Google Cloud Region: Lifting Productivity in the Israeli Economy

Google Cloud Access Partnership αlphaβeta

HIGHER PRODUCTIVITY

The Google Cloud Region in Israel is estimated to contribute a cumulative **USD 7.6 billion** to Israel's GDP between 2022 and 2030.

JOB CREATION

The Google Cloud Region is estimated to create **21,200** jobs in 2030 alone.

SUPPORTING SMALL BUSINESS GROWTH

Google's cloud services eliminates the need for customers to own or operate physical data centers and servers by themselves, supporting the growth ambitions of more than **600,000 micro, small and medium-sized enterprises (MSMEs)** in Israel.

IMPROVED EFFICIENCY IN PUBLIC AND PRIVATE SECTOR

Google's cloud services has **supported COVID-19 public health response efforts** and **improved agricultural productivity.**

INCREASE PUBLIC SECTOR EFFICIENCY

Increased investment in cloud technologies by the public sector between 2022 and 2030 is estimated to have an effect equivalent to higher public health spending of around **USD 1.3 billion.**

PROMOTING SUSTAINABILITY

Migration of on-premise data centers to Google Cloud would enable organizations to reduce their energy consumption and associated emissions – hyperscale data centers are **5 times less carbon intensive.**

Adoption of Google's cloud services by businesses and the public sector will enable cost savings, risk mitigation, and support greater scalability. These effects will help lift productivity, supporting economic growth and job creation, and facilitate more efficient delivery of public services. Google's cloud services could also support broader benefits, including addressing challenges around sustainability, enabling innovation to deliver social impact, and supporting small business growth.

The Google Cloud region in Israel is estimated to contribute a cumulative USD 7.6 billion to Israel's GDP between 2022 and 2030, and support the creation of 21,200 jobs in 2030 alone.

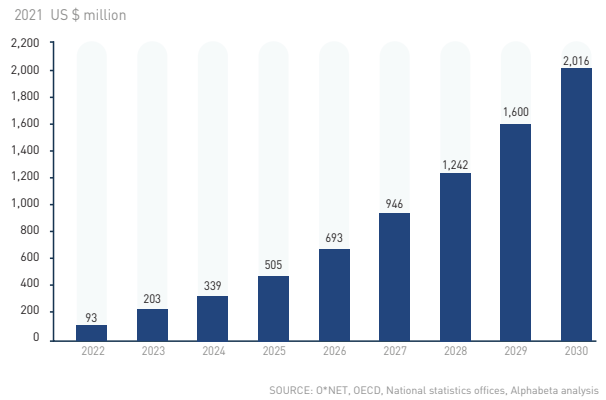
The productivity gains from increased adoption of Google's cloud services will contribute to economic growth and employment. These effects will benefit both businesses as well as consumers, who will enjoy cost savings and improved quality on products and services, and real wage growth.

Productivity gains allow businesses to free up resources for broader investment. This effect, in addition to real wage growth driving higher consumption, will increase the demand for labour – supporting jobs creation.

EXHIBIT 1

The Cloud Region will contribute USD $7.6 billion to Israel's GDP between 2022 and 2030

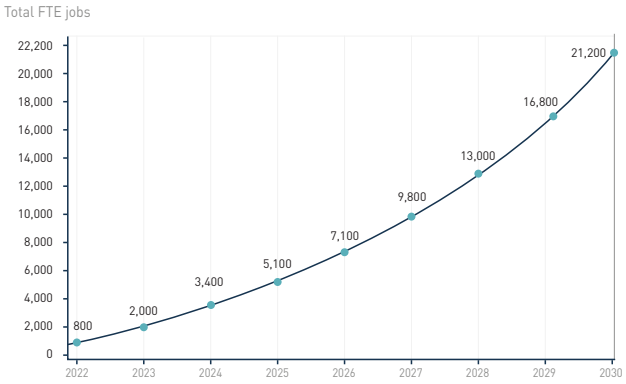
Potential annual productivity impact of adopting Google cloud technologies in Israel



SOURCE: O*NET, OECD, National statistics offices, Alphabeta analysis

The Cloud Region will support the creation of 21,200 jobs in 2030 alone

Potential annual jobs created from adopting Google cloud technologies in Israel



SOURCE: IMF, OECD, National statistics offices, Alphabeta analysis

Google's cloud services has supported COVID-19 public health response efforts and improved efficiency in agriculture.

CASE STUDY: Diagnostic Robotics

DIAGNOSTIC ROBOTICS

In the early days of COVID-19, Diagnostic Robotics, an Israeli company, partnered with the Israeli government to create an algorithm that can predict COVID-19 diagnosis based on data on symptoms shown.

Google Cloud has provided Diagnostic Robotics with the scalability required to collect and process a large amount of data in real time. Diagnostic Robotics was thus able to quickly implement the system nationwide, providing national health organizations with a clinical snapshot of the entire population within just two to three days. This has allowed the Ministry of Health to identify cities which were COVID-19 hotspots, and better direct resources and supplies to these cities.

CASE STUDY: Taranis

TARANIS

Taranis supports farmers in crop monitoring and reducing yield loss through the use of artificial intelligence (AI) and drone technologies. Drones, satellite and plane imagery are used to take high-resolution photographs of fields to leaf level, sometimes in remote areas. The images are then fed by agronomists into AI models to identify potential issues with crops in a timely manner.

The use of Google Cloud has enabled Taranis to store large volumes of data and train machine learning (ML) models more efficiently. Upload times have been three to four times faster, allowing farmers to identify potential issues with crops early and intervene in a more targeted way using fewer chemicals.

Google Cloud Platform can support small business growth.

Google Cloud Platform provides an IT infrastructure solution that is scalable with the growth ambitions of the more than 600,000 micro, small and medium-sized enterprises (MSMEs) in Israel.[1] It eliminates the need for customers to own or operate physical data centers and servers by themselves, which can be cost-prohibitive particularly for MSMEs who often face financial and skills gaps.

Micro-and small businesses are likely to benefit even more from cloud adoption – the increase in cloud adoption by 2030 is estimated to lift productivity in that year by up to 3.5% more than the scenario without cloud adoption.[2] More broadly, Google Cloud Platform will provide MSMEs with greater access to technology and help put digitalized MSMEs in a better position to benefit from the potential gains.

[1] OECD (2022), Financing SMEs and Entrepreneurs 2022: An OECD Scoreboard. https://www.oecd.org/cfe/smes/financing-smes-and-entrepreneurs-23065265.htm.

[2] Gal, P., Nicoletti, G., Renault, T., Sorbe, S., & C. Timiliotis (2019), Digitalisation and productivity: In search of the holy grail Firm-level empirical evidence from European countries, OECD Working Paper No. 1533.

CASE STUDY:
Arpeely

ARPEELY

Arpeely is an Israeli ad-tech startup that utilizes machine learning media acquisition algorithms to help clients target their advertising to areas with the most valuable traffic, users and lifetime value.

In the early days of the start-up, Google Cloud offered a solution to the cash-strapped firm, allowing Arpeely to leverage on what was already available rather than building cloud products and services from scratch. Google Cloud has also allowed Arpeely to keep their team small while quickly scaling their business overseas, as only a small number of engineers and data scientists were required to create self-scaling machines and conduct model testing.

By 2030, use of Google's cloud services by the Israeli public sector would facilitate greater efficiency of service delivery.

Google Cloud adoption by the public sector will enable more efficient delivery of public services. By reducing costs in the public sector, resources in the economy would be freed up and redeployed for more productive uses. More efficient delivery of public services would also lead to better outcomes for citizens, such as in health and education. For instance, the public sector's investment in cloud technologies of USD4.5 billion in 2030 is estimated to contribute to more efficient delivery of public health services that is equivalent to higher annual public health spending of around USD 1.3 billion.

Google Cloud can promote sustainability by reducing energy use through cloud storage.

In May 2022, Israel introduced a Climate Law which set a target to reduce greenhouse gas emissions in 2030 by at least 27% compared to 2015, and reach net-zero carbon emissions by 2050.[3] Migration of on-premise data centers to Google Cloud would enable organizations to reduce their energy consumption and associated emissions. Hyperscale data centers are 5 times less carbon intensive per workload to operate than internal data centers.[4]

[3] Ministry of Environmental Protection (2022, May 8). Making history, the government approves the climate law; Minister Tamar Zandberg brought to the approval of the Ministerial Committee for Legislation the Israeli Climate Law after collaborative work with the relevant government ministries. https://www.gov.il/en/departments/news/gov_approved_climate_law.

[4] Hessam, L. (2022, May 3). Measuring greenhouse gas emissions in data centres: the environmental impact of cloud computing. Climatiq. https://www.climatiq.io/blog/measure-greenhouse-gas-emissions-carbon-data-centres-cloud-computing

METHODOLOGY

The scope of the economic impact estimates are the catalytic effects of Google Cloud Infrastructure, which are defined to be the impact on GDP due to productivity improvements enabled by the use of Google Cloud Services. It excludes estimates of the economic contribution of building and operating Google Cloud Infrastructure.

The catalytic effects are comprised of economy-wide impacts, with the analysis disaggregating the economy into four sectors. Three are subsectors of the private sector—manufacturing, financial services, and other services—while the fourth is the public sector. The decision to adopt this four-sector disaggregation reflects that the impact of technology adoption on productivity in each of these sectors will differ.

Productivity improvements relate to higher GDP insofar as greater technical efficiency enables private sector firms to produce higher levels of output for the same level of input, and earn higher incomes. On the other hand, public sector productivity is more difficult to measure, as public sector outputs can be intangible and may not have a market value. For the purposes of this analysis, public sector productivity improvements are reflected in a decline in the unit cost of delivering public sector outcomes. That is, should the quality of public sector outcomes remain unchanged, declines in the unit cost of delivering these outcomes reflect greater technical efficiency. The relationship to GDP in the case of public sector productivity improvements reflects an improvement in economy-wide allocative efficiency – resources that would otherwise be deployed in the public sector could otherwise be deployed in the private sector for more productive uses.

ESTIMATING THE IMPACT ON PRIVATE SECTOR PRODUCTIVITY AND JOBS

Productivity in the private sector reflects the overall efficiency with which labour and capital inputs are used together in production. It is measured by changes in the amount of outputs for a given amount of inputs. Increases in the quality of inputs as well as changes in the way in which the inputs are combined for production, such as due to improvements in skills and technology, can lead to productivity growth. There have been various studies that have examined the relationship between technology use and productivity. Gal et. al. (2019) assesses how the adoption of a range of digital technologies affects firm-level productivity. The findings of Gal et. al. (2019) provide evidence of a positive relationship.

The private sector productivity gains are estimated for a three sector disaggregation of the economy – manufacturing, financial services, and other services. The distribution of productivity gains by sector is based on an assessment of the workforce automation potential of each sector. This is determined by mapping the degree of automation of the specific activities undertaken by all occupations within the workforce in each industry, based on the US Department of Labor O*Net database.

The relationship between technology use and productivity is applied to projections of cloud adoption by industries into the future, calculated based on IDC forecasts of expenditure, to estimate the productivity growth attributable to the private sector. The contribution of Google Cloud to this estimate is apportioned using a projected market share of Google Cloud.

ESTIMATING THE IMPACT OF PUBLIC SECTOR EFFICIENCY

Productivity growth in the public sector is typically framed as improvements in the efficiency of delivering public sector outcomes, such as in health, a major area of government expenditure. Improvements in health outcomes in an economy have a relationship with GDP, based on an extensive body of literature. Improvements in health outcomes driven by more efficient public sector delivery are expected to generate productivity gains for the economy, e.g. increased workforce participation, reduced private health spending. Bloom et. al has also shown through an error-correction model that while a long-run relationship between health and GDP exists, convergence to the equilibrium is gradual in the short term.[5] An econometric analysis has been used to estimate the relationship between the government spending on ICT and the delivery of public health outcomes. This relationship is found to be positive, and applied to projections of public sector expenditure on cloud into the future based on IDC forecasts of expenditure. The increase in health outcomes attributable to future increases in cloud expenditure (a subset of ICT expenditure) is applied to estimates of the short-run relationship between health outcomes and GDP. The contribution of Google Cloud to this estimate is apportioned using the projected market share of Google Cloud. The equivalent health expenditure required to generate a similar improvement in health outcomes is also estimated. Given that this analysis only focuses on productivity gains arising from improvements in health outcomes, this is likely a conservative estimate of the impact of public sector efficiency.

ESTIMATING GOOGLE'S MARKET SHARE

In the absence of a Cloud Region launch, Google's market share growth is assumed to experience a linear decline (from its historical CAGR) over the next 10 years. This is based on the rationale that market share growth slows as competition dynamic stabilizes in a market.

The launch of a Cloud Region will lead to an exponential market share growth for Google for the first two years of launch, fuelled by Google's more intensive marketing efforts, allowing it to gain an edge and increase market share rapidly. Following which, Google's market share growth remains the same as pre-launch. This assumes that marketing efforts by Google will become less intense and be on par with competitors after the first two years of launch.

[5] Bloom, D., Canning, D. and Fink, G, (2009), Disease and development revisited. NBER Working Paper No. 15137.