Economic Impact Report:

Democratizing access to AI in Thailand with Google

November 2023

Important Information

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All calculations were done in USD, and have been converted to THB based on the average exchange rate in 2022 of 1 USD = 35.07 THB, obtained from the IMF database. All estimates in this report are expressed in THB, and are based on the latest available data as of time of analysis in 2023.

Access Partnership (https://accesspartnership.com/), a global digital policy consultancy, works with the public sector, corporations, NGOs, not-for-profits, and investors to identify opportunities and develop strategies to grow, improve service delivery, support economic prosperity, and generate tangible impact.

Access Partnership's Economics Strategy team (formerly known as AlphaBeta) is a leading economic and strategy consulting practice with deep experience across a number of topics in the digital economy and the future of skills, sustainability, and economic development.

Contents

Executive Summary

Accelerating Thailand's digital future through AI

The pandemic and Thailand's aging population have deepened the productivity gap in the country's economy. To counter this, digital technologies are key to supporting Thailand's continued economic growth. The Digital Thailand Plan was laid out to support digitization with the long-term vision of fully leveraging digital technologies to facilitate the country's economic and social development. In particular, adopting Artificial Intelligence (AI) presents tremendous potential, as it creates higher-value jobs, automates operations, and boosts productivity in many industries. Accelerating the adoption of AI would require the right enablers, such as the proper infrastructure, skills, and a safe online environment.

Building a digitally skilled workforce

While Thailand has invested heavily in digital infrastructure, its digital talent development is less rigorous. Digital skills training can help Thailand build a digitally skilled workforce necessary to harness the opportunities from AI.

Securing Thailand's digital future

Protecting Thailand's people and organizations from cyber threats is critical as economic activities shift online. Helping businesses adopt cybersecurity tools and providing cybersecurity training for the general population can help reduce cybercrime losses.

Google's impact in Thailand

Helping businesses to digitize and grow

Google's AI-powered products and solutions stand to unlock revenue gains, cost savings, and productivity gains for Thai businesses. Businesses are also able to expand into overseas markets and grow.

Supporting jobs in the digital economy

The economic activity enabled by Google products and solutions supports jobs in Thailand, helping people improve their livelihoods. For example, the use of Google Ads enables businesses to expand their customer bases, supporting job creation as they require increased hiring to meet additional demand.

Enabling households to participate meaningfully in the digital economy

From information and content discovery and entertainment to improved efficiency, each Thai user benefits from AI-powered products that are secure and easy to use. Additionally, YouTube has provided a convenient platform for Thais to learn new digital skills, such as AI, software programming, and website development.

Key highlights

Accelerating Thailand's digital future through AI

Unlocking key opportunities in AI

At least **THB 2.6 trillion** in **economic benefits can be enjoyed by businesses in 2030** if AI-enabled tools are adopted.

Building a digitally skilled workforce

THB 1.0 trillion of value can be generated in 2030 by **narrowing Thailand's digital talent gap through digital skills training.**

Securing Thailand's digital future

THB 726 billion of **cybercrime-related costs to businesses and individuals** can be mitigated in 2030 through cybersecurity tools and training programs.

Google's impact in Thailand

Helping businesses to digitize and grow

> THB 150 billion

in economic activities were unlocked in 2022 by businesses in Thailand using Google's AI-powered products and solutions.[1]

Supporting jobs in the digital economy

> 250,000 jobs

were supported in Thailand.[2]

Enabling households to participate meaningfully in the digital economy

THB 458 billion

in economic activities were gained by Thai households through their use of Google products and solutions in 2022.[3] This is equivalent to an annual benefit of **THB 7,390 per Internet user.**

1. Products and solutions assessed include Google Search, Google Ads, Google AdSense, Google Play, YouTube, and Google Cloud.
2. These include jobs supported from the use of Google Search, Google Ads, Google AdSense, YouTube, Google Cloud, and Android by businesses. Jobs supported by Android accounts for direct, indirect and spillover jobs in the app economy. Jobs supported by Google Search, Google Ads, Google AdSense, YouTube and Google Cloud products include both direct and indirect jobs created in the use of these Google products.
3. Products and solutions assessed include Google Search, Google Maps, Google Play, YouTube, Google Drive, Google Docs, Google Sheets, Google Slides, and Google Photos.

Chapter 1

Accelerating Thailand's digital future through AI

The COVID-19 pandemic and a rapidly aging population have worsened Thailand's productivity gap. Thailand's labor productivity fell by 7% during the pandemic, the second largest decline among Asia Pacific countries.[1] Unfortunately, labor productivity has not improved since and even recorded further declines in every quarter of 2022.[2] Meanwhile, the population continues to age, with Thais aged 60 and over accounting for 20% of the population in 2021 and are expected to reach 36% by 2050.[3] Home to the third most rapidly aging population in the world, the country's productivity will only continue declining as its working population shrinks.[4]

To counter the declining productivity, **digital technologies are key to Thailand's continued economic growth**. Aiming to elevate its digital economy's contribution to 30% of its Gross Domestic Product (GDP) by 2030, Thailand is directing investments toward digital transformation across its industries to enhance innovation and productivity across sectors.[5] With these goals in mind, the Digital Thailand initiative was introduced in 2018 to better leverage digital technologies and facilitate greater economic and social development.[6]

Among the different technologies, AI presents tremendous potential. To ensure that individuals and businesses in Thailand are well-equipped to harness AI's potential effectively, Thailand needs to focus on enhancing two enablers:

1.
Improving Thailand's digital competitiveness through talent upskilling

2.
Empowering individuals and businesses in Thailand to address the evolving cybersecurity risks brought by AI

Strengthening digital skills in the workforce is imperative to enable Thai workers to take advantage of the opportunities created by AI. Additionally, increasing cybersecurity awareness will ensure that AI-enabled digital tools, including cybersecurity tools, can be properly utilized, allowing Thais to use AI tools in a safe and secure environment.

AI adoption is more crucial than ever

AI presents tremendous potential to enable productivity growth in the workforce and promote continued economic advancement. Helpful in creating higher-value jobs and automating manual-intensive work, AI can boost productivity in the coming years. For example, in Thailand, a study found that adopting AI in the economy, coupled with skills development, can uplift the economy's productivity by up to 35% while boosting employment rates by 18%.[7] Additionally, a separate study has found that generative AI has the potential to boost productivity by up to 14% for both skilled and unskilled workers.[8]

Recognizing the importance of increasing its competitiveness through the use of AI, the Thai Government announced the National AI Strategy in 2021 — the country's first formal national strategy on AI adoption — and has seen great progress in the development and adoption of AI since.[9] Key goals of the strategy include increasing digital infrastructure investment by 10% per year to support AI development and supporting over 600 public and private organizations to adopt AI innovations by 2027. With this strategy in place, Thailand has moved up the global Oxford Insights Artificial Intelligence Readiness Index, which assesses governments on their readiness to implement AI in the delivery of public services, from 60th place in 2020 to 33rd in 2022.[10]

At least THB 2.6 trillion
in economic benefits* can be enjoyed by businesses in 2030 if AI-enabled tools are adopted.

*Note: Economic benefits refer to benefits such as cost savings, revenue increments, and productivity gains that businesses experience from adopting AI-enabled tools. This represents the lower-bound estimate in a scenario where AI is adopted in each sector at a slow pace, which leads to fewer firms benefiting from the use of AI in their operations. A larger benefit of up to THB 4.3 trillion could potentially be unlocked in a high-impact scenario with more rapid AI adoption.

Unlocking key opportunities across industries with AI

Applications and benefits of AI can be seen across many sectors, with **manufacturing, wholesale and retail trade, and financial services expected to benefit the most**. For instance, automotive and assembly in manufacturing have the potential to boost productivity in the industry by up to 4% annually. At the same time, the applications of AI in marketing, sales, supply chain management, and other areas can increase revenue in the retail industry by up to 6% annually.[11]

With aspirations to become the manufacturing leader in Southeast Asia, Thailand has identified the robotics industry as a pivotal avenue towards this goal.[12] Adoption of AI presents countless benefits that can facilitate advancements in the industry. For example, AI-powered automation can reduce menial, everyday tasks, freeing workers' time to pursue higher-value tasks such as innovating and researching new technology applications. Likewise, AI applications like additive manufacturing can reduce assembly time without compromising the quality of goods. As a result, manufacturing firms can pursue a larger share of high-technology manufactured goods that require greater precision and sophistication, including electronics and computer parts.[13]

AI can also greatly benefit Thailand's retail businesses through sales and marketing personalization. By creating a positive customer experience through targeted promotions and recommendations, brands have a powerful tool to help them lift customer retention and sales conversion.[14] Thus far, only 25% of retail businesses in Thailand have planned or implemented AI in their operations, leaving substantial economic potential untapped for Thailand's retail industry.[15]

Adopting the necessary AI principles to facilitate broader adoption

As more focus is placed on advancing AI-enabled technologies, attention to the ethical and responsible development of AI should also increase. In short, putting in place the **fundamental principles of AI that ensure social benefits, accountability, and transparency for all users** must sit at the heart of this evolution.[16] Promoting the responsible development of AI bolsters trust between users and AI providers and facilitates the seamless integration of AI tools and systems into the broader Thai society. Similarly, prioritizing fair and accountable design of AI technologies can better safeguard algorithms and models against biases and discrimination by ensuring that the datasets used in model training do not reflect any biases. Lastly, enforcing transparency over data usage will provide additional protection and security around users' privacy.

For Thailand to fully harness the potential of AI, these principles must be established to prevent the emergence of AI technologies that could pose risks to society.

Photo credit: https://www.nxpo.or.th/th/en/18648/

Thailand is actively developing AI governance frameworks

Recognizing the importance of developing AI responsibly, the Thai Government has proactively rolled out appropriate AI principles and robust governance frameworks. In collaboration with the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), the Association of Pacific Rim Universities (APRU), and Google, the government is installing AI governance frameworks and building capabilities for social good in critical areas such as healthcare and poverty alleviation.[17] For instance, the process of developing and applying AI from research to market in healthcare has been hindered by the absence of a clear AI governance framework due to unclear approval criteria for AI-based medical products. Therefore, the government is actively crafting a well-defined governance framework to better facilitate the commercialization of innovative AI-based medical products and services that could benefit Thai society.

1.1 Building a digitally skilled workforce through training

Despite being one of the first Southeast Asian countries to embrace digital infrastructure, the development of its digital talent is less rigorous than some of the country's other digital initiatives.[18] It is estimated that Thailand will need 600,000 additional workers with advanced and intermediate digital skills by 2027 to support the growth of the digital economy.[19] Bridging this digital skills gap is crucial if Thailand wants to better leverage AI in the workplace.

As AI adoption rises and work shifts from repetitive tasks such as data collection and other physical activities to troubleshooting machines when they falter, understanding the fundamentals of how machines work becomes even more important.[20] **Investing in digital skills training is essential to help Thai workers make the most of AI-enabled tools.** Workers with such skills can improve productivity through AI automation, and Thailand's workforce will remain competitive internationally.

Other than advanced digital skills, equipping non-technical workers with basic digital skills can lay the foundation for more Thai workers to pursue advanced digital skills. For example, providing learners with basic coding skills may spark their interest in more advanced areas such as data analytics, software engineering, or machine learning.

Digital skills training can add

THB 1.0 trillion

of value to Thailand's economy in 2030 by narrowing Thailand's digital talent gap.

Digital skills training leads to more meaningful economic participation

Digital skills training can help Thailand build a digitally skilled workforce necessary to harness AI's opportunities, especially in machine learning, mobile development, and cloud computing. This section examines some of Thailand's digital skilling plans and initiatives to support the country's digital economy and society.

Thailand heavily invests in upskilling its people and bridging the digital talent gap

The Digital Economy Promotion Agency (DEPA), a government agency aimed at supporting the digital industry, recently unveiled Phase 2 of a nationwide master plan designed to foster the growth of Thailand's digital economy from now to 2027.[21] To narrow the digital skills gap, DEPA plans to create a platform for lifelong learning in support of online training and courses, tailored to the needs of the labor market. A primary objective of this initiative is to propel the digital workforce forward and equip an additional 500,000 individuals with the necessary digital skills. The platform is free of charge to make it more accessible to the masses.

Thailand taps into online education to catalyze digital skills training

To elevate digital literacy proficiency, DEPA created many initiatives that promote digital skills training in schools. One such initiative is through collaboration with Chiang Mai Primary Educational Service Area Office 4 and Ban San Pa Sak School, a coding learning center in Thailand, which DEPA hopes will promote digital skills training for students and teachers across 1,500 schools by 2023.[22] Using online training platforms that harness AI technology can personalize training to each learner's needs, which is instrumental in delivering optimized learning experiences for participants. Skills addressed through the program include coding, science, technology, engineering, mathematics (STEM) and AI. An example of the success of this program is the "Using AI Technology to Promote Active Learning" course, which attracted substantial participation of 2,000 attendees.[23]

1.2 Securing Thailand's digital future through cybersecurity efforts

As economic activities shift online, businesses and consumers alike are increasingly exposed to vulnerabilities. Safeguarding the country's digital infrastructure and systems while protecting the online safety of citizens and businesses has never been more critical.

Between March 2022 and May 2023 alone, almost 300,000 fraud cases costing THB 40 billion in damages were reported, with fraudulent purchases of goods and services (37% of cases) and money transfer scams (14% of cases) being the most common threats.[24]

Awareness and preparedness, however, remain low among businesses and individuals. Thailand ranks 44th out of 175 economies in the National Cyber Security Index, revealing that there is still plenty of room for improvement.[25] To that end, **44% of Thai Internet users are highly susceptible to cyber threats because they lack the basic cyber skills to protect themselves.**[26] Furthermore, 97% of SMBs in Thailand have reported feeling vulnerable to cyber threats, and 67% suffered at least one cyber incident in 2021.[27] This underscores the pressing need to strengthen businesses' cybersecurity preparedness against future cybercrimes.

As Thai people become more digitally connected and inevitably more exposed to cyber risks, two priorities can help secure Thailand's digital future:

1. **Individuals must be empowered to self-protect against cybercrime**

2. **Businesses, especially SMBs, must continuously invest in cybersecurity**

Through a combination of cybersecurity investments and digital literacy programs, the country can reduce cybercrime-related losses by
THB 726 billion in 2030.

Thailand is fully committed to improving the country's cybersecurity landscape

Aware of the rising frequency of cybercrime attacks, the Thai Government is proactively tightening its cybersecurity laws and ensuring that cybersecurity awareness spreads across the public. In 2023, the Thai Government issued a new law, the Royal Decree on Measures for Protection and Suppression of Technology Crimes, to strengthen legal measures and authorities' abilities to tackle cybercrime head-on.[28] This means financial institutions can implement AI-powered tools to assist with investigations of illicit transactions.

The Thailand National Cyber Week, inaugurated in 2023, was also launched to amplify cybersecurity awareness and knowledge among the general public.[29] Furthermore, Thailand's own Cyber Wellness Index was introduced in June 2023 to track the public's risk of cybercrime.[30]

1.3 Google's contribution to AI, digital skilling, and cybersecurity in Thailand

Google is committed to supporting the Thai Government in achieving its ambitions. Besides the impact created through their products and solutions, Google is also directly enabling economic sectors in Thailand to benefit from AI.

Photo credit: *https://www.youtube.com/watch?v=Tt7gwWQ9z58*

Google pilots AI use in Thailand's healthcare sector

In 2018, as part of its AI for Social Good Program, Google piloted a first-of-its-kind AI research program to screen 5 million diabetic patients with diabetic retinopathy. The technology, developed by Google, detects retinopathy with 95% accuracy and delivers instant results. With only 1,400 eye doctors in Thailand, the program proved tremendously beneficial as doctors could screen more patients more accurately. As a result, clinicians and community health workers in Thailand can now effectively screen for diabetic retinopathy, allowing more patients to seek early intervention and avert permanent blindness.[31]

Google offers free access to AI skills training

To make careers in AI more accessible to individuals, Google offers AI skills training so users can learn, explore, and evaluate AI products for free.[32] Ten courses covering a wide range of topics, including Introduction to Generative AI, Large Language Models, Responsible AI, and more, are freely available so Thais can seize the opportunity to build and demonstrate their proficiency in in-demand AI skills to prospective employers. Additionally, new users receive complimentary credits that allow them to experiment with AI and machine learning products, solutions, and services powered by Google's research and technology.[33] This allows users to better understand the products before fully committing.

Google enhances cyber resilience for Thai businesses

As a market leader in threat intelligence, Mandiant (a Google subsidiary) has identified security vulnerabilities and strengthened the cybersecurity capabilities of many Thai businesses so that they can remain resilient in the face of rising cyber threats.[34] Additionally, Mandiant has simulated real-world attacks to help expose cybersecurity gaps, enabling many Thai businesses to reinforce their defenses and protect against attacks. In 2022, Mandiant was called on to help remediate and eradicate threats after one of Thailand's businesses suffered a data breach. Mandiant also helped the business's legal team respond to the General Data Protection Regulation (GDPR).

Chapter 2

Google's impact in Thailand

Google products and solutions help Thailand foster the adoption of AI and better address the challenges of digital skills and cybersecurity as the country experiences a rise in digital activity. With AI systems embedded into common Google products, businesses and households can explore the use of new technologies to unlock value. Google Workspace, for instance, has enabled over 3 billion people globally to see productivity gains through AI-powered features, like Smart Compose in Gmail and Google Docs' auto-generated summaries.[35]

Google products have helped businesses in Thailand unlock economic value and new opportunities by:

- Expanding online presence locally and globally (Google Search, Google Ads, Google AdSense, Google Play, and YouTube); and

- Improving work efficiency (Google Cloud).

Google products and solutions also greatly benefit Thai households by:

- Increasing and democratizing access to information (Google Search);

- Enabling greater productivity and convenience (Google Maps, Google Drive, Google Photos, Google Slides, Google Docs, and Google Sheets); and

- Providing a range of education and entertainment avenues (Google Play and YouTube).

2.1 Helping businesses digitize and access global markets

AI tools maximize impact on businesses and continue to create jobs around the country. Google Cloud is one such example of employing advanced AI-powered technologies to prevent and detect hacks — and as a result, offers higher security than on-premise solutions.[36] At the same time, Google Cloud also enables faster recovery after a hack, boosting business resilience while reducing production disruptions.[37]

> THB 150 billion
in economic activities

were **gained by businesses in Thailand** through their use of Google Search, Google Ads, Google AdSense, Google Play, YouTube and Google Cloud in 2022.

THB 74 billion
in economic activities

were gained by SMBs through their use of Google products and solutions in 2022.

THB 20 billion
in export activities

were gained by **Thai businesses through Google-enabled exports** to overseas markets in 2022*.

28 days
of time savings

per employee annually through their use of Google Workspace.[38] This includes time saved by **accessing, storing, and sharing online documents for work** and **from reduced meetings and more efficient collaborations**.

*Note: Products assessed for the estimation of export benefits include Google Ads, Google AdSense, Google Play, and YouTube. Benefits from Google Cloud were not included in this estimation.

SUITCUBE suits up with Performance Max, conversions rocket

Purveyor of men's suits, local fashion brand SUITCUBE wanted to revive its business after COVID-19 had greatly reduced people's need for office wear. With an AI and data-driven approach (using Search and Performance Max in Google Ads), SUITCUBE's conversion rate jumped by 2.8X, while cost per acquisition (CPA) dropped by 68% compared to the period before launching Performance Max. SUITCUBE's click-through rate (CTR) also improved by 12%, and its cost-per-click (CPC) decreased by 78%. SUITCUBE is delighted with the results and plans to continue using Google's automation tools by adding product feeds in the future.

Photo Credit:: *https://workpointtoday.com/son-chunsuparerk-suitcube/*

Businesses in Thailand leverage Google's AI-powered products and solutions to scale their operations

Thai Otsuka turn to AI-powered ads solutions to boost revenues

As operating costs mounted, pharmaceutical company Thai Otsuka was determined to boost sales via e-commerce platforms like Shopee. To do so, the company needed to implement the right solutions that would boost traffic and online sales while remaining affordable to customers. Thai Otsuka decided to deploy a host of Google's AI-powered ad solutions (including Discovery and Performance Max Campaign) and watched its revenue soar by 44%. Better yet, the cost per visit to their online stores dropped by 32%.

Photo credit: https://www.thai-otsuka.com/news-events/samutsakhon-hospital/

KASIKORN Business-Technology Group (KBTG) Labs partnered with Google to innovate AI-powered solutions

Assessing, verifying, and processing vehicle insurance claims is very labor-intensive and time-consuming. To address this, KBTG Labs teamed up with the Google Cloud team. Using Google's Cloud Storage and Vertex AI, they built an AI model to analyze images that accompanied insurance claims at scale.[39] They also figured out that shifting from close-ups of the damage on a car to one that shows more of the vehicle improves the accuracy of car recognition by about 30%. This was crucial to helping KBTG Labs simplify the detection and verification of damages through user-submitted images, resulting in cost and time savings for the insurance company.

Photo credit: https://www.cio.com/article/191701/meet-the-brains-behind-kbank-s-innovation-drive-in-thailand.html

The new Google Cloud region will further Thailand's economic growth while creating new high-income jobs

Google Cloud serves as a digital partner for many businesses in Thailand. By providing a reliable, easy-to-use, secure, and readily available service that keeps operations running smoothly, organizations across the country are able to maximize efficiency and productivity. **In 2022, Google announced plans for a new Google Cloud region in Thailand,** which promises reliable, low-latency connectivity as well as the highest security, data sovereignty, and compliance standards, including any specific data storage requirements.[40] This enables businesses to achieve more, elevating their revenues, hiring better and more adept employees, and accelerating efforts towards becoming a "high-income" nation.

THB 145 billion
in contributions to GDP

will be generated by the new Google Cloud region between 2025 and 2030.[41]

50,300
full-time equivalent jobs

such as cloud engineers and data scientists will be created through the Google Cloud region in 2030 alone.[42]

78%
improvement in energy efficiency*

could be achieved through the migration of on-premise data centres to cloud, enabling organizations to reduce energy consumption and associated emissions.[43]

*Note: This finding refers to benefits from cloud-based solutions in general, and is not specific to Google Cloud.

2.2 Enabling households to participate in the digital economy meaningfully

Google's AI-powered and easy-to-use products have shifted everyday habits across the country. From navigating with Google Maps to accessing over 2.8 million apps via Android and Play that serve a wide range of needs and wants, Thai households have significantly benefited from Google's products.[44] For instance, 70% of YouTube users in Thailand say they have turned to the platform to learn a new advanced digital skill, such as AI, software programming, mobile application, and website development.[45]

Globally, **Google leverages AI to discover 40 billion spam pages daily** and deprioritize them, making them less likely to end up as top search results.[46] In addition, **Google Messages on Android devices protects users against 1.5 billion spam messages per month**.[47]

THB 458 billion

in economic activities* were gained by Thai households through their use of Google products in 2022.

Equivalent to **an annual benefit of THB 7,390 per Internet user**, these benefits measured how much households valued the easier access to information, increased productivity, and a variety of entertainment and enrichment benefits from Google products and solutions.

> 250,000 jobs

were supported in Thailand.[48]

For example, Google Ads enabled businesses to expand their customer bases, supporting job creation as they require increased hiring to meet additional demand. Furthermore, the growth of the Android ecosystem not only generated tech jobs in app development companies but also increased recruitment for other roles (e.g., marketing and finance support).

*Note: The economic activities were calculated based on how much Thai users are willing to pay for each Google product before they would switch to an alternative product. This represents how much they are willing to pay and not cost savings.

Photo credit: https://www.bangkokpost.com/thailand/general/2577019/all-bma-kids-to-join-google-classroom

437 schools in Bangkok log in to Google Classroom

The Bangkok Metropolitan Administration (BMA) is expanding the Google Classroom project to cover all 437 schools under its administration by 2026.[49] Under the project, every student receives a reconditioned laptop that comes with Google Classroom, which is free for schools and allows everyone to access and collaborate on documents and work on projects together online. Since everything runs on Google Cloud, the hardware memory from the refurbished laptops is not overextended, and students can use the products freely.[50] This greatly improves the learning connectivity and data accessibility of Thai students.

Methodology

- **Estimating the economic value of AI and digital technologies in mitigating societal challenges in Thailand**

This report estimates the annual economic benefits of AI in 2030. Additionally, the benefits of digital technologies in the mitigation of two key societal challenges by 2030 were also estimated: digital skills shortages and cybersecurity risks. The analysis takes 2030 as the target year to ensure sufficient runway for reasonable projections (which take into account increases in technology uptake over the coming years).

The economic value of AI in 2030 was assessed by conducting a sector-specific analysis of the impacts of both traditional and generative AI within each sector. This evaluation involved measuring the sector-targeted effects of over 400 traditional AI applications and over 60 use cases related to generative AI. For the digital skills shortages, the economic benefits of digital skills training were estimated based on the relationships between digital skills training (i.e., offline and online) and employment outcomes (i.e., labor productivity). For cybersecurity risks, the cost savings for businesses deploying AI in cybersecurity and the cost savings for individuals undergoing cybersecurity training were estimated. This report measures the potential reduction in direct costs (financial losses associated with a cyber-security incident, such as loss of productivity, fines, and remediation costs) and indirect costs (opportunity cost to the organization, such as customer churn due to reputation loss) as more businesses in Thailand deploy AI in cybersecurity in the year 2030, forecasted based on global trends. For individuals, the percent reduction in cybercrime vulnerability through training was extrapolated to calculate the number of cybersecurity incidents that could be avoided and the direct financial savings for individuals in such cases while accounting for underreporting, which tends to be prevalent in cybercrime cases.

- **Estimating Google's economic activity in Thailand**

The household benefits supported by Google are challenging to measure and analyze because individuals typically do not pay to use Google Search, Google Maps, Google Play, Google Drive, Google Photos, Google Docs, Google Slides, and Google Sheets (all free tools). In the absence of price indicators, the economic "willingness to pay" principle provides a proxy for the dollar amount Thais benefit from these tools. Individuals were asked how much they value the specific services, a value amount known as consumer surplus.

These insights were gathered through a survey conducted in June 2023 with 500 individuals based in Thailand. The sample size of respondents is statistically significant based on the Internet population in the country, at a 90% confidence level.

The economic activities generated by businesses from Google products, such as Google Search, Google Ads, Google AdSense, Google Play, Google Cloud, and YouTube, were estimated based on the economic value generated by Thai businesses from leveraging Google products. The value of using Google products does not include the flow-on economic effects generated, such as further purchases from their suppliers or the economic activity generated by employees of these businesses who spend their wages in the broader economy. The value also does not account for the activities that may have been displaced by Google, nor does it attempt to estimate the incremental impact of Google on Thailand's economy in hypothetical instances where Google itself does not exist but similar companies do. The methodology adopted to derive the economic activity generated by Thai businesses in this report references the US Google Economic Impact Report methodology.[51]

The export-related benefits for Google products such as Google Search, Google Ads, Google AdSense, Google Play, and YouTube were estimated based on the economic activity generated by businesses using each product and its respective export ratio. The export ratios for Google Search, Google Ads, Google AdSense, and YouTube were derived based on the share of overseas traffic on search and display advertisements and online video channels for Thailand, respectively. For Google Play, the overseas share was estimated using the 'power law' curve (an established empirical approach to approximate the dynamics of winner-take-all markets like mobile apps).

The number of jobs supported by Google in 2022 was estimated based on the economic benefit to businesses from each advertising product and Google Cloud, the share of digitally-enabled businesses, and the labor productivity in Thailand. The number of jobs supported by the Android app economy in 2022 was calculated based on the methodology from the Progressive Policy Institute, a leading institute studying app economies around the world. This is derived based on the estimated app intensity of Thailand (app economy jobs as a share of total jobs) and the economically active population in Thailand.

A detailed methodology memo outlining the approach adopted in our study can be accessed on our website here.

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