A PARTNERSHIP OF POSSIBILITIES

Industry Recommendations on Advancing Cooperation under the U.S.-Singapore Partnership for Growth and Innovation

AmCham SINGAPORE

BOWER GROUP ASIA

Contents

Executive Summary

As Singapore remains a vital market for American enterprises, the U.S.-Singapore Partnership for Growth and Innovation (PGI) presents an important opportunity to strengthen U.S.-Singapore trade and investment collaboration. The *Industry Recommendations on Advancing Cooperation under the U.S.-Singapore Partnership for Growth and Innovation,* captures the perspectives of business leaders in Singapore as they share the challenges and opportunities of operating in Singapore and in the broader Southeast Asia region.

- **The Covid-19 pandemic provided a transformative shift** that accelerated companies' digitalization, specifically the adoption of digital infrastructure to scale up in the digital economy and investing in cloud technology to enhance processes.
- To bolster supply chain resiliency, **companies actively digitalized their supply chain networks and built capabilities in other geographical regions** to ensure the continued provision of goods and services amid tightened restrictions.
- **There is an increasing focus on developing the advanced manufacturing capabilities of supply chain partners**, as well as encouraging their adoption of sustainability goals, e.g., setting carbon emission reduction targets
- **Companies understand the importance of incorporating sustainability into their business model.** They are ambitious in setting carbon neutrality and renewable energy commitments, as well as taking steps to reduce plastic waste.
- Companies communicated their **desire for the U.S. and Singapore governments to facilitate data sharing across sectors under the PGI**, recommending a concerted effort to develop data sharing and cybersecurity frameworks as well as a sandbox to testbed private-public data sharing initiatives.
- On building a strong and diverse digital talent pipeline, there were suggestions for **both governments to share best practices and leverage on the expertise of both countries** to develop training schemes to overcome the digital skills gap and reskill employees across sectors
- Across sectors, companies requested for governments to recognize the merits of industry recommendations in public policy development and recommended that both governments work towards creating more meaningful industry-government dialogue that could result in stronger public-private partnerships.

The launch of the Indo-Pacific Economic Framework (IPEF) heralds the U.S.'s growing involvement in the region, with Singapore as a close ally expected to play a key role in the shaping of IPEF initiatives. Informed by industry-led recommendations found in this paper, the PGI thus presents a unique opportunity to test-bed bilateral initiatives for wider regional implementation under the IPEF.

Introduction

The United States (U.S.) and Singapore have maintained a strong economic partnership over decades. In 2020, U.S. foreign direct investment (FDI) flows into Singapore[1] amounted to US$270.8 billion (SGD 376.5 billion), while Singapore contributed $27.3 billion (SGD 38 billion) of direct investment to the U.S. In 2021, the U.S. was Singapore's third largest merchandise trade partner[2] – behind China and Malaysia – with $76.25 billion (SGD 105.7 billion) in merchandise trade value.

Context & Background

In October 2021, U.S. Secretary of Commerce Gina Raimondo and Singapore's Minister for Trade and Industry Gan Kim Yong signed a Memorandum of Understanding implementing the U.S.-Singapore Partnership for Growth and Innovation (PGI), which aims to strengthen U.S.-Singapore trade and investment collaboration. As both countries continue to progress in their post-pandemic economic recovery and manage the ongoing Covid-19 pandemic, businesses across sectors are faced with growing challenges and must look to invest into opportunities that expand access while tackling new threats.

During Secretary Raimondo visit to Singapore in November 2021, she and Minister Gan co-chaired a PGI Roundtable that engaged both U.S. and Singapore companies in a rich sharing and discussion. The focus of the Roundtable was on creating opportunities and increasing collaborations to secure inclusive economic growth between the U.S. and Singapore.

Methodology

To better understand where opportunities for growth lie and how U.S. companies can benefit from PGI, we held virtual and face-to-face interviews with more than 30 experts representing 20 U.S. companies based in Singapore across various sectors to explore the initiatives currently undertaken by companies under each of the PGI's four pillar areas – Digital Economy, Clean Energy and Environmental Technologies, Advanced Manufacturing and Supply Chain Resilience and Healthcare. We also discussed the challenges these companies face, as well as their views and recommendations on how the U.S. and Singapore can leverage the PGI to create more room for opportunities and develop effective solutions.

[1] https://ustr.gov/countries-regions/southeast-asia-pacific/singapore#:~:text=U.S.%20foreign%20direct%20investment%20(FDI,%2C%20manufacturing%2C%20and%20wholesale%20trade

[2] https://www.singstat.gov.sg/modules/infographics/singapore-international-trade

We posed the following questions:

Ongoing Initiatives Under Pillar Areas

1. (Digital Economy) How has YOUR COMPANY pivoted towards digital adoption and how has the strategic focus of the company shifted to incorporate plans that ensure participation in the digital economy?
2. (Clean Energy) What actions is YOUR COMPANY taking to reduce carbon emissions in Singapore (and the region if applicable) and do you intend to make any further changes to align these actions with Singapore's sustainable development plans (e.g., Singapore's Green Plan 2030)?
3. (Advanced Manufacturing) What steps has YOUR COMPANY taken to enhance supply chain resilience, particularly in light of the Covid-19 pandemic and geopolitical tensions?
4. (Healthcare) What digital healthcare trends (e.g., telemedicine, artificial intelligence, blockchain, etc.) YOUR COMPANY has adopted? In your experience, what digital strategies are worth investment?

Partnerships

5. How do you see Singapore and U.S companies collaborating under PGI to co-develop solutions that address challenges in the various pillar areas? What roles do you think the Singapore and U.S governments can and must play to support industry needs and initiatives?
6. What commercial outcomes would YOUR COMPANY like to achieve under PGI? Do you have specific activities or a target set for increased collaboration/partnerships with the U.S. and Singapore governments?

How PGI Can Support Companies

7. What challenges does YOUR COMPANY encounter when exploring business development and innovation opportunities in Singapore (e.g., talent, policy and regulatory hurdles, geopolitical tensions, standards and requirements, interoperability, etc.)? How can PGI help you overcome these challenges?
8. What suggestions do you have to help make PGI more robust? What gaps or barriers do you think need to be addressed for PGI to better support partnerships?

The insights and recommendations gleaned from the interviews are captured in this white paper, which suggests steps toward increasing collaboration between U.S. and Singapore companies as well as possible ways to value-add to ongoing efforts. To further deepen U.S. economic linkages in the Indo-Pacific region, the U.S. launched the Indo-Pacific Economic Framework for Prosperity (IPEF) in May 2022 with a dozen initial regional partners – including Singapore – representing around 40 percent of global GDP, focusing on four key pillars that have overlaps with the PGI: Connected Economy, Resilient Economy, Green Economy as well as Fair Economy.[3]

We hope that this report will provide a starting point for conversations among governments, companies and other stakeholders to strengthen collaborations and serve as a foundation of more forward-looking areas for IPEF.

Ongoing Initiatives by Companies

Digital Economy

Accelerated Adoption of Digital Technologies

All companies interviewed expressed that the pandemic accelerated their adoption of digital technologies. Digitalization primarily increased business efficiency and allowed for the continued provision of goods and services amid tightened restrictions, with several companies having committed to the creation of digital infrastructure in Singapore to advance digital economy capabilities. Companies engaged in the development of digital products also highlighted an increase in demand over the last two years from companies seeking to digitalize, household consumers and the government, as most transactions transitioned to digital platforms.

Investments in Digital Infrastructure & Cloud Technology

Digital initiatives not only increase cost-savings for the companies, but also help reduce carbon emissions and human error while enhancing efficiency. Two prominent trends highlighted were **investment in infrastructure aimed at scaling up digital economy capabilities** and **the use of cloud technology to enhance business processes**.

In tandem with the increasing adoption of digital technology, most companies also stressed the importance of cybersecurity and the need for greater investment to safeguard user data and corporate information.

Investment in Digital Economy Infrastructure: Attracted by the support provided by the Singapore government to companies seeking to set up regional headquarters in the country, several companies have chosen to invest in setting up digital economy infrastructure, such as innovation hubs and research centers, in Singapore.

[3] https://www.whitehouse.gov/briefing-room/statements-releases/2022/05/23/fact-sheet-in-asia-president-biden-and-a-dozen-indo-pacific-partners-launch-the-indo-pacific-economic-framework-for-prosperity/

Dell – Global Innovation Hub

Dell Technologies' Global Innovation Hub, a first-of-its-kind innovation center situated outside its global headquarters in the United States, was established in Singapore in 2021 to focus on advancing digital transformation in areas such as augmented and mixed reality, data analytics, cloud-native, edge computing and cybersecurity. The hub also represents Dell's commitment to support Singapore's Smart Nation initiative by driving digital innovations and experiences developed in Singapore for the world.

Procter & Gamble (P&G) – Using "Control Tower" Technologies to Digitalize Supply Chains

P&G embarked on a transformation of its supply chain to enable control tower capabilities back in 2017. This transformation allowed the company to automate manual processes and gain end-to-end visibility into its supply chain network to serve customers both faster and smarter. This also gave the company a competitive edge with updated supply chain planning processes and technologies during the COVID-19 pandemic – P&G was able to maintain visibility of the Suez Canal chain even as border closures disrupted businesses globally.

Pfizer – Cybersecurity and Digital Forensics Hub

Singapore remains one of Pfizer's regional hubs for cybersecurity and digital forensics. Established in 2018, Pfizer's APAC Cyber Security Operations and Response Environment (CORE) team is staffed with top-tier talent in the areas of Digital Forensics, Cyber Threat Analysis, and Security.

Honeywell – Cybersecurity Center of Excellence

Honeywell launched its third Industrial Cyber Security Center of Excellence in Singapore's Changi Business Park in 2018 – it is the first of its kind in Asia, serving as a key hub for proprietary research, new cybersecurity technology development, hands-on training and certifications specifically for the operational technology industry.

Using cloud technology to establish business processes without delay: Many of the technology companies interviewed were either providers, or users, of cloud technology. The stated benefits of cloud technology were the capacity to start up a program in a short span of time – often a matter of days – as opposed to the longer timeframe faced by businesses seeking to set up internal servers, as well as the cheaper cost of utilizing already-existing cloud solutions.

Oracle – Provision of Cloud Technology

The launch of Oracle Cloud Singapore Region in November 2021 supports the growing demand for enterprise cloud services in Southeast Asia, expanding Oracle's reach to 38 cloud regions globally. To accelerate the adoption of cloud infrastructure, Oracle also provided free training and certification for the use of cloud technology to expand the IT talent pool in Singapore, making it easier for companies to acquire and develop skilled professionals to capitalize on the digital initiatives made possible by cloud technology.

AWS – Cloud Innovation

AWS announced the launch of the AWS Singapore Cloud Innovation Center (CIC) in December 2021 to work with public and private organizations in identifying pressing social challenges as well as identify industry-focused solutions with AWS technologies and technical experts. The CIC also aims to drive innovation in Smart Cities initiatives, quantum computing, cybersecurity and workforce digital development.

Adobe – Using Cloud to Accelerate Modernization of Digital Signing Processes

Adobe launched Adobe Sign on the Microsoft Azure cloud center in Singapore in December 2020. This not only removes barriers to the cloud for local Singapore enterprises, but has benefited many businesses in the private sector, particularly those in legal and financial services, as well as telecommunications. For example, at Starhub, this now supports 1,250 paperless workflows per month.

Clean Energy

All companies interviewed for this report acknowledged the need to set goals and put in place measures to achieve carbon neutrality, transition to renewable energy sources and reduce plastic waste. Companies in the technology space placed greater emphasis on reducing carbon emissions and transitioning to renewable energy sources, while healthcare companies focused on driving other internal sustainability initiatives, such as ensuring sustainability across their supply chains and reducing product packaging waste.

Setting Carbon Neutrality Goals

Several companies have already outlined goals to achieve carbon neutrality or net zero emissions globally in the next decade and beyond, with a majority of companies interviewed committed to racing ahead of Singapore's 2050 goal[4]. Companies that have already achieved its current global net zero goals are further challenging themselves to extend commitments to their entire value chains as well.

Companies have also embarked on **clean energy plans to increase usage of renewable energy sources**:

Oracle – Full Use of Renewable Energy

Oracle Cloud to be 100% powered by renewable energy by 2025

Meta – Bringing New Renewable Energy to the Singapore Grid

Powering its Asia Pacific regional hub and data center in Singapore with renewable energy sources purchased from solar panels from rooftop projects by the Housing Development Board (HDB).

Johnson & Johnson – Longstanding Commitment to Energy Efficiency

The company's commitment to energy leadership dates back to more than 30 years where since 1986, a formal energy engagement plan has already been put in place. Today, over half of its global electricity use comes from renewable sources. J&J also has a CO2 Capital Relief Program which allocates up to US$40 million per year for energy efficiency programs at our most energy-intensive manufacturing and R&D sites. Since the program's launch in 2005, J&J completed approximately 250 projects that helped avoid around 300,000 metric tons of GHG per year.

[4] https://www.nccs.gov.sg/media/press-release/singapore-will-raise-climate-ambition

AWS – Purchasing Solar Energy

Investments in diverse sources of energy across the region. Recent partnership with local energy firm Sunseap to purchase solar energy harnessed from the latter's largest aggregated mobile solar system in Singapore to power Amazon offices, fulfilment centers and AWS data centers in Singapore.

3M – Leveraging Renewable Energy Resources for Plant Operations

3M has set forth global targets to reduce Scope 1 and 2 emissions 50 percent by 2030 and carbon neutrality in its operations by 2050. One of the ways to meet this target is to use electricity from renewable energy sources. In Singapore, 3M's Tuas plant houses one of Singapore's largest installations, a 2.2-megawatt rooftop solar photovoltaic system, which can generate energy equivalent to electricity usage for over 500 units of 4-room HDB flats annually. The plant is also certified by several international environmental standards that include the ISO 14001 (environmental management systems, ISO 9001 (quality management systems) and more.

Ensuring Sustainability Across Supply Chains

Companies are also looking to **'green' manufacturing facilities** through the adoption of energy and water conservation features as well as advanced manufacturing capabilities in support of Industry 4.0.

Oracle – Partnering Suppliers to Drive Green Efforts Across the Industry

Oracle is extending green efforts downstream – the company is committed to engaging suppliers who pledged to adopt sustainable development strategies and will support them in tracking their targets. As of December 2021, 100% of its key suppliers globally have environmental programs in place, while 80% have set carbon emission reduction targets.

Adobe – Eliminating the Use of Paper

The use of Adobe Sign has created 95% less environmental impact than a paper workflow – every 1 million transactions is the equivalent of taking over 2,300 cars off the road for a year, resulting in US$7.2 million in cost savings.

Dell Technologies – Striving for an Ethical and Environmentally Responsible Supply Chain

As a condition of doing business with Dell Technologies, all materials suppliers must manage their environmental impact of operations through reporting, pollution reduction and use of natural resources. They must also ensure minerals incorporated into components for products are mined responsibly and safely. A 4-element robust management system focusing on risk assessment, audit, corrective action and capability building is Dell's approach to building a sustainable supply chain.

3M – Energy Conversion and Recycling to Achieve Zero-Landfill Status

3M's Tuas facility is a zero-landfill site – 100 percent of the waste generated is converted into energy or recycled. 3M partners with a group of innovative vendors on these efforts, for example, to process waste plastic film into a polycarbonate alloy resin that can be molded into trays.

Developing Sustainable Products

There is also a growing focus on the environmental impact of products. Companies cited how they were investing in developing new products or finding alternatives to current product packaging to **reduce the amount of single-use waste**. Healthcare companies cited research and development initiatives on design innovations such as pods and straw alternatives as part of their efforts to reduce plastic and tin usage in their packaging while maintaining product costs.

HP – Developing Instant Ink Products

Instant ink products launched in 2022 have led to a reduction of the carbon footprint of buying and distributing ink supplies by 73%.

Johnson & Johnson – Adopting Sustainable Packaging

Accelerating efforts to convert its consumer health products packaging to sustainable options. Their goal is to use 100% recyclable, reusable or compostable plastic packaging, certified/post-consumer recycled paper and pulp-based packaging by 2025.

Oracle – Recycled Hardware Assets

Collected 2.5 million pounds of retired hardware assets, of which 99.6% was either reused or recycled in 2021.

With the gradual roll-out of sustainability initiatives under the Singapore Green Plan 2030, companies in Singapore will be expected continue to accelerate their efforts in this space and take bigger steps in incorporating ESG initiatives into their energy goals, supply chain and product development.

Advanced Manufacturing

Companies in Singapore have invested in research and development on emerging technology capabilities, such as AI and machine learning, as well as adopted and promoted industry 4.0 processes to their networks, which highlight strong support for Singapore's Manufacturing 2030 vision[5].

With border closures bringing supply chain resilience to the forefront during the pandemic, companies accelerated plans to digitalize their supply chains and develop the capacities and capabilities of their supply chain partners. Companies used digital tools to gather data-driven insights on supply chain partners, map out supply chains and predict their customers' needs.

Having learned their lessons from supply chain disruptions during the pandemic, businesses are also seeking to build new capabilities in other geographical regions to strengthen their resilience. Localizing and diversifying supply chains further enabled companies to reduce business and operational risks for future disruptions.

Leading global companies recognize the importance of diversifying supply sources to minimize risk by moving towards a **'Made-in-Asia for Asia' supply chain resilient strategy**. While Singapore remains the regional hub of choice for advanced manufacturing for the Asia-Pacific market, companies are adopting other strategies to invest in the construction of deeper manufacturing capacity in other regions as well.

[5] Singapore's Manufacturing 2030 vision is the government's masterplan to invest in the manufacturing ecosystem, build research capabilities and promote industry 4.0 adoption, to grow Singapore's manufacturing sector by 50 percent of its 2021 value (SGD106 billion) while maintaining its share of 20 percent of gross domestic product by 2030.

Seagate – Gathering Data and Upskilling Supply Chain Partners

Leveraged its close relationships with suppliers to garner data on the different links in its global supply chain, allowing the company to foresee shortages in components for integrated circuits and networking cards. In addition, Seagate also conducted upskilling and tooling development programs to help develop the capabilities and talents of their supply chain partners.

Becton, Dickinson and Company (BD) – Investing in Supply Chain Resilience

With nine manufacturing plants across Asia, BD is enhancing supply chain resilience through expanding manufacturing capacity, and creating end-to-end solutions to improve supply visibility for its customers. During the COVID-19 pandemic, BD invested $1.2billion (SGD 1.67 billion) over four years to ramp up its manufacturing capacity for its pre-filled syringes around the world.

Pfizer – Automated and Expanded API Facility

Slated for completion in 2024, Pfizer's new small molecule active pharmaceutical ingredient (API) will be highly automated and designed to support the changing needs for current and future therapeutic products. Located at the Tuas Biomedical Park, the facility will cover 19 acres, representing Pfizer's strong pipeline and commitment to ensuring a stable and steady supply of high quality medicines to the region after close to 20 years of manufacturing in Singapore.

3M – Building Supply Chain Resilience through Technology and Digitalization

3M Manufacturing & Supply Chain Operations in Singapore serves as the regional headquarters in Asia Pacific and is among the company's strategic locations. Singapore is also the regional distribution center in Asia Pacific. 3M is driving efficiency and productivity through greater information flows across the eco-system, developing "platform interoperability" through technology and digitalization. Over the last few years, 3M invested in several automation projects in its Singapore factories, such as visual inspection automation and data automation tools (software).

Healthcare

Aside from investing in the latest digital technologies, healthcare companies have been focusing on three primary areas for digital transformation: (i) digitalize processes, (ii) providing care through digital means and (iii) using data analytics to offer personalized treatment solutions. These efforts have enabled companies to save costs, reduce delays, and increase the accuracy of healthcare provided.

Digitalizing Processes to Reduce Errors and Circumvent Delays

The global pandemic underscored the need for companies to digitalize internal administrative and logistical processes to reduce errors and delays in the provision of products and services for customers. Companies interviewed broadly operate by way of digital platforms today for product offerings and payment, providing a holistic overview of treatment options available and greater flexibility in purchasing necessary medical supplies.

The use of data for financial forecasting, product management and raw materials forecasting also enabled organizations to determine optimal manufacturing production volume based on supply and demand forecasting. These serve to avoid shortages in the provision of products and equipment, as well as ensure packages and shipments arrive safely at consumers' and healthcare facilities' doorsteps during restrictive and emergency situations.

Digitalizing Provision of Care Through Technology-powered Solutions

The pandemic accelerated the adoption of telemedicine services that significantly improved patient access to care by helping to bridge the constraints of distance, time and cost. The demand for remote care continues to grow even as countries emerge from the pandemic, as healthcare providers increasingly rely on the value of telehealth solutions to optimize efficiency and effectiveness, alleviate physician and healthcare worker fatigue, empower patients to assume greater ownership over their own healthcare and ultimately, improve patient outcomes.

Technology-powered efforts include telemedicine for diagnosis, bolstering patient education to raise awareness, as well as using robotic-assisted systems for direct-to-consumer prescription of medications and digital surgery. Companies also developed telehealth solutions to equip healthcare workers with innovative tools to overcome manpower challenges. The implementation of artificial intelligence (AI) helped in taking mundane tasks off employees' task loads, further increasing workers' efficiency.

Becton, Dickinson and Company (BD) – Leveraging Informatics and Artificial Intelligence to Automate Healthcare and Public Health Processes

Medical technology company BD employs proprietary algorithm in the BD Rowa™ Smart and Vmax to automate pharmacy systems for delivery and dispensing of drugs in clinical settings. The BD Rowa™ portfolio, which include dispensing robots, digital solutions, and pouch packaging systems, harnesses the power of data analytics to enable healthcare providers to better track and manage the provision of pharmaceutical services for their patients. The BD Veritor™ System for Rapid Detection of SARS-CoV-2, through the BD Synapsys™ Informatics Solution, provided Singapore a critical solution that allowed the automatic collation of antigen rapid testing results into GovTech's database and removed the need for manual data tracking and storage during the height of the Covid-19 pandemic. Frequent testing and timely reporting of test results was a critical strategy to Singapore's pandemic control.

Johnson & Johnson – Pioneering Innovative Digital Care to Push the Boundaries of Personalized Medicine

Healthcare company Johnson & Johnson (J&J) launched its 3D Printing (3DP) Point of Care Lab in November 2021, located within the premises of National University Hospital (NUH) - a first of its kind in Singapore. In this Point-of-Care model, J&J's biomedical engineers and NUH clinicians work closely to design and produce personalized anatomical models for preoperative planning and surgical simulation. Such industry collaborations bring new techniques to healthcare professionals and harnesses the value of healthcare innovation for patients in Singapore.

MasterControl – Production of Lightweight Industrial Applications for Electronic Batch Records

Quality management systems company MasterControl provides Electronic Batch Records (EBR) software that enable pharmaceutical production facilities to go completely paperless in their keeping of batch records. This allows for greater scrutiny in remote auditing, reduction of possible compliance risks, as well as provides an electronic pool from which data insights can be harvested.

Harnessing the Power of Data Science for Better Predictions

Companies are increasingly turning to artificial intelligence solutions, blockchain technology and harnessing the power of data analytics to enhance and innovate their pipeline from production to packaging to distribution. The use of data analytics not only helps organizations predict potential healthcare needs but also ensure efficient allocation of logistical resources and manufacturing production in areas such as utilization of healthcare facilities and medical resources required by healthcare facilities.

Thermo Fisher Scientific – Leveraging Scientific Solutions and Technology-enhanced Business Models

Scientific products and technologies manufacturer Thermo Fisher Scientific tapped on the Internet of Things to digitalize its range of products and services offered to customers. While implementing digital technologies across its businesses to enhance efficiency and revenue resources, Thermo Fisher Scientific realized the need to partner with its customers and bring them along in its digital revolution. Success factors include creating convenience for customers through digital means and enhancing the choice of services, products and technologies offered by Thermo Fisher Scientific. There is also greater emphasis placed on convincing customers of the ease of digital transformation and benefits of revising business models, so as to enhance their transactional relationships with Thermo Fisher Scientific.

MSD (Merck Sharp and Dohme) – Contributing to Singapore's National AI Framework

Research-based biopharmaceutical company, MSD, contributed to Singapore's Model AI Governance Framework that was launched at the World Economic Forum (2020), the Implementation and Self-Assessment Guide for Organisations (ISAGO), with the company's AI governance practices featured as a case study in the Compendium of Use Cases in 2020. MSD partnered with the Singapore government through the Infocomm Media Development Authority (IMDA) and Personal Data Privacy Commission (PDPC) to build the foundation of AI governance in Singapore and provide a guidance for employees on how to implement a safe, ethical and responsible AI.

Challenges Faced by Companies

Restricted Flow of Data and Lack of Suitable Data Sharing Frameworks

Companies highlighted how the lack of data sharing initiatives, coupled with impending Global Minimum Tax requirements, could weaken investor confidence and Singapore's competitiveness as a regional hub.

Data localization resulting from unique data protection requirements in each country has exponentially increased the compliance burden of companies with a global presence, potentially causing gaps that increase the risk of cyber breaches. While the reluctance of government authorities to share data due to concerns over data security and privacy is understandable, the Singapore government's aversion to sharing data with the private sector stifles innovation and government-industry collaboration.

A key issue raised was the lack of clear expectations on the safeguarding of data, which inhibits the flow of data necessary for analytics to spur innovation and research, limit services available to consumers and frustrate efforts to implement security measures. Moreover, the lack of data-sharing drives business costs upwards, as companies seeking to advance research and development efforts must allocate resources to generate evidence and real-world data to inform innovation – necessary data that the government already possesses.

Companies in the healthcare sector highlighted how the current ambiguity of standards puts the onus on healthcare providers to voluntarily disclose patient information, which keeps data sharing between healthcare providers and industry low. Technology companies highlighted that the government currently practices a differentiated approach in safeguarding different forms of data, which creates inconsistencies in the companies' ability to gather the necessary data for innovation.
For instance, healthcare data is designated as sensitive and sharing of such data is put under significant legal constraints, whereas data relating to financial services is not held to the same standards. This introduces unnecessary compliance difficulties for companies charged with handling data from a multitude of sectors due to the differentiated requirements for privacy, which also inhibits the free flow of data. Companies instead suggested that all data ought to instead be held to the same high level of security, as opposed to the current model.

Lack of Government Guidance on Standards to Support Data Sharing

Companies have further attributed challenges in data sharing to the lack of top-down guidance on which interoperable standards they should adopt, to ensure data interoperability and cybersecurity. For example, healthcare companies have requested for clearer direction on cybersecurity standards for healthcare and public health critical infrastructure in Singapore.

Several international standards bodies have published standards outlining reference architecture to ensure interoperability in systems integration. These standards focus on various details, such as the required frameworks for digital entities in an interoperable IoT system, or models specific to integrating health informatics systems. Furthermore, companies are divided on certifications to pursue for cybersecurity and information security management.

Businesses therefore choose to either voluntarily adopt standards of their choice or rely on proprietary methods and internal guidelines on data governance and cybersecurity. This introduces new challenges and difficulties in data interaction and different levels of cybersecurity within each sector, thereby increasing barriers to data sharing between the public and private sectors. Further, multinational companies whose data often resides in more than one country highlighted difficulties in ensuring compliance given the lack of clarity in data residency and sharing laws across borders.

Local government agencies like the Infocomm Media Development Authority (IMDA) are working closely with public and private sector partners to publish Singapore standards and adopt complementary international standards as well as participating in the development of international standards. However, companies emphasize the need for the government to take the lead in providing clearer expectations on standards adoption to ensure greater interoperability and security in data sharing.

Human Capital and Talent Development Needs

U.S. companies have been formidable in winning the war on talent in the Asia Pacific region. According to a 2022 whitepaper by Odgers Berndtson and AmCham Singapore, companies that can project and reflect U.S. corporate culture and values are well placed to be the employer of choice for ambitious go-getters[6].

However, global labor shortages, the intensifying competition for talent and work pass restrictions have also exacerbated shrinking labor market conditions within Singapore. Multiple companies expressed challenges in hiring more digitally skilled talents to drive the digitalization needs of their industry. Companies on the search for multi-skilled technology workers across various sectors are faced with difficulties in a small country like Singapore that is limited by the amount of talent and resources that can be employed. Importantly, they foresee that business success will be difficult to achieve due to the limited size of the talent pool in Singapore.

U.S. companies continue to play an active role to support Singapore's government training programs, such as SkillsFuture and Workforce Singapore, and partner with institutes of higher learning such as the National University of Singapore and National Technology University of Singapore to grow Singapore's talent pipeline. However, companies have highlighted that these initiatives could do more to involve cross-skilling and marrying of different skill sets. For instance, SkillsFuture provides data analytics courses that enable participants to interpret data but does not provide the opportunity for participants learning to interpret such data to specialize in niche areas like healthcare.

[6] https://amcham.com.sg/wp-content/uploads/2022/03/Winning-in-Asia-Pacific-The-American-Way.pdf

Meta – New Immersive Learning Academy (MILA) Launched to Build Skills and Capabilities

Meta introduced two new programs and two curriculum updates under the 2022 edition of its Upskill initiative, the company's largest training initiative in Singapore. Upskill is run by Meta and supported by the Income Media Development Authority (IMDA), Enterprise Singapore (ESG), and Digital Industry Singapore (DISG).

- The new **Meta Immersive Learning Academy (MILA)** is an educational program that will enable beginner and professional augmented (AR) and virtual reality (VR) creators to build their skills and capabilities. Singapore will be the first country to launch MILA in the Asia-Pacific region;
- **New Coursera certification programs for software engineering**, where Meta will offer 200 scholarships for Singaporean learners;
- An exclusive **Meta Career Programs Job Board** for Meta-certified professionals, and
- **Boost 2.0** – a mentoring program for Singapore SMEs, curated by Meta in partnership with industry association SGTech.

MSD (Merck Sharp and Dohme) – Nurturing the Next Generation of IT Talents

Pharmaceutical company MSD is the main industry organizer for the annual Singapore Healthcare AI Datathon that is co-organized by the National University of Singapore (NUS), National University Health System (NUHS) and MIT Critical Data. The annual event brings together clinicians, data scientists and innovators in healthcare to address current problems in healthcare with data analytics technologies. 2021 marked the fifth time MSD returned as co-organizer for the event.

In addition, MSD partnered with non-profit organization, She Loves Data, to empower female data scientists through a series of data clinics led by MSD's data scientists. The participants, who were graduates of the Data Visualization course hosted by She Loves Data and the Singapore Management University (SMU), attempted to solve challenges that focused on nutrition and healthy eating.

Dell Technologies – Launched Tech Skills Accelerator Initiative and Partnership with IHLs

Committed to nurturing the next generation of tech talent, Dell Technologies partnered four Institutes of Higher Learning (IHLs) in Singapore to co-develop new content for curriculum modules, specialist diplomas and degree courses focused on critical core skills tied to new and emerging technologies such as cloud computing, data analytics, the Internet of Things (IoT) and digital cities management. The company also launched a new tech skills accelerator initiative to help fresh graduates and mid-career professionals gain practical knowledge and skills in cloud computing, data protection and management, data science and big data analytics.

Both programs aim to help create a pipeline of tech talent in Singapore and equip them with in-demand skills ready for the digital future.

HP Inc – Launch of Sustainable Manufacturing and Procurement Courses to Upskill the Manufacturing Industry

HP Inc partnered SSG as a SkillsFuture Queen Bee to uplevel the manufacturing industry in Sustainable Manufacturing and Procurement capabilities. The program involves HP Inc and the Singapore Institute of Management (SIM) developing a curriculum featuring 15 courses, while also mentoring manufacturing companies as they develop proofs-of-concept to support business transformation.

Through this initiative, HP Singapore aims to train over 1,500 learners and provide mentorship in 100 proof-of-concept projects, supporting 180 companies to better position and futureproof Singapore's workforce of manufacturing talent.

Lack of Meaningful Industry-Government Dialogue

While the Singapore government has publicly recognized the importance of building dialogue with industry in co-creating solutions to common challenges, many companies continue to feel that there are not enough opportunities to provide feedback on policies.

There is a perceived lack of visibility into government workstreams, plans and priorities and the absence of meaningful industry-government dialogue make it challenging for businesses to venture into public-private partnerships. As policy development in Singapore often operates in an environment where engagement with the private sector precedes policy announcements but follows policy decisions, interviewees stated that the inability for industry partners to contribute to policy decisions beyond the stipulated consultation can have a 'chilling effect' on businesses. Companies also conveyed having a limited understanding of where they could support and value-add as industry partners and stakeholders in the economy.

Recommendations: How the PGI Can Support Companies

Deeper, More Constructive Industry-Government Dialogues

Given the government's emphasis on collaboration with the private industry to co-create solutions to overcome common challenges, the PGI can serve as a platform where agencies from both Singapore and U.S. governments can leverage in deepening recognition and acceptance of the role and status of private sector organizations as partners in economic development. Companies interviewed emphasized that more needs to be done to develop and implement strategies that incorporate dialogue with industries as a method to policy development leading to public-private partnerships.

Under the PGI, the Singapore and U.S. governments could also discuss current and new methods of engaging with industry for policy development. This will reflect both countries' commitment to more progressive policy-making frameworks that incorporate feedback from the private sector.

Where we are now

- Government holds industry consultation sessions to invite feedback from companies on certain draft legislations, regulations, or proposed licensing conditions.
- Sessions are ad-hoc, held several times over the course of policy development with no transparent follow-up.
- Sessions mostly involve feedback gathering, less of two-way information sharing
- Unstructured channels: informal dialogue with companies or through touchpoints with trade and industry associations and chambers of commerce, who represent members' voices

Proposed ways forward

- Extend beyond industry consultations and establish a more formalized approach towards two-way dialogues.
- Ensure targeted and proactive engagement strategy to keep dialogue on-going across healthcare and tech industries
- Carry out sessions that involve both information-sharing on government priorities and plans, as well as have government agencies present on areas they would like to seek expertise from private stakeholders for value-adding to policies
- Build on the expertise of REACH as the government's established feedback unit. Expand to foster greater and more regular collaboration with industry and trade associations and chambers of commerce, reducing the ad-hoc nature of engagement

Ensuring Interoperable Standards Across U.S. and Singapore

Recognizing the increasing need to share data to drive innovative solutions across sectors, companies turn to governments for leadership in establishing data governance and drive the development of security and privacy standards. Under the PGI, the U.S. and Singapore are well-positioned to:

- Develop a U.S.-Singapore data sharing framework to guide companies, including a common set of internationally recognized standards that ensure technical interoperability and cybersecurity in data sharing, and
- Exchange knowledge and best practices on data sharing between the private and public sectors.

Besides a common set of standards, the framework may include a commitment to the development of mechanisms aimed at facilitating the free flow of cross-border transfers of information – for example, measures prohibiting data localization requirements and ensuring protection and security for data transferred out of the country – as well as promotional efforts to encourage adoption of a common set of standards. Although the proposed framework may be incorporated as part of a digital economy or free trade agreement, it should maintain flexibility in terms of platform to ensure its adaptability to short innovation cycles.

Moving forward, the framework may expand to include other areas under the digital economy, such as the ethics of Artificial Intelligence (AI). It also serves as a building block to inform future policies, regulations and certification to facilitate seamless and safe data sharing regardless of industry. The recently launched IPEF also encompasses a digital trade pillar, where most ASEAN member states are signatories. ASEAN's potential interest in digital trade with the U.S. provides a platform for this data sharing framework to be extended into the region, amplifying the possibilities for cross-border data flows while ensuring its security.

Where we are now

- Inconsistent voluntary adoption of standards by companies.
- Differing methodologies, guidelines and frameworks
- Challenges and difficulties in data interaction
- Different levels of cybersecurity
- Worsening barriers to data sharing between the public and private sector

Proposed ways forward

Developing a data sharing framework to:

- Provide a central guiding source of direction for U.S. and Singapore companies
- Outline a common set of standards from various international or regional standards bodies
- Share best practices on data sharing between the private and public sectors
- Potentially expand to other areas such as the ethics of Artificial Intelligence (AI)
- Inform future policies such as creating certification similar to the Common Criteria
- Connect ASEAN digital economies with the U.S.

Building & Maintaining a Diverse Talent Pool

Companies expressed the wish to see more collaboration under the PGI to support building a digitally literate workforce in Singapore. More emphasis on talent and knowledge building is required to enhance key digital skills across sectors and better equip the local workforce in order to enable transition to a digital economy. A company interviewed observed the asymmetry in talent between Singapore and the U.S., specifically on how the U.S. is ahead in growing the talent pipeline with programs and initiatives that cross-train and upskill the workforce to meet changing talent needs.

To plug those gaps, the PGI could look to establish appropriate joint US-Singapore skills and training programs, providing a national-level avenue for regular dialogue, sharing of best practices and leveraging on the expertise of both countries to develop training schemes to overcome the digital skills gap and reskill local employees across sectors. Access to US experts in the field could expedite the establishment of deeper talent pools in Singapore.

Where we are now

- The market primarily consists of individuals who are skilled in data analytics or in different expertise related to their sector (e.g., healthcare professionals or business professionals)
- There is insufficient diversity and multi-skilled talent

Proposed ways forward

- Training programs and platforms to leverage best practices and expertise from both the U.S. and Singapore
- Focus on increasing diversity in talent through marrying of sector-specific knowledge with digital skills
- Short-term work passes for foreign talent to plug existing gaps and transfer knowledge in areas deemed strategic priorities under PGI

Establishing Cybersecurity Frameworks

In tandem with increasing digitalization is the growing need to establish stronger cybersecurity to safeguard business processes and data. Companies are cognizant of the importance for security and highlighted the need for the Singapore government to act as a leader in the development of security and privacy standards for data sharing, and not as the inhibiting factor to free flow of data, stymying innovation.

Accordingly, companies expressed a desire to see greater collaboration between the U.S. and Singapore governments to take the lead in the establishment of clear cybersecurity frameworks. The establishment of the United States-Singapore Cyber Dialogue in March 2022 was welcomed by companies as a step in the right direction to strengthen bilateral cooperation. Given the advanced degree of digital adoption of both countries, this platform will be crucial towards developing clear frameworks to be used as thought leadership and a possible model for other countries in the region to allow for greater interoperability of data standards.

Where we are now

- While cybersecurity dialogues exist under the PGI, it remains a work in progress. Outside this, little discussion has focused on how governments can create interoperable cybersecurity standards beyond sharing existing legislation and technology that has already been implemented.
- Cybersecurity frameworks already exist to protect data privacy but those standards are often inconsistent across industries.

Proposed ways forward

- Industry would strongly support a U.S.-Singapore digital economy agreement focused on collaboration in ensuring standards are consistent and allowing for interoperability of systems.
- Singapore and the U.S. have the opportunity to lead the creation of security and privacy standards; establishing a tangible initial model framework of interoperable standards that could serve as a guide for other governments in the region.
- Establish a cybersecurity infrastructure that equally protects all forms of data, not just data considered sensitive at a given point in time.

International ground rules are also crucial for Singapore and other global economies in establishing strong cyber defense. To that end, most companies welcome additional collaboration between Singapore and other countries to exchange best practices in cybersecurity.

Companies identified the establishment of the U.S.-Singapore Cyber Dialogue, as well as the creation of regional capacity building programs through the ASEAN-Singapore Cybersecurity Center of Excellence as good starting points to expand cybersecurity dialogue. Companies also stated that they believed the PGI, as a bilateral arrangement, provides both governments greater latitude and focus in negotiating the details of cybersecurity standards and in sharing recent advancements in the field of cybersecurity. The bilateral PGI should focus on establishing a tangible initial model framework of interoperable standards that could serve as a guide for other governments in the region. Given the IPEF's intent to focus on cybersecurity under its "connected economy" pillar, input from the PGI can feed into future IPEF initiatives, given that the regional framework remains at a nascent stage of implementation.

Sandbox Environment for Data Sharing

The PGI presents a unique opportunity for both countries to pilot innovative sandbox solutions to provide isolated, self-contained environments for secure data sharing. These would serve to help research and innovation companies, technology and platform providers, professionals and businesses facing rapid digitalization, and infrastructure teams securely access critical data (e.g., clinical and patient data), to design and build clinical trials and proof-of-concepts (POCs) using government approved third-party applications. Given Singapore's experience in this area – including programs such as IMDA's Trusted Data Sharing Framework as well as its Data Regulatory Sandbox – both countries could tap on such resources and consider incorporating them into a formalized bilateral initiative going forward.

Concerted Support for Sustainable Practices

There is also room for the U.S. and Singapore to develop a joint U.S.-Singapore Climate Partnership under the PGI to exchange information on efforts to incentivize businesses to develop sustainability practices and transition to cleaner energy sources, in line with the countries' sustainability goals. Efforts could include implementing tighter regulations and green taxes to put a stronger cost on businesses practicing harmful environmental activities, supporting R&D on innovative climate technologies as well as collaborating on sustainable finance ambitions. The industry could be a strong partner in contributing both technical solutions and insights from their own experiences.

Both governments could also provide clearer regulatory definitions of sustainability in businesses to prevent greenwashing practices, as well as create or expand certification on green buildings recognized by both countries. The Green Mark certification scheme (GM: 2021) developed by Singapore's Building and Construction Authority (BCA), which is internationally recognized, could be a good launching point for collaboration.

Paving the Way for Deeper U.S-Singapore Partnership: PGI to IPEF

Given Singapore's unique position as a gateway to Asia, many of the recommendations provided by companies naturally bear consideration for their global operations in the wider ASEAN region. Singapore's existing bilateral relationships with many countries in the region will do well in supporting IPEF's cross-pollination with other regional and bilateral mechanisms.

There is also opportunity for companies to look to the PGI as a key bilateral mechanism for shaping significant areas of cooperation, leverage existing and new initiatives and build momentum for IPEF.

In fact, three out of four pillars under PGI are aligned with IPEF:

PGI Pillar Name	Key Issue Areas	IPEF Pillar Name	Select Issue Areas
Digital Economy	Digital trade standards; global interoperability; responsible use of AI applications	**Connected Economy**	Digital economy; trade facilitation; stronger labor and environmental standards and corporate accountability
Advanced Manufacturing and Supply Chain Resilience	Standards to improve manufacturing resiliency, new opportunities for collaboration among the private sectors	**Resilient Economy**	Supply chains, including crafting early warning mechanisms; improving traceability and coordinating diversification efforts
Clean Energy	Increase adoption, deployment and trade of clean energy solutions and environmental technologies and services	**Clean Economy**	Energy, infrastructure and decarbonization, including renewables and energy efficiency

PGI Pillar Name	Key Issue Areas	IPEF Pillar Name	Select Issue Areas
Healthcare	Digitalization of healthcare; adoption of medical technologies and secure data sharing	**-**	-
-	-	**Fair Trade**	Tax, anti-money laundering, anti-bribery, beneficial ownership

The PGI presents itself as a valuable opportunity for bilateral engagement and development of initiatives between the Singapore and U.S. governments and companies that could work towards building tangible solutions on which the IPEF can formulate its wider regional stance.

Although IPEF is intended to be the signature economic initiative of the Biden team's Indo-Pacific strategy, it presents inherent challenges that are similarly echoed by companies interviewed for the purposes of this paper on the U.S.-Singapore PGI. The objectives of IPEF pillars, such as the digital economy, could prove difficult to achieve. For example, "high standard rules of the road" on cross-border data flows and data localization contradict the diverse array of approaches adopted across the region.

Currently, IPEF remains in a nascent stage although founding members have already begun talks on the commitments and goals of the framework. Collaboration under the PGI could serve as a testbed for a working model that informs the IPEF and other regional mechanisms in the lead-up to concrete policy recommendations. PGI can also support companies in the execution of their strategic plan while at the same time help to shape and steer IPEF for the benefit of the U.S. and the Indo-Pacific region.

Appendix

The table below provides an overview of the companies interviewed for this paper as well as an indication of the pillars they identified with in the PGI.

Company	Digital Economy	Clean Energy & Environmental Technology	Advanced Manufacturing	Healthcare
3M	x	x	x	x
Abbott Laboratories				x
Adobe	x			
Amazon Web Services (AWS)	x	x		
Becton, Dickinson and Company (BD)			x	x
Dell Technologies	x	x	x	
Edwards LifeSciences		x	x	x
HP, Inc	x	x	x	
Health Catalyst	x			x
Honeywell	x	x	x	x
Johnson & Johnson	x	x	x	x
MasterControl	x	x	x	x
Meta	x	x		
Merck, Sharp and Dohme (MSD)		x		x
Oracle Corporation	x	x		x
Pfizer	x		x	x
Procter & Gamble	x		x	x

Company	Digital Economy	Clean Energy & Environmental Technology	Advanced Manufacturing	Healthcare
Salesforce	x			
Seagate	x	x	x	
ThermoFisher Scientific		x	x	x

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