologies. 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, categorised 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 analysed 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 analysed. In this scenario, the country was assumed to achieve full digital adoption (100 percent) in the 40 digital technology applications across ten sectors. This scenario was modelled 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 summarises 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 • Department of Statistics Malaysia
Population	• United Nations Department of Economic and Social Affairs Population datasets
Labour Force	• International Labour Organisation (ILO) • World Bank Labour Force statistics • Department of Statistics Malaysia
Wage	• Department of Statistics Malaysia
Exchange rates	• OFX

AGRICULTURE AND FOOD

DESCRIPTION	SIZING ASSUMPTIONS	SOURCE
1. PRECISION FARMING TECHNOLOGIES		**PRODUCTIVITY GAINS/COST SAVINGS**
Data-driven optimisation 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 Malaysian Agricultural Research and Development Institute (2019) found that precision agriculture saved 17 percent of total fertilisation cost and increased production efficiency by 20 percent over conventional fertilisation 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.	• Malaysian Agricultural Research and Development Institute (2019)[172] • World Bank[173]
2. SUPPLY CHAIN 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)[174] • Food and Land Use Coalition[175]
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)[176] • PricewaterhouseCoopers (2015)[177] • Food and Agriculture Organisation of the United Nations[178]

172. Malaysian Agricultural Research and Development Institute (2019). "Precision Agriculture in Malaysia". Available at: https://ap.fftc.org.tw/article/1417
173. World Bank (2018). Available at: https://blogs.worldbank.org/opendata/new-country-classifications
174. 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
175. 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
176. 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
177. PricewaterhouseCoopers (2015), Food fraud vulnerability assessment. Available at: https://www.pwc.com/sg/en/industries/assets/food-fraud-vulnerability-assessment.pdf
178. 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

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 labour, 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 labour 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)[179]
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)[180]
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)[181] • The Vulcan Post (2018)[182] • Singapore Tourism Board (2019)[183]
4. DATA ANALYTICS ON TRAVEL PATTERNS		**INCREASED REVENUES**
Use of big data analytics in predicting consumer behaviour	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 personalised experiences. Country-level estimate was derived based on tourism revenue.	• Boston Consulting Group (2020)[184]

179. 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
180. 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
181. 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
182. 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/
183. 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
184. 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)[185]

EDUCATION AND TRAINING

DESCRIPTION	SIZING ASSUMPTIONS	SOURCE
1. E-CAREER CENTRES AND DIGITAL JOBS PLATFORMS		**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 labour market characteristics, education and income levels and demographic trends. Country-level estimate was derived based on national employment rate, labour force and GDP per capita.	• McKinsey Global Institute (2015)[186]
2. PERSONALISED LEARNING		**GDP INCREMENTS**
Use of digital technologies to provide personalised and remote learning opportunities for students	Sized based on increase in GDP from higher employment rate. McKinsey Global Institute (2018) estimated that personalised 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, labour force and GDP per capita.	• McKinsey Global Institute (2018)[187] • World Bank[188]
3. ONLINE RETRAINING PROGRAMMES		**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 programmes 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, labour force and GDP per capita.	• McKinsey Global Institute (2018)[189] • World Bank[190]

185. The Straits Times (2017), "Delivery sales drive up eateries' revenues." Available at: https://www.straitstimes.com/business/delivery-sales-drive-up-eateries-revenues
186. 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
187. 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
188. World Bank (2018). Available at: https://blogs.worldbank.org/opendata/new-country-classifications
189. 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
190. 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)[191]
2. 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 digitisation 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 (2019) estimated that the cost- efficiency in South Korea from digital banking services is 1.5 percent. Country-level estimate cost savings was derived based on domestic banking sector operating costs.	• McKinsey Global Institute (2017)[192]
3. 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)[193] • KPMG (2013)[194]

191. 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
192. McKinsey Global Institute (2019), Bracing for consolidation: The quest for scale. Available at: https://www.mckinsey.com/~/media/McKinsey/Industries/Financial%20Services/Our%20Insights/Bracing%20for%20consolidation%20in%20Asia%20Pacific%20banking%20The%20quest%20for%20scale/Asia-Pacific-Banking-Review-2019-vF.pdf
193. 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
194. 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)[195]
2. 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)[196]
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 labour costs, reduced lead-time and a more streamlined process. Country-level estimate was derived based on public procurement volumes.	• Public Procurement Service[197]
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)[198]

195. 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
196. McKinsey Global Institute (2011), Big data: The next frontier for innovation, competition, and productivity.
Available at: https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/big-data-the-next-frontier-for-innovation
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Available at: https://www.europarl.europa.eu/document/activities/cont/201207/20120710ATT48620/20120710ATT48620EN.pdf
198. 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)[199]

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)[200] • World Bank[201]
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)[202]

199. 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
200. 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
201. World Bank statistics on current health expenditure. Available at: https://data.worldbank.org/indicator/SH.XPD.CHEX.GD.ZS
202. 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)[203] • UN Population Division (2018)[204] • World Bank[205]
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)[206] • McKinsey Global Institute (2013)[207]
5. SMART MEDICAL DEVICES AND WEARABLES		**GDP INCREMENTS**
Analysing data across connected implants, smart medical devices and wearables in personalised 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)[208] • UN Population Division (2018)[209] • World Bank[210]

203 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
204. UN Population Division (2018). Available at: https://esa.un.org/unpd/wpp/DataQuery/
205. World Bank (2018). Available at: https://blogs.worldbank.org/opendata/new-country-classifications
206. 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
207. 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
208. 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
209. UN Population Division (2018). Available at: https://esa.un.org/unpd/wpp/DataQuery/
210. 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)[211] • World Bank[212] • Transparency Market Research[213]

INFRASTRUCTURE

DESCRIPTION	SIZING ASSUMPTIONS	SOURCE
1. SMART GRIDS		**COST SAVINGS**
Use of digital communications technology in detecting and optimising electricity networks	Sized based on cost savings from energy savings due to lower consumption and efficiency improvements. The International Herald Tribune (2018) reported that engineers indicated a five to ten percent in energy savings 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.	• The International Herald Tribune (2011)[214] • World Bank[215] • Business and Sustainable Development Commission (2017)[216]
2. 5D BIM AND PROJECT MANAGEMENT TECHNOLOGIES		**COST SAVINGS**
Use of integrated modelling 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)[217] • Global infrastructure Outlook[218]

211. 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/mgi%20india%20tech_full%20report_december%202014.pdf
212. World Bank statistics on current health expenditure. Available at: https://data.worldbank.org/indicator/SH.XPD.CHEX.GD.ZS
213. Transparency Market Research (2018), "Electronic Health Records Market". Available at: https://www.transparencymarketresearch.com/electronic-health-records-market.html
214. The International Herald Tribune (2011), "To build a better grid". Available at: https://www.nytimes.com/2011/07/29/business/global/to-build-a-better-grid.html?_r=1&pagewanted=all
215. World Bank statistics on electric power consumption. Available at: https://data.worldbank.org/indicator/EG.USE.ELEC.KH.PC
216. 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
217. 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
218. 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)[219] • World Bank[220] • UNESCO-IHE (2011)[221] • Business and Sustainable Development Commission (2017)[222]
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 2-degree pathway).	• McKinsey Global Institute (2018)[223] • IPCC[224] • World Bank[225] • Business and Sustainable Development Commission (2017)[226]

219. 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
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222. Business and Sustainable Development Commission (2017), Valuing the SDG prize: Unlocking business opportunities to accelerate sustainable and inclusive growth.
223. 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
224. IPCC estimates on global greenhouse gas emissions. Available at: https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data
225. World Bank (2018). Available at: https://blogs.worldbank.org/opendata/new-country-classifications
226. 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)[227]
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)[228]
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)[229]
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)[230]

227. 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
228. 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
229. 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
230. 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 analyse 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)[231]
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)[232]
3. PREDICTIVE MAINTENANCE TECHNOLOGIES		**PRODUCTIVITY GAINS/COST SAVINGS**
Use of remote operations centres 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)[233]

231. 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
232. 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
233. 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)[234] • World Bank[235]
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)[236] • Council of Supply Chain Management Professionals (2013)[237] • World Bank (2016)[238]
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)[239]
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)[240]

234. 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
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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 organisations manage the economic impact of COVID-19, 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 40 technology applications, 22 were assessed to have the potential to manage the economic impacts of the pandemic in Malaysia's context, through three channels. These are:

- Facilitate customer interactions, transactions and marketing through digital platforms;
- Enable the continuity of business operations amid remote working arrangements; and
- Reduce logistical bottlenecks amidst global and regional supply chain disruptions induced by the pandemic.

Exhibit A2 shows the list of these 22 COVID-19 relevant technology applications, grouped by their respective sectors and the specific channel through which they deliver COVID-19 relevant impact.

EXHIBIT A2:

OF THE 40 APPLICATIONS, 22 HAVE THE POTENTIAL TO ALLOW BUSINESSES TO THRIVE DESPITE THE COVID-19 PANDEMIC THROUGH THREE KEY CHANNELS

CHANNEL	SECTOR	COVID-19 RELEVANT TECHNOLOGY APPLICATION/S
Facilitate 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 centres and digital jobs platforms 4. Online retraining programmes
	Financial services	5. Digital banking services
	Health	6. Telehealth applications
Enable the continuity of business operations amid remote working arrangements	Agriculture & food	7. Precision farming technologies
	Consumer, retail and hospitality	8. IoT-enabled inventory management 9. Automation and AI customer service in hotels
	Government	10. Government e-services 11. E-procurement
	Health	12. Remote patient monitoring 13. Smart medical devices and wearables
	Infrastructure	14. Smart grids 15. 5D BIM and project management technologies 16. Predictive maintenance technologies
	Manufacturing	17. Big data analytics 18. Robotics and automation
	Resources	19. Smart exploration and automation in mining operations
Reduce logistical bottlenecks amidst global and regional supply chain disruptions induced by pandemic	Agriculture & food	20. IoT-enabled supply chain management (food)
	Manufacturing	21. IoT-enabled supply chain management (manufacturing)
	Transport services	22. Smart ports

SOURCE: AlphaBeta analysis

B: SIZING GOOGLE'S ECONOMIC IMPACT IN MALAYSIA

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, YouTube and Google Play.

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

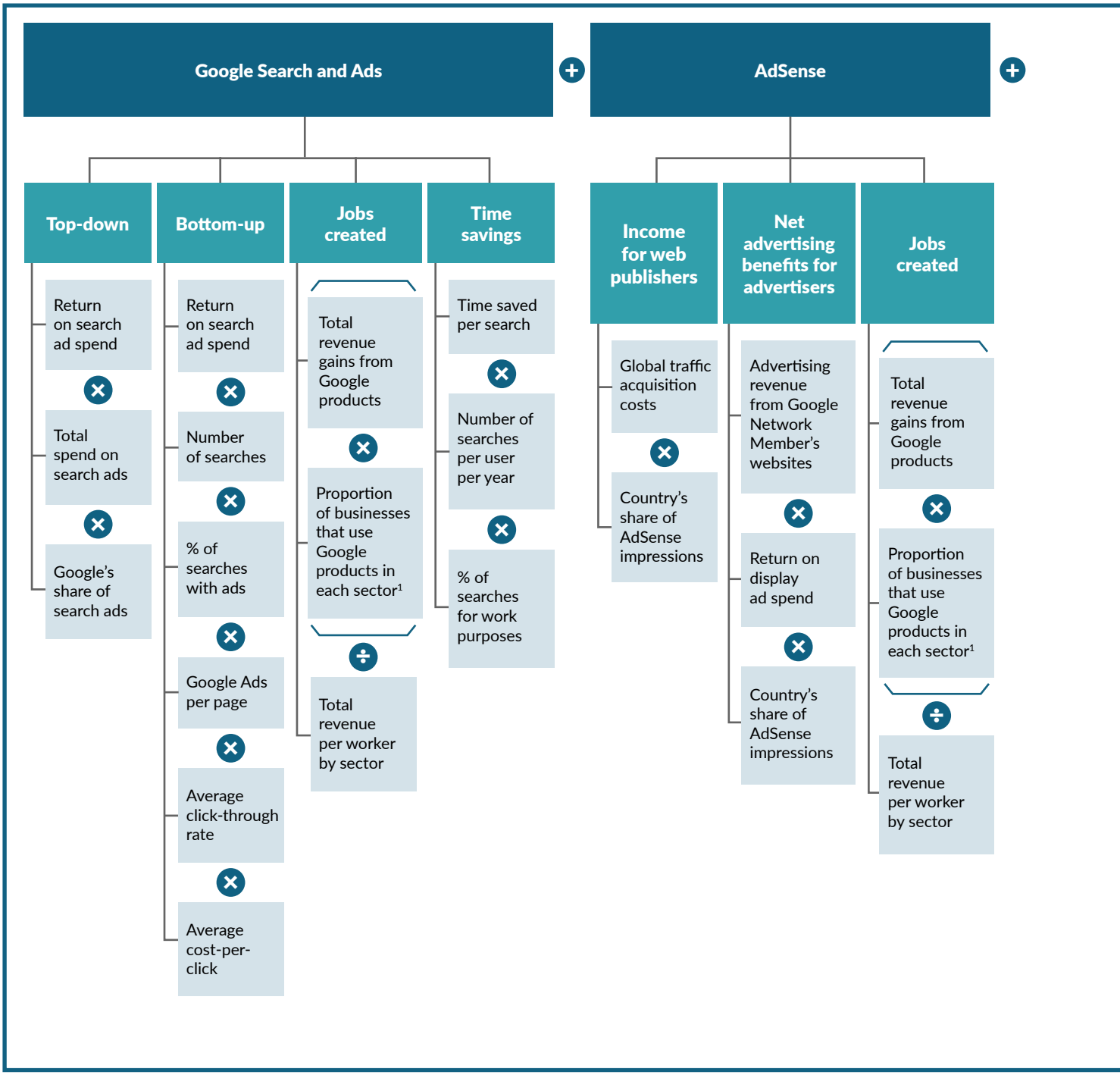
Estimating the **consumer benefits** supported by Google is a challenging task. This is because individuals typically do not have to pay for the Google products that they use. There are several established methodologies for estimating the benefits of free services, including consumer surplus based on 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 547 Internet users in Malaysia. This sample size is statistically significant based on Malaysia's online population, at a 95 percent confidence level (the level typically adopted by researchers). The survey was conducted online, which was deemed suitable given the intention to survey internet users. The sample was also checked for its representativeness of Malaysia's 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, YouTube, Google Maps, Google Drive, Photos, Docs, and Sheets.

BUSINESS AND JOB CREATION BENEFITS

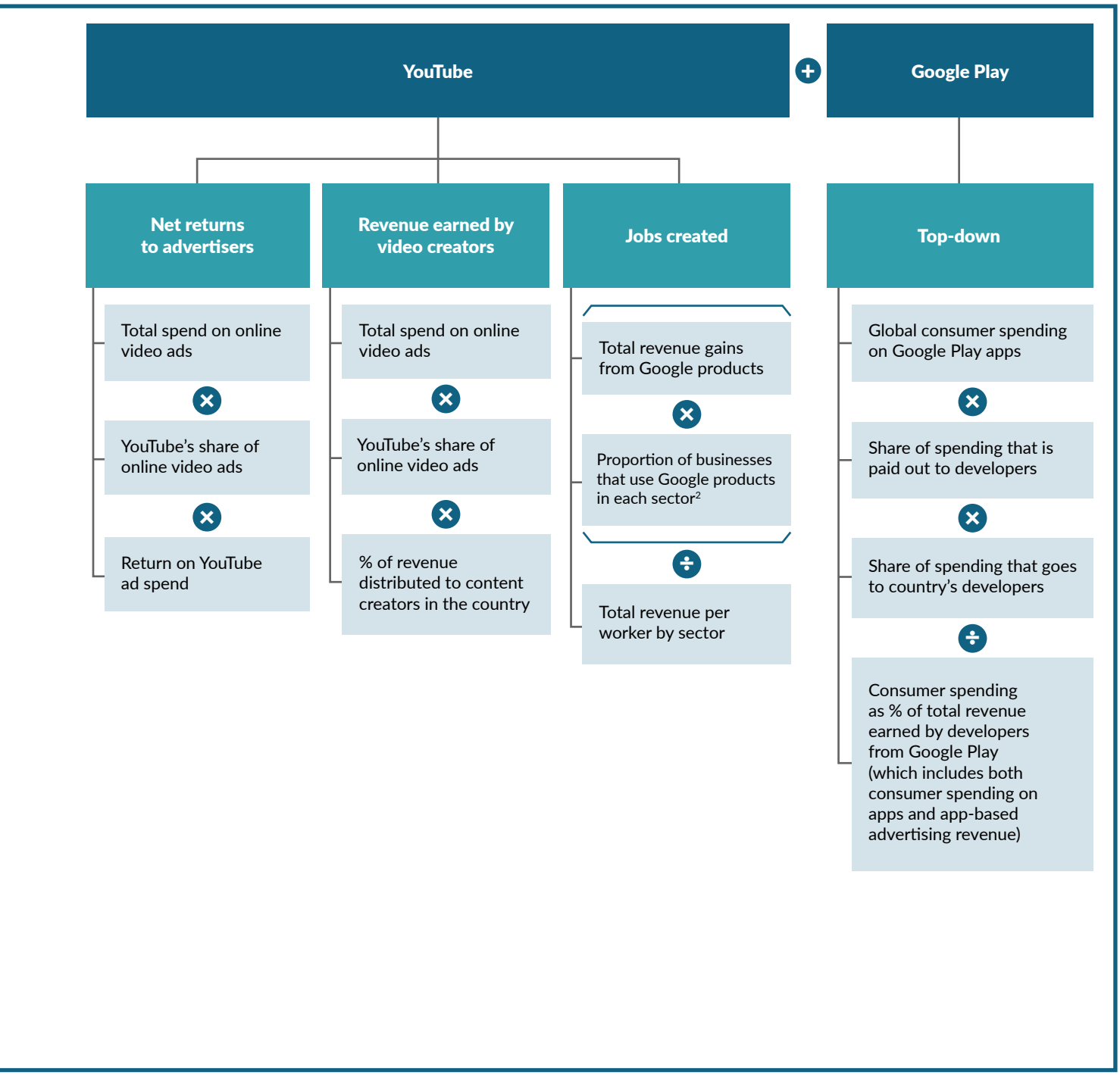
The business benefits supported by Google include the gross revenue, income or savings generated by businesses using Google products. These benefits do not include the flow-on economic effects generated, such as further purchases from their suppliers or the economic activity generated by the employees 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 Malaysian economy beyond what would be the case if Google did not exist but other companies like it did. Exhibit B1 summarises the methodology used for sizing the business benefits of Google's products, as well as the job creation benefits.

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 in each sector. This data is available from Department of Statistics, Malaysia (2018), "Usage of ICT and e-commerce by establishment". Available at: https://www.dosm.gov.my/v1/
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 Department of Statistics, Malaysia (2018), "Usage of ICT and e-commerce by establishment". Available at: https://www.dosm.gov.my/v1/
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


YouTube
Google Play
Net returns to advertisers
Revenue earned by video creators
Jobs created
Top-down
Total spend on online video ads
YouTube's share of online video ads
Return on YouTube ad spend
Total spend on online video ads
YouTube's share of online video ads
% of revenue distributed to content creators in the country
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 Google Play apps
Share of spending that is paid out to developers
Share of spending that goes to country'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)

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.[241] 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 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 eight 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.[242] 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.[243] In addition, we applied an ROI ratio that advertisers earn using display advertising, derived from academic literature.

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

241. ROI reflects the net advertising benefits that businesses receive from online advertising (i.e., total revenue minus online advertising cost).
242. This refers to the increase in revenues and sales that can be directly attributed to advertising minus the related advertising expenditure.
243. 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.

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

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

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

GOOGLE PLAY

We estimated the revenue earned by app developers in the country from consumer spending on Google Play based on global consumer spending on Google Play, the share of the spending that was paid out to app developers, and the share of the spending that went to the country's app developers. The revenue from consumer spending earned by app developers in the country was scaled up to include advertising revenue to arrive at the total revenue supported by Google Play in the country, using estimates for the distribution of revenue across consumer spending and ads.

Table 6 shows the inputs and sources used for estimating the business benefits of Google Play.

JOB CREATION BENEFITS FROM GOOGLE PRODUCTS

We estimated the number of jobs that are indirectly supported through revenue gains experienced by Malaysian 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 as well as 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 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 Malaysia's economy was taken as a sum of the estimated job creation benefits across all sectors.

Table 7 shows the inputs and sources used for estimating the job creation benefits from Google products.

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)[244]
	Google Search's market share	• StatCounter (2019)[245]
Bottom-up approach	Google Search traffic data	• AlphaBeta Consumer Survey (2020)
	% pages that display advertisements	• Varian (2009)[246], Jansen & Spink (2009)[247] • Deloitte (2015)[248]
	Advertisements per page on average	• Varian (2009)[249], Jansen & Spink (2009)[250] • Deloitte (2015)[251]
	CTR for Search (Estimate)	• Word Stream (2019)[252] • BannerTag (2019)[253]
	Average CPC for Search (Estimate)	• Word Stream (2018)[254] • Adstage (2019)[255]
Both Methods	ROI ratio Lower and Upper Bound	• Varian (2009)[256], Jansen & Spink (2009)[257] • Deloitte (2015)[258]

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258. 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)[259]
	ROI ratio	• Gupta et al. (2015)[260]
Revenue to content creators	Global traffic acquisition costs related to AdSense	• Alphabet (2019)[261]
Both estimates	Country share of global impressions on AdSense (Estimate)	• DoubleClick (2012)[262] • Internet World Stats (2019)[263]

TABLE 4: INPUTS AND SOURCES FOR CALCULATING BUSINESS BENEFITS OF YOUTUBE

METRIC	SOURCE
Total video advertising spend in country	• Statista (2019)[264]
YouTube's market share	• AlphaBeta Consumer Survey (2020)
YouTube ROI ratio	• Business Insider (2014)[265]

TABLE 5: INPUTS AND SOURCES FOR CALCULATING TIME SAVING BENEFITS OF GOOGLE SEARCH

METRIC	SOURCE
Time saved per search	• Varian (2014)[266] • Chen et al. (2014)[267]
Average daily searches per worker	• AlphaBeta Consumer Survey (2020)
% of searches for work purposes	• AlphaBeta Consumer Survey (2020)

259. Alphabet (2019). Form 10-K for fiscal year ended December 31, 2019 - Submission to US SEC.
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Available at: https://www.sciencedirect.com/science/article/abs/pii/S0167811615001159
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Available at: https://www.slideshare.net/RFONNIER/display-business-trends-publisher-edition-google-2012
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TABLE 6: INPUTS AND SOURCES FOR CALCULATING BUSINESS BENEFITS OF GOOGLE PLAY

METRIC	SOURCE
Global consumer spending on Google Play	• Sensor Tower (2020)[268]
Share of the spending that is paid out to app developers	• Google (2020)[269]
Share of the spending that goes to the country's app developers	• Caribou Digital (2016)[270]
Consumer spending as % of total revenue earned by developers from Google Play (which includes both consumer spending on apps and app-based advertising revenue)	• Appota/ AdSota (2017)[271]

TABLE 7: INPUTS AND SOURCES FOR CALCULATING JOB IMPACT

APPROACH	METRIC	SOURCE
Revenue per worker by sector	Number of employees in Malaysia by sector	• Department of Statistics Malaysia (2018)[272]
	Gross output by sector	• Department of Statistics Malaysia (2018)[273]
Breakdown of business benefits for Google Ads, AdSense and YouTube	Businesses using a website from each sector as % of total	• Department of Statistics Malaysia (2018)[274]
	Businesses with a social media account as % of total	

268. Sensor Tower (2020), "Consumer Spending in Mobile Apps Grew 17% in 2019 to Exceed NZ$83 Billion Globally".
Available at: https://sensortower.com/blog/app-revenue-and-downloads-2019
269. Google (2020). Available at: https://support.google.com/googleplay/android-developer/answer/112622?hl=en
270. Caribou Digital (2016), Winners and Losers in the Global App Economy.
Available at: https://www.cariboudigital.net/wp-content/uploads/2016/02/Caribou-Digital-Winners-and-Losers-in-the-Global-App-Economy-2016.pdf
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273. Department of Statistics, Malaysia (2018), Annual economic survey 2018. Available at: https://www.dosm.gov.my/v1/
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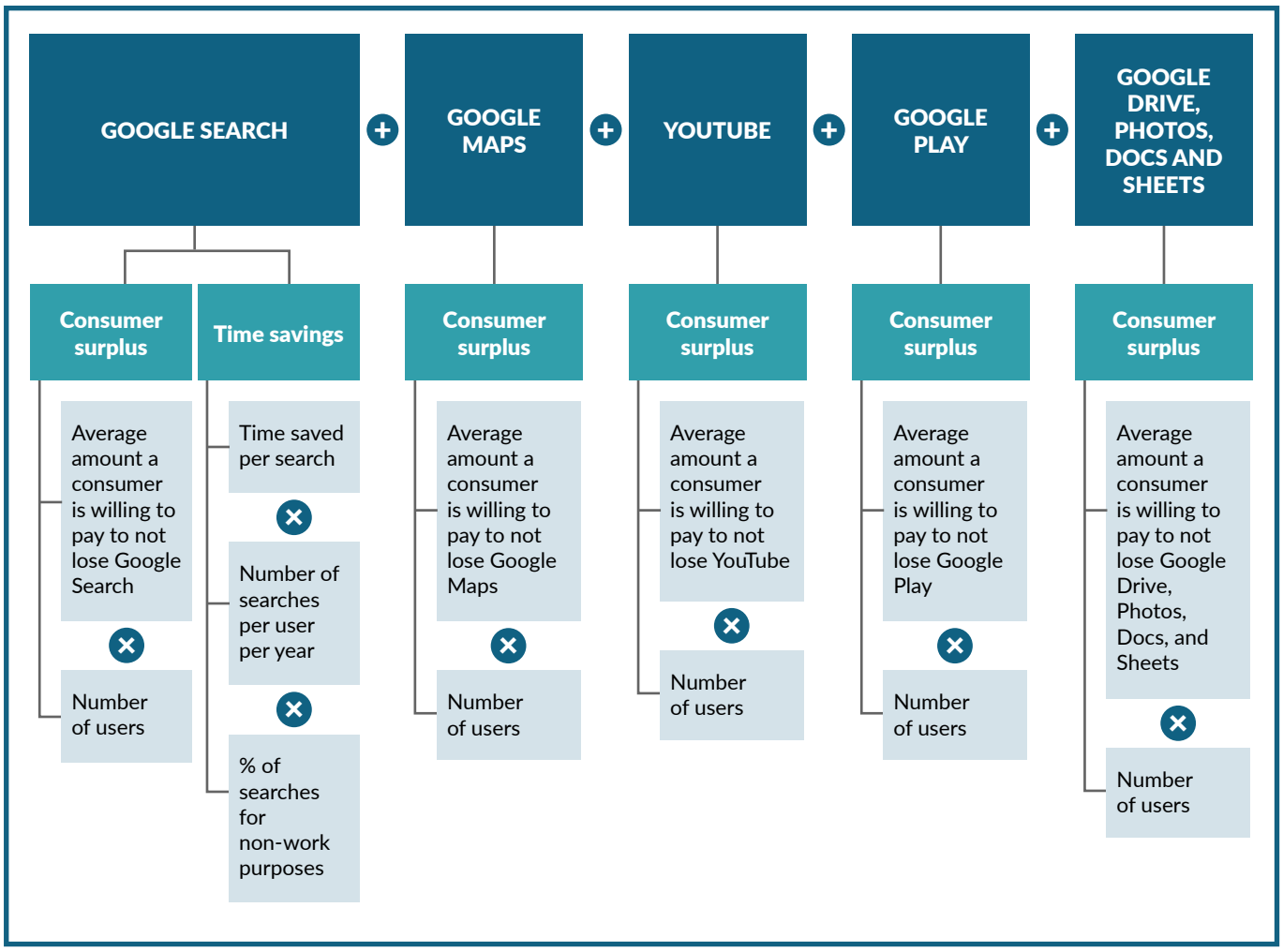
Available at: https://newss.statistics.gov.my/newss-portalx/ep/epFreeDownloadContentSearch.seam?cid=385487

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 summarises the methodology used for sizing consumer surplus and time savings of relevant products.

EXHIBIT B2:
METHODOLOGY FOR SIZING CONSUMER BENEFITS 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.[275] 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 8 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 favourite 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 9 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 favourite online distribution platform for digital products. Results from the survey of the country's online population were used.

Table 10 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 favourite online cloud-based file storage and document collaboration 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 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 favourite online video service. Results from the survey of the country's online population were used.

Table 12 shows the inputs and sources used for calculating the consumer benefits of YouTube.

275. Chen et al. (2014) A day without a search engine: an experimental study of online and offline searches. Experimental Economics, Vol 17, Issue 4, pp 512-536. Available at: https://link.springer.com/article/10.1007/s10683-013-9381-9

TABLE 8: 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)[276]
	Search users as % of OP	• AlphaBeta Consumer Survey (2020)
Time saved per user	Time saved per search	• Varian (2014)[277] • Chen et al. (2014)[278]
	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 9: 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)[279]
	Map users as % of OP	• AlphaBeta Consumer Survey (2020)

TABLE 10: 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)[280]
	Google Play users as % of OP	• AlphaBeta Consumer Survey (2020)

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

TABLE 11: 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)[281]
	Google Drive users as % of OP	• AlphaBeta Consumer Survey (2020)

TABLE 12: INPUTS AND SOURCES FOR CALCULATING CONSUMER BENEFITS OF YOUTUBE

ESTIMATION	METRIC	SOURCE
Consumer surplus	Amount that Internet users value product per year (WTP)	• AlphaBeta Consumer Survey (2020)
	Online Population (OP)	• Internet World Stats (2019)[282]
	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 the country who made use of YouTube to learn advanced digital skills	• AlphaBeta Consumer Survey (2020)

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

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