Asia-Pacific Economic Cooperation

USAID FROM THE AMERICAN PEOPLE

FACILITATING ACCESS TO OPEN GOVERNMENT DATA: FRAMEWORKS AND PRACTICES

April 2023

TABLE OF CONTENTS

ACRONYMS

ABS	Australian Bureau of Statistics
AI	Artificial Intelligence
AIDER	APEC Internet and Digital Economy Roadmap
APEC	Asia-Pacific Economic Cooperation
API	Application Programming Interface
ARTA	Anti-Red Tape Authority
ASEAN	Association of Southeast Asian Nations
DEPA	Digital Economy Partnership Agreement
DIPA	Data Integrated Partnership for Australia
DPDSA	Public Sector Data Sharing Policy
EASD	Enhancing Access to and Sharing of Data
ENCCRV	Estrategia Nacional de Cambio Climático y Recursos Vegetacionales
G8	Group of 8
GDP	Gross Domestic Product
GODI	Global Open Data Index
IoT	Internet of Things
IT	Information Technology
MADIP	Multi-Agency Data Integration Project
MAS	Monetary Authority of Singapore
MINSA	Ministry of Health of Peru
MOAC	Ministry of Agriculture and Cooperatives
NDSP	National Data Sharing Policy
NECTEC	Thailand's National Electronics and Computer Technology Center
NSOs	National Statistical Organizations
ODC	International Open Data Charter
ODIN	Open Data Inventory
OECD	Organization for Economic Cooperation and Development
OGD	Open Government Data
openEHR	Open Electronic Health Record
OURdata	Open, Useful, and Re-usable data
PDN	Mexico's National Digital Platform
PEAN	Physical Environment Analysis Network
PDPC	Personal Data Protection Commission

POC	Proof of Concept
Polar-ICE	Polar Interdisciplinary Coordinated Education
PSI	Public Sector Information
R&D	Research and Development
SDG	Sustainable Development Goal
SESNA	Mexico's National Anti-Corruption System Secretariat
SMEs	Small and Medium Enterprises
SMM	Chile's Monitoring and Measurement System
USMCA	United States-Mexico-Canada Agreement
WEF	World Economic Forum

INTRODUCTION

OPEN GOVERNMENT DATA IS THE NEXT FRONTIER FOR DIGITAL GOVERNMENTS

Data-driven technologies have a growing role in providing useful and beneficial services to communities and businesses. From entertainment and transport to education and healthcare, innovations based on the flow of data can help expand existing markets and create new trade possibilities, contributing to the creation of new jobs, higher standards of living, and increased dynamism and innovation.

This is especially true for the economies of the Asia-Pacific Economic Cooperation (APEC) region, who put openness at the heart of the digitalization of government and the facilitation of digital trade/e-commerce: "We have witnessed a remarkable acceleration in digital adoption and transformation across our economies. To sustain this enormous growth potential, we will accelerate the implementation of the APEC Internet and Digital Economy Roadmap (AIDER), further develop digital infrastructure, encourage the development and application of new technologies, and work towards a digital business environment that is open, fair, and inclusive (…)."[1]

An increasingly critical issue within modern trade agreements (including digital partnerships) is facilitating access to government data. One means of sharing government data with the aim of promoting universally inclusive uses of data is open government data (OGD), which encompasses all non-sensitive data[2] produced or commissioned by government entities;[3] published and updated by the public sector for anyone to search, retrieve, use, reuse, and redistribute; available in common machine-readable standard formats without usability restrictions; and available at no or reasonable cost.

To the extent that economies choose to make government-generated information available to the public, the provisions found in trade agreements (including digital partnerships) aim to expand access to this information, thus enhancing the accessibility and use of public information across borders. Not only do public institutions become more transparent and accountable when making datasets available, these datasets can enable innovation and enhance commercial applications.

This study is part of a project led by the United States under the APEC Committee on Trade and Investment (CTI) aimed at highlighting emerging practices in the region surrounding OGD. It is hoped that through this stock take and subsequent policy discussions, CTI regulators and other APEC economy officials can gain a better understanding of the various policies and regulatory frameworks on OGD measures to better facilitate ways for companies to make more effective use of data that is growing across the region. As this report shows, OGD mechanisms and initiatives are already well established in every APEC member economy, across all types of organizations, and through many key sectors. The open Internet is already here, and APEC member economies would do well to work together to fully harness this next frontier of economic and social growth.

OPEN GOVERNMENT DATA IS VITAL TO POST-PANDEMIC RECOVERY AND DYNAMISM

The COVID-19 pandemic has highlighted the importance of transparent government-generated data in the design of informed, effective, and decisive policy responses. As economies begin to recover from this global crisis, ensuring access to information without compromising data privacy and data rights will

[1] APEC (2021) 2021 Leaders' Declaration, www.apec.org/meeting-papers/leaders-declarations/2021/2021-leaders-declaration
[2] Data that is not restricted under domestic law.
[3] Government data could also apply to data created for governments by external organizations, and data of significant benefit to the public that is held by external organizations and related to government programs and services.

assist in global and domestic recovery efforts, as well as help build trust in public entities and manage future shocks of this nature.

For example, the Republic of Korea's Open Data Portal—which makes administrative data and information available online—has been instrumental in the monitoring and management of the COVID-19 crisis. Users are able to access anonymized datasets related to infections, hospitalizations, and recoveries,[4] as well as data on vaccination drives and their efficacy.[5] This is in addition to the over 1,000 public service applications that have been developed to deliver much-needed services, including a Food Poisoning Prediction Map service and the National Disaster Management Information System.[6]

In Singapore, the data.gov.sg portal centralizes the publicly available datasets of 70 public agencies, giving developers access to Application Programming Interfaces (APIs) that allow them to turn data into useful websites, applications, and dashboards.[7] Since the beginning of the outbreak, open APIs and databases have enabled both community-oriented services (mask availability,[8] visitor density in public spaces,[9] workplace safety,[10] support of small businesses[11]) and supportive response mechanisms (contact tracing applications, quarantine verification systems, real-time dashboards to track/monitor the spread of the virus).[12]

Despite such initiatives, the regulatory and policy landscape on OGD remains largely nascent in most APEC economies. In many cases, OGD-specific provisions are bundled within digital transformation plans and strategies. In others, certain aspects of OGD are incorporated into trade agreements to foster innovation, especially for small and medium enterprises (SMEs). For example, the United States-Mexico-Canada Agreement (USMCA) and the US-Japan Digital Free Trade Agreement include specific provisions pertaining to OGD. Likewise, the Digital Economy Partnership Agreement (DEPA) contains a module that promotes expanded access to and use of OGD.[13]

However, despite the unevenness of OGD policies and frameworks globally, OGD has been under active discussion by several governments for over a decade. For instance, the governments of Chile, Indonesia, Mexico, Peru, the Philippines, and Thailand have pioneered OGD initiatives with a view to improving government transparency and boosting economic growth, among other reasons. The advances made by these governments can be capitalized upon globally, as best practices emerge and lessons are learned.

As this report demonstrates, the emergence of OGD models and mechanisms paves the way for innovative ways for non-sensitive economic data to help APEC policymakers make timely and data-driven decisions as they embark on designing and implementing their post-pandemic agendas. In particular, APEC policymakers can utilize OGD to expand access to new markets and opportunities, increase revenue for innovative enterprises, and create new jobs.

---

[4] Public Data Portal (2021) Coronavirus 19 databases, www.data.go.kr/en/tcs/eds/idt/selectIssueData.do?issueId=372154&issueType=ISSUE&sortType=sort_order&perPage=10
[5] Public Data Portal (2021) COVID-19 vaccination databases, www.data.go.kr/en/tcs/eds/idt/selectIssueData.do?issueId=372162&issueType=ISSUE&sortType=sort_order&perPage=10
[6] Public Data Portal (2021) Index of databases, www.data.go.kr/en/index.do
[7] Data.gov.sg (2021) All Datasets, www.data.gov.sg/search
[8] MaskGoWhere (2021) Main page, https://mask.gowhere.gov.sg
[9] Safe Distance @ Parks (2021) Main page, https://safedistparks.nparks.gov.sg
[10] SafeEntry (2021) Main page, www.safeentry.gov.sg
[11] Help Our Hawkers! (2021) Main page, www.google.com/maps/d/u/0/viewer?mid=1XcpTiJpt_O-Rw6Wu8qrtCm_Ek9VUgIDF&hl=en_GB&ll=1.3648715064829804 percent2C103.838868&z=11
[12] GovTech (2020) Responding to COVID-19 With Tech, www.tech.gov.sg/products-and-services/responding-to-COVID-19-with-tech
[13] Asian Trade Centre (2019) Comparing Digital Rules in Trade Agreements, http://asiantradecentre.org/talkingtrade/comparing-digital-rules-in-trade-agreements

STRUCTURE OF THIS REPORT

The first section of this report, *Landscape: OGD Initiatives and their Impact*, presents on-the-ground evidence of OGD activity and dynamism, highlighting the many ways in which public-sector organizations are framing, developing, and implementing OGD principles and policies across the APEC region. Case studies highlight the positive role that governments play in creating an enabling environment for OGD facilitation to flourish.

The second section, *Operationalization: OGD Policies for Widespread Adoption*, leverages this overview of the OGD landscape to examine some of the key policy areas that are making their way into APEC-level discussions, identifying where APEC can be impactful in helping data-driven business models and ecosystems emerge—promoting wider voluntary cross-border data sharing readiness and adoption.

LANDSCAPE: OGD INITIATIVES AND THEIR IMPACT

This section provides an overview of on-the-ground OGD initiatives. Drawing from a number of APEC member economy case studies, it showcases a cross section of the many innovative and transformative applications that governments are driving and supporting as part of data sharing and data collaboration initiatives—many of which will only increase as emerging technologies such as artificial intelligence (AI) and Internet of Things (IoT) widen the scope and scale of data usage. In this context, it is important to see what OGD initiatives are already achieving and facilitating across APEC member economies, what impacts it is delivering, and—where properly enabled—what can be expected in coming years.

ASSESSING THE OPENNESS OF APEC ECONOMIES

The Open Data Policy Lab frames the rising challenge of OGD around a simple observation: "Even as ever greater amounts of data are generated and stored, the ability to actually re-use this data in a productive and responsible manner to spur positive social change remains stunted."[14]

Indeed, one of the defining features of the digital era is the unparalleled quantities of data being created, consumed, and exchanged thanks to the convergence of widespread connectivity, affordable digital technologies, and a rising demand for digital services. With 2.5 quintillion bytes of data created each day,[15] it is estimated that the world's data will grow to 175 zettabytes by 2025,[16] contributing to a 3.5 percent rise in global gross domestic product (GDP)—the equivalent of USD2.8 trillion.[17]

In this context, open data remains an untapped opportunity for most APEC economies. While many economies have some form of domestic framework or strategy towards open data, the scope and scale of data made accessible varies widely across the region. Some governments are comfortable making transport, weather, or urbanism data available for public access and use, while others are more open to sharing governance-related datasets (public budgets and investments, election results, etc.). Likewise, some economies are able to share datasets in a wide range of formats and across multiple touchpoints, while others struggle to make data-sharing platforms more visible or usable and the data itself machine-readable, retrievable, and accompanied by suitable metadata.

OPEN DATA INVENTORY (ODIN)

When it comes to gauging *the level* of an economy's data openness, it is useful to turn to a third-party study such as the Open Data Watch's **Open Data Inventory (ODIN)**, which assesses the scope, scale, and quality of data availability by examining the degree to which the data published by domestic statistical offices is openly and comprehensively available to public, private, and academic stakeholders alike.[18]

Covering 22 areas across social, economic, and environmental categories, ODIN provides an overall score that allows economies to assess the completeness and openness of the datasets made public by national statistical organizations (NSOs). The strengths and weaknesses of NSOs' approaches are

[14] Open Data Policy Lab (2021) Third Wave of Open Data, https://opendatapolicylab.org/third-wave-of-open-data
[15] Domo (n.d.) Data Never Sleeps 5.0, www.domo.com/learn/data-never-sleeps-5
[16] IDC & Seagate (2018) The Digitization of the World, www.seagate.com/files/www-content/our-story/trends/files/idc-seagate-dataage-whitepaper.pdf
[17] McKinsey (2016) Digital globalization: The new era of global flows, www.mckinsey.com/business-functions/digital-mckinsey/our-insights/digital-globalization-the-new-era-of-global-flows
[18] Open Data Watch (2020) Open Data Inventory 2020/2021, https://odin.opendatawatch.com/Report/annualReport2020

evaluated through a six-stage process that involves independent evaluators as well as NSO representatives.[19]

Table 1 : APEC economies' ODIN scores (2020)

Economy	ODIN Score	Rank
Australia	63	44
Brunei Darussalam	53	77
Canada	76	15
Chile	36	151
People's Republic of China	35	155
Hong Kong, China	78	12
Indonesia	68	33
Japan	68	32
Republic of Korea	70	22
Malaysia	53	78
Mexico	69	29
New Zealand	70	25
Papua New Guinea	21	178
Peru	60	58
The Philippines	73	18
The Russian Federation	59	59
Singapore	92	1
Chinese Taipei	60	56
Thailand	44	117
The United States of America	70	22
Viet Nam	49	91

According to ODIN criteria, all APEC economies openly share government data, but the amount and quality of published datasets varies greatly. With an overall score of 92, Singapore stands out as a clear leader in the OGD space, with the report noting that Singapore has a wide range of high-quality, longitudinal datasets available in accessible formats and on user-friendly platforms. For other APEC economies, current scores are largely encouraging but much work remains to be done.

GLOBAL OPEN DATA INDEX (GODI)

Regarding *the nature* of an economy's data openness, another third-party resource that can be leveraged is the Open Knowledge Foundation's **Global Open Data Index (GODI)**.[20] The GODI benchmarks governments' progress on open data release, examining the findability and usability of the datasets published by governments around the world.

Specifically, it categorizes government data into four distinct levels of openness:

1. **Open data**: Data that can be freely used, modified, and shared by anyone for any purpose. The data is provided in its entirety, is findable and downloadable online, and does not require registration or payment to access.

[19] A summary of the ODIN methodology is available here: https://odin.opendatawatch.com/Report/annualReport2020#sec6; a detailed methodological guide (91-page document) is available here: https://docs.google.com/document/d/1MBK0hN6MoQrii7_E1bmRXmsUcE8Fbb-Q32nxm8d8qTw/edit

[20] Open Knowledge Foundation (2016) Global Open Data Index (GODI), https://index.okfn.org

2. **Public data**: Data that can be found and viewed by the public online without any restrictions (e.g., access controls). The data is readily available online, though it may not be downloadable in common formats (for example, data can be openly licensed and downloadable as a PDF, but not necessarily in a machine-readable format).
3. **Access-controlled data**: Data for which a provider controls who, when, or how it can be accessed. Access controls include:
    - Registration/identification/authentication
    - An active request (often with a note what the data will be used for)
    - A data sharing agreement (stipulating use cases)
    - Ordering/purchasing data
4. **Data gaps** (missing or incomplete data): Comprises cases where:
    - Governments do not produce any data on a phenomenon.
    - Governments produce some data on a phenomenon, but it is not available online.
    - Governments produce some data on a phenomenon and it is available online, but it is difficult to find, access, or use.

According to the GODI findings, only Australia and Chinese Taipei stand out as providing fully open datasets. The rest of the APEC economies fall under the following categories:

Table 2: APEC economies' GODI categorization (2016)

Economy	GODI category
Australia Chinese Taipei	Open data
Canada Chile Hong Kong, China Japan Mexico New Zealand Singapore The United States of America	Public data
The Philippines The Russian Federation Thailand	Access-controlled data
Indonesia Malaysia Peru	Data gaps
Brunei Darussalam People's Republic of China Papua New Guinea Republic of Korea Viet Nam	*Not included in study*

Note: The GODI is only one way to define and measure "openness." In addition, its 2016 findings may not be reflective/representative of more recent OGD developments in APEC economies.

OPEN, USEFUL, AND RE-USABLE DATA (OURDATA) INDEX

The Organization for Economic Cooperation and Development (OECD) has developed the **Open, Useful, and Re-usable data (OURdata) Index** to measure the extent to which an economy is

"open by default"—meaning, the extent to which government data is treated as a public good, delivered with a purpose, proactively, and with a focus on re-use, in line with user needs and governed by the right policies in terms of data protection, privacy, transparency, ethics, and digital rights.[21]

The OECD finds that many economies have adopted "open by default" approaches, paving the way for more mature OGD policies that can promote global policy actions in areas such as public sector integrity, gender equality, and sustainable development. Overall, the Republic of Korea stands out as a leading economy when it comes to sustained government support to open data at the highest level. It is important to highlight that at the moment, the OURdata Index only covers four of 21 APEC economies, but its methodology could very well be extended to include more of them in the future.

Table 3: APEC economies' OURdata Index scores (2019 where available)

Economy	OURdata Index score
Australia	0.72
Brunei Darussalam	*Not included in study*
Canada	0.73
Chile	0.41
People's Republic of China	*Not included in study*
Hong Kong, China	*Not included in study*
Indonesia	*Not included in study*
Japan	0.75
Republic of Korea	0.93
Malaysia	*Not included in study*
Mexico	0.71
New Zealand	0.65
Papua New Guinea	*Not included in study*
Peru	*Not included in study*
The Philippines	*Not included in study*
The Russian Federation	*Not included in study*
Singapore	*Not included in study*
Chinese Taipei	*Not included in study*
Thailand	*Not included in study*
The United States of America	0.64 *(2017)*
Viet Nam	*Not included in study*

As these different indexes demonstrate, there is no universal framework to determine what makes a government "open." Nor is there a single, universal manner for that openness to take shape—though the principles that OGD should be up to date, machine-readable, searchable and retrievable, and available at reasonable or no cost are included in several definitions of OGD. Whichever the level of openness of a government and of its data, the various organizations measuring openness agree that enabling OGD offers a wide range of social, economic, and governance benefits.

EXAMINING INNOVATIVE EXAMPLES OF OGD ACROSS APEC

[21] OECD (2020) Open, Useful, and Re-usable data (OURdata) Index, www.oecd.org/gov/digital-government/policy-paper-ourdata-index-2019.htm

Most APEC economies already recognize the importance of OGD but not all harness and leverage it in the same manner. Across the region, OGD experimentation, innovation, and usage is well underway, with many projects, programs, and initiatives taking shape across key sectors and encompassing all types of businesses and organizations—whether small, micro, or large; whether for profit or not-for-profit; whether from the public or the private sector.

The examples presented in this section illustrate the many ways in which OGD can lead to a range of benefits for both emerging and maturing digital economies in the APEC region—namely, in the economic, social, and governance spheres:

- **Economic**: Stimulating innovation and competition as businesses develop new products and services leading to transformative business models and opportunities. Some advantages, such as newfound time and cost efficiencies, the growth of the knowledge economy, and the development of a greater number of data-knowledgeable workers, are not easily quantified, but are nonetheless valuable.

- **Social**: Widening the scope, scale, and effectiveness of public service delivery, ensuring people and communities can both benefit from and contribute to the digital economy.

- **Governance**: Increasing transparency and accountability at all levels of government, expanding publics' knowledge of data-based mechanisms, encouraging citizen engagement and participation to drive evidence-based policymaking.[22]

OGD FOR ECONOMIC DYNAMISM

The OECD estimates that data access and sharing can generate social and economic benefits worth between 0.1 percent-1.5 percent of GDP for public-sector data, and between one percent to four percent of GDP when including private-sector data.[23]

According to McKinsey, data that is at once machine-readable, accessible to a broad audience at little or no cost, and capable of being shared and distributed has the potential to not only transform every sector of the economy, but to also unleash more than USD3 trillion in global economic value annually.[24] Another McKinsey study finds that the broad adoption of open data ecosystems in the financial sector alone could lead directly to economic growth of between 1.5 percent to five percent of GDP in a given economy.[25]

In Europe, where the European Data Portal (EDP) reached over 890,000 datasets in 2019, the market size for open data is valued at EUR75.7 billion. Looking at the impact of open data for specific sectors, the public sector is expected to have the highest share in terms of direct market size, with a value of EUR22.11 million. This growth is expected to trigger a high demand for skilled open data workers, with an estimated 100,000 new jobs created.[26]

---

[22] Microsoft (2021) Data Sharing Key to Solving Asia's Biggest Economic and Societal Challenges: Microsoft Asia Whitepaper, https://news.microsoft.com/apac/2021/09/28/data-sharing-key-to-solving-asias-biggest-economic-and-societal-challenges-microsoft-asia-whitepaper

[23] OECD (2019) Enhancing Access to and Sharing of Data, www.oecd-ilibrary.org/sites/276aaca8-en/index.html?itemId=/content/publication/276aaca8-en

[24] McKinsey (2014) How government can promote open data, www.mckinsey.com/industries/public-and-social-sector/our-insights/how-government-can-promote-open-data

[25] McKinsey (2021), Financial data unbound: The value of open data for individuals and institutions, www.mckinsey.com/industries/financial-services/our-insights/financial-data-unbound-the-value-of-open-data-for-individuals-and-institutions

[26] Data.europa.eu (2020) The benefits and value of open data, https://data.europa.eu/en/highlights/benefits-and-value-open-data

Beyond purely financial estimates, it is clear that OGD constitutes a trove of direct and indirect economic opportunities for the economies that enable it. Direct benefits involve access to new markets and opportunities; growth and expansion opportunities; better understanding of potential markets to build new data-driven products; increased revenues for innovative enterprises; the creation of new, value-added jobs; and cost savings related to shorter, more efficient production chains for digital products and services.

In Canada, **Townfolio** is a city marketing tool that aggregates publicly available data to build 'dashboards' for communities, presenting all types of socio-demographic data in an accessible manner. As some of the data is drawn from OGD, it includes comprehensive census data that can be leveraged by private businesses or development organizations to develop products and services in a uniquely targeted manner.[27] With over 38,000 profiles for communities and municipalities, the platform presents a wide range of opportunities for agile businesses—especially SMEs—to expand across North America. In return, the fact that municipalities can "market" themselves on the platform gives them more control over the type of business, industry, or investor they attract, ensuring a durable, self-determined approach to economic development.[28] This tool has long-term economic and social benefits, as it allows businesses to expand the scope and scale of their services to where they are most needed.

In the People's Republic of China, **Open Data China** has launched a data collaboration project to enhance Fintech innovation. A multi-stakeholder initiative involving leading state-owned financial institutions, the project provides SMEs with access to financial data, helping them develop a sustainable financial data sharing model and cultivate talent in data analytics and AI.[29] This cross-sector, public-private data collaboration aims to reduce the cost of Fintech development by drawing on the expertise of key stakeholders (financial institutions, incubators, accelerators, infrastructure service providers, and research and civic organizations that focus on data sharing). Thanks to a sandbox approach and the creation of physical "data clean rooms," SMEs and technology startups can expedite the launch of their Fintech products and solutions, trialing innovative products and services in a secure environment with flexible regulatory arrangements. This represents tangible economic benefits, as small businesses are supported in their journey to adopt and deploy transformative digital technologies.

In Singapore, the Monetary Authority of Singapore (MAS) has launched over a dozen types of **open datasets as APIs** to provide financial institutions and application service providers with opportunities to serve their customers better. Drawing from its monthly statistical bulletins since 2016, MAS provides datasets that include price index, number of listed companies, turnover, and capitalization, among others. MAS has since progressively released more datasets as APIs and provides an option for the public to request for datasets. Use case examples include financial institutions that leverage MAS data to benchmark themselves against the industry, using MAS APIs to minimize costly manual data entry; application developers that use the APIs to create applications to compute exchange rates to help companies file tax returns; and users that automate the extraction of MAS's data to illustrate trends quickly and easily via the APIs.[30]

The launch of MAS' APIs is in line with the government's push for government agencies to publish open APIs in hopes of encouraging public innovation and engagement. Other examples of open APIs released by government agencies include real-time APIs on carpark availability published by GovTech; taxi

[27] Townfolio (2021) About, https://jointownfolio.com/about
[28] Communitech News (2018) Startup Uses Open Data to Help Small Towns Attract New Businesses, http://news.communitech.ca/startup-uses-open-data-to-help-small-towns-attract-new-businesses
[29] Open Data China (2021) A Journey of Building a Fintech Innovation Data Collaboration, https://report.opendatachina.org/pln-report-fintect-collaboration
[30] MAS (n/a) API, https://secure.mas.gov.sg/api/Search.aspx

availability and traffic images published by the Land Transport Authority; pollutant standards index (PSI), weather readings and forecasts, ultra-violet index and fine particulate matter readings (PM2.5) by the National Environment Agency.

In Viet Nam, the Viettel telecoms group has launched the **Viettel Data Mining Platform** to build the foundations for wider applications of big data in government and business.[31] The platform aims to help local entities use data to develop more targeted products and services. The idea is that helping local organizations better understand the Vietnamese market is the first step towards bypassing more expensive and less localized foreign entities. The Viettel Data Mining Platform provides real-time information gathered across disparate public and private sources, integrating specialized knowledge from sectors such as marketing, asset management, finance, and risk management to help optimize operations in enterprises from those specific fields.

The Viettel Data Mining Platform is furthermore intended to be used alongside the Viettel AI Open Platform, which was developed to help government agencies and private organizations rapidly improve production and working methodologies. Utilizing sector-specific data and machine learning algorithms provided by the AI Open Platform, businesses can expect personalized recommendations to eliminate operational and organizational bottlenecks, develop specific customer taste profiles, and improve a range of customized business development tools.[32] The cost and time efficiencies found through these tools, as well as the promotion of a labor pool with greater familiarity with data mechanisms translate into significant economic benefits to businesses and communities alike.

OGD FOR SOCIAL DEVELOPMENT

Societal benefits of OGD are just as wide-ranging as economic benefits. A joint report by the International Data Corporation (IDC) and Lisbon Council finds that open data offers "(…) radical new insight on aspects of life that were never measured before and could drive an unprecedented understanding of human behavior as well as natural phenomena."[33]

Indeed, if properly harnessed and operationalized, OGD can help: map the spread of diseases and attenuate the impact of pandemics; mitigate climate change and environmental crises; address longstanding social issues such as poverty and hunger; predict and prevent mental health issues; track and rationalize energy consumption; forecast energy and transport demand; enable the growth of smart cities; and many more.

For example, Malaysia's **Zer0hunger** works with partners to create visual heatmaps of hunger spots to better coordinate efforts and enhance the effectiveness of relief operations. Mapping out where the most vulnerable groups are located allows Zer0hunger to plan strategies to best coordinate on-demand help, as well as perform more transparent and verified beneficiary profiling to both avoid duplication and wastage of resources.[34] Through its online and mobile platforms, Zer0hunger also plays a centralized coordinating role: it allows interested participants to find out if food, clothes, and other types of donations are required across different groups or locations, while providing confirmation that aid has

[31] Nhan Dan Online (2020) First 'Made-in-Vietnam' data mining platform debuted, https://en.nhandan.vn/scitech/item/9411702-first-%E2%80%98made-in-vietnam%E2%80%99-data-mining-platform-debuted.html
[32] VietnamNet (2020) Nền tảng "Make in Vietnam" hỗ trợ doanh nghiệp ra quyết định thông minh, https://vietnamnet.vn/vn/thong-tin-truyen-thong/nen-tang-make-in-vietnam-ho-tro-doanh-nghiep-ra-quyet-dinh-thong-minh-698468.html
[33] IDC & The Lisbon Council (2016) Opening up private data for public interest, https://datalandscape.eu/sites/default/files/report/Opening_Up_Private_Data_for_Public_Interest_EDM2.pdf
[34] Zer0hunger (n.d.) About www.zer0hunger.org/about

effectively been delivered as intended.[35] The creation of this feedback loop improves the quality of service provision, with clear social benefits.

Regarding environmental issues and challenges, several innovative initiatives can be found in APEC economies.

In Chile, the **National Forest Monitoring System** provides consistent and accurate data on the initiatives launched by the National Strategy for Climate Change and Vegetation Resources (Estrategia Nacional de Cambio Climático y Recursos Vegetacionales or ENCCRV) to reduce emissions related to deforestation and forest degradation.[36] The project involves a strong, integrated participatory process, which ties together branches of government, academia, and civil society, encouraging data sharing and collaboration within and between stakeholders. This interoperability helps all involved move towards best practices in methodologies and practices, as well as build a global picture of counter-deforestation initiatives. [37]

These data-driven monitoring activities also allow Chile to fulfill multiple international agreements, including the Paris Agreement on forestry and land use, the United Nations Convention to Combat Desertification and its mechanism for Land Degradation Neutrality, as well as several domestic Sustainable Development Goals (SDGs). As a result, there are social and environmental benefits to this data-sharing program.

In Chinese Taipei, where exposure to high levels of PM2.5 (fine particulate matter) brings high levels of air pollution every year, efforts to monitor air quality to inform research on air pollution have been stymied by the poor availability of granular data.[38] This gap in data collection attracted the attention of Chen Ling-jyh of Chinese Taipei's Academia Sinica and Hsu Wuulong, the founder of an online community focusing on location-aware sensing systems.[39]

The two decided to collaborate on the development of an open-source air quality sensor and gathered a community of makers to develop "AirBoxes" designed to collect air quality data from as many parts of Chinese Taipei as possible. The **AirBox** project is not intended to replace existing air quality monitoring methodologies and metrics but complement them and provide more granular data for use in big data analyses on public health.[40] The project is further intended to stimulate interdisciplinary innovation in public health, risk management, urban planning, atmospheric science, and other studies. Besides this contribution to the knowledge economy, it offers social benefits as air quality data is more comprehensive.

In Peru, the **Open Data and Knowledge Management Platforms for COVID-19** was launched to support scientific, clinical, and epidemiological research on COVID-19. Peru is one of several economies that leveraged OGD to communicate the socioeconomic impact of the COVID-19 situation to its citizens. Relatively early-on into the pandemic, the ministry of health (MINSA) started publishing open

[35] NST (2021) Hunger no more: How data sharing can help tackle Malaysia's hunger issue, www.nst.com.my/lifestyle/sunday-vibes/2021/07/709478/hunger-no-more-how-data-sharing-can-help-tackle-malaysias

[36] Data 4 Better Climate Action (2021) The National Forest Monitoring System as part of the National Strategy on Climate Change and Vegetation Resources in Chile, https://data4betterclimateaction.com/2021/11/02/the-national-forest-monitoring-system-as-part-of-the-national-strategy-on-climate-change-and-vegetation-resources-in-chile

[37] Food and Agriculture Organization of the United Nations (2021) The National Forest Monitoring System as part of the National Strategy on Climate Change and Vegetation Resources in Chile, www.fao.org/3/cb4253en/cb4253en.pdf

[38] More details available here..

[39] More details available here .

[40] Smart City Summit and Expo (2020) "AIR BOX"—PM2.5 Air Pollution Monitoring Device For Smart City, https://en.smartcity.org.tw/index.php/en-us/component/k2/item/59-air-box-pm2-5-air-pollution-monitoring-device-for-smart-city

datasets related to COVID-19 cases and deaths. Data was regularly updated and information on vaccination rates and vaccine manufacturer catalogue were subsequently added to the platform.[41]

The COVID-19 open data and knowledge management platforms provided transparency on government policies and actions taken during a public health crisis and served as an important repository of information on the economy's COVID-19 situation. Beyond the COVID-19 crisis, this OGD experience is useful to Peru in two distinct but related manners. First, it shows the utility of government data in addressing unexpected, large-scale crises, making institutions better prepared and equipped to collaborate quickly and efficiently when needed. Second, it pushed public organizations to build the foundations of an OGD-driven platform that can be copied, re-used, or re-purposed to address any other socio-economic challenge (poverty, crime, climate change, natural disasters, etc.).

In the Russian Federation, the **open electronic health record (openEHR)** system has allowed healthcare providers to digitize most of their paper-based document management processes, reduce time spent filling up unnecessary paperwork and patient wait time, and gain better access to decisive information when needed. The platform has also provided healthcare providers with a tool to better manage health data, notably by separating clinical data from process logs. It also allowed primary care clinics and hospitals to build applications on top of the centralized platform, which provided greater flexibility on the use of data stored.[42]

Launched in 2016, the openEHR system is a cloud-based, vendor-neutral, and centralized EHR system that stores and manages the health data of Russian citizens. Prior to 2011, Moscow's healthcare services operated in isolation and much of the administrative processes were being done manually and in paper form. When the COVID-19 pandemic struck, Moscow was able to leverage this central repository of digitalized patient care record to establish a comprehensive digital health platform within a relatively short time. The city was also able to quickly establish a single online registry of infected persons, available in real time that included personal records, referral, and treatment of the patient; a digital platform that automatically generated a time schedule for patients that required home visits; a specialized telemedicine center to support citizens; and a new system for epidemiological research, because of the existing centralized EHR system.[43]

OGD FOR EVIDENCE-BASED POLICYMAKING

OGD can encourage practices of co-responsibility by improving transparency, introducing greater accountability, and instituting more participative decision-making. Through OGD, citizens can better engage their governments and drive the improvement of public services by contributing to public planning or providing direct feedback to government agencies.[44] OGD also has much to offer for governments to improve their own internal processes, setting the stage for better governance mechanisms as well as increased capacity in terms of crisis readiness and preparedness, political transition/continuity, and smart city implementation.

Regarding OGD for better urban living and planning, several initiatives have been launched across the APEC region.

[41] Datos Abiertos Minsa y Gestión del Conocimiento en COVID-19 (n/a) Home, www.minsa.gob.pe/datosabiertos/?tipo=1&op=21
[42] Better Care (n/a) Moscow City SIMI project, www.better.care/client-stories/moscow-city-simi-project
[43] Better Care (2021) An Open Data Platform Enables Moscow to Respond Rapidly to the COVID-19 crisis, https://blog.better.care/an-open-data-platform-enables-moscow-to-respond-rapidly-to-the-COVID-19-crisis
[44] Open Data Handbook (2020) Why Open Data? https://opendatahandbook.org/guide/en/why-open-data

In Japan, the **Open Data Challenge for Public Transportation** brought policymakers and developers together to crowdsource ideas to make the city's public transportation systems (railway, bus, airline, and ferry) more accessible to visitors—including tourists, the disabled, and the elderly. Tokyo is one of the most visited cities in the world but its urban transport infrastructure is not always user-friendly. The Association for Open Data of Public Transportation has been promoting the openness of data related to public transportation since 2017, with the aim of making public transportation in Tokyo, purportedly one of the most complex systems in the world, easier to navigate for the public. By making government data available to third parties in anticipation of the Tokyo Summer Olympic Games, the competition aimed to develop a multi-lingual mobile application that would provide a wide range of services to domestic users and foreign visitors alike.

Types of data shared included static and dynamic data for railways (e.g., train/station timetable, and train location information), static and dynamic data for buses (e.g., station data and bus location information and congestion information), static and dynamic data for airlines (e.g., flight table and real-time arrival/departure information), data from ferry operators, data related to intra-station maps, and other data such as mobile population, mobile space statistics, and bike-sharing data. Applications for the competition included, but were not limited to, smartphone applications, web services, and IoT gadgets. One of the grand winners of the 4th and latest Open Data for Public Transportation challenge was Tratal, a web portal that provides information on transportation service tailored to each individual user. The web application allows individuals to check timetables, visualize fare differences based on routes, search for the nearest train station, bus stop, ferry port, or bicycle sharing dock, among other features. The portal garnered high praises from competition judges on its full use of open data on public transportation. Other prize winners were acknowledged for being user-friendly, and for using data to improve the quality of life of both residents and visitors to Tokyo.[45]

In Hong Kong, China, researchers from the Hong Kong University established the **Intermodal Transport Data Sharing Programme** as a proof of concept (POC) to operationalize intermodal data sharing between both government and private transport operators. The POC laid important foundation to enable trust in sharing data between all the stakeholders through trusted third parties, establishing the data sharing model through a clear data trust framework.[46] Within two years, the POC yielded impactful results, especially on the rail-to-bus interchange dynamic. Increased trust in data sharing is largely beneficial in the long term, as it helps the general public understand that such information can help policymakers make timely, relevant decisions that affect their day-to-day.

In the Russian Federation, the non-profit International Association of Public Transport has collaborated with the city of Moscow's municipal transport operator Moscow Transport to develop **CityTransitData**, a data sharing platform that collects and displays data on sustainable mobility from cities around the world. Launched in July 2021, the online database allows users to view and compare information about transport infrastructure gathered from six megacities in Europe and North America.[47] The database currently assesses 30 indicators covering areas such as the modal share of sustainable transit options, accessibility to people with reduced mobility, and the presence of a unified Movement as a Service (MaaS) public transportation system. Notable factors assessed include COVID-19 passenger capacity comparisons, which indicate the degree to which the use of transport facilities has evolved since the onset of the pandemic. Comparisons can also be made for factors across various assessed cities,

[45] Tokyo Challenge (2021) Award, https://tokyochallenge.odpt.org/2021/award/index-e.htmll
[46] Zhou et al. (2021) Intermodal Transport Data Sharing Programme, https://www.accesspartnership.com/cms/wp-content/uploads/2021/11/Intermodal-Transport-Data-Sharing-Programme-Final-Report-Oct-27.pdf
[47] UITP (2021) CityTransitData Platform, https://citytransit.uitp.org

allowing users to assess the impact and efficacy of different policy decisions—directly contributing to governance-related improvements.[48]

In the Republic of Korea, the government sought to better understand the usage patterns of public transport at night. The Seoul Metropolitan Government partnered with major telecommunications operator KT to access and analyze anonymized mobile communication data of over three billion mobile call logs and data from over five million taxi rides to map the distribution of late-night commuters.[49] The night bus route was designed based on the travel pattern obtained and the **Owl Bus** service was born.

Following the success of a few initial pilots, the Owl Bus services and routes were expanded while commuters also responded with very high satisfaction rates. Since 2016, the Owl Bus services are used by an average of 7,900 daily passengers, helping to reduce approximately 2.3 million individual car trips yearly and reducing an estimated 500 tons of greenhouse gas emissions. Additionally, the Owl Bus services have led to an 11 percent increase in women's activities at night by making it safer and more affordable for them to travel at night. In addition to contributing to the planning and implementation of essential public services, such initiatives demonstrate the potential value of OGD to the quality of life of vulnerable and/or marginalized populations.[50]

In terms of transparency, OGD supports public oversight of governments and helps reduce corruption. For instance, OGD makes it easier to monitor government activities (tracking public budget expenditures and their impact), encouraging and facilitating greater citizen participation in government affairs.

In Mexico, the National Anti-Corruption System Secretariat (SESNA) launched the **National Digital Platform on Public Procurement**, a centralized dashboard to track and visualize the way a public entity is fulfilling its open data requirements. Indeed, the General Law of the National Anti-Corruption System puts in place obligations on procurement transparency for the whole economy. Specifically, the law requires that each state provide local procurement data on the National Digital Platform (PDN) to ensure public funds and budgets are properly collected and used. However, obtaining quality data from each of Mexico's 32 federal states, institutions, and autonomous bodies has proven challenging.

In 2019, SESNA started working with the UK Government Digital Services Global Digital Marketplace Program to run pilot projects in three states (Chihuahua, Jalisco, and Oaxaca) with a focus on helping the states to develop capabilities to report information concerning public officials involved in public procurement contracts, and sanctioned public officials and individuals, to the PDN. The launch of the dashboard was accompanied by a library providing open source, easy-to-replicate tools to enable sub-domestic governments to overcome technical challenges when providing data on the domestic platform. SESNA's hands-on approach through pilot projects with states and launch of open-source library, with tools, manuals, and guides, has helped generate and standardize data at a local level, and allowed for quality data at the state level to be captured and shared on a domestic platform.

OGD can also empower citizens with the ability to alert governments to gaps in public datasets and to provide more accurate information. These governance-related benefits can initiate a virtuous cycle of data sharing, with further economic and social advantages.

[48] Moscow Transport (2021) Moscow launches CityTransitData project, https://transport.mos.ru/en/news/107126
[49] Susa (n.d.) Big Data in Transportation Policy, www.susa.or.kr/en/Big-Data-in-Transportation-Policy
[50] Seoul Solution (2017) Night Bus: Route Design Using Big Data, https://seoulsolution.kr/en/content/night-bus-called-owl-bus-route-design-using-big-data

In Australia, the **Multi-Agency Data Integration Project (MADIP)** was launched to improve the government's understanding of the multiple risks associated with heatwaves. The Australian Bureau of Statistics (ABS), the Bureau of Meteorology, the Department of Health, Geoscience Australia, and the Department of Agriculture, Water, and Environment worked together to a build custom MADIP database containing demographic characteristics and death information, as well as indicators of chronic disease. The project was able to establish links with weather observations and environmental characteristics, such as dwelling type and distance from health services, to estimate the likelihood and impact of a person getting sick or dying during heatwaves.[51]

For example, the project found that approximately two percent of deaths are attributable to heatwaves each year; that contemporary housing, as measured by factors such as building and construction type, has a stronger association with heat related deaths than housing from other periods; and that large rural towns have the highest elevated risk for heatwave deaths. These findings and other insights helped provide evidence to support the development of targeted government services to help vulnerable Australians survive future heatwaves, including local interventions such as forecast warning systems.[52] MADIP data assets are accessible to the Commonwealth government, state government, academic institutions, and private institutions.

Key Takeaway

The OGD initiatives examined here represent some of the most exciting and dynamic areas of opportunity for governments and businesses throughout the region to both drive and benefit from data-driven economic growth and social opportunity. Many APEC economies are developing OGD programs and schemes, encouraging government agencies to publish datasets for public use. Now there is an urgency to rapidly further the use and reuse of data through enhanced OGD initiatives, particularly as cross-border digital trade/e-commerce among APEC member economies facilitates and accelerates data sharing mechanisms. This will involve governments sharing information and experiences on practices and policies that can facilitate best practices in open government data initiatives.

In light of the diverse range of OGD projects and initiatives in APEC member economies, Operationalization explores some essential measures APEC decision-makers can undertake as they work towards making OGD development and use a key priority for their post-pandemic economic agendas.

[51] Physical Environment Analysis Network (2021) Reducing Illness and Lives Lost from Heatwaves Final Report https://www.pean.gov.au/sites/default/files/2021-10/BOM%20%282021%29%20Heatwaves%20report.pdf;
[52] Australian Bureau of Statistics (n/a) MADIP Case Studies, www.abs.gov.au/websitedbs/d3310114.nsf/home/statistical+data+integration+-+madip+case+studies

OPERATIONALIZATION: OGD POLICIES FOR WIDESPREAD ADOPTION

This section builds on the overview and case studies from *Landscape: OGD Initiatives and their Impact* and sheds light on the common features that stand out from different OGD approaches, opportunities, and challenges that can be identified when designing and implementing enabling policy tools. The variety of approaches taken by domestic frameworks and multilateral agreements provides governments with a variety of options for engaging and expanding OGD policies depending on the needs of the economy. But they also highlight the risk of OGD architecture frameworks and policies being developed and applied in different manners across jurisdictions, or with undue restraints—thereby emphasizing the need for APEC member economies to explore ways in which their respective policy frameworks and strategies can better align.

EMERGING OGD FRAMEWORKS, STRATEGIES, AND PROGRAMS

Across the APEC region, a multitude of frameworks, strategies, agencies, programs, and initiatives actively target and promote OGD models. From digital transformation plans to private-sector collaboration schemes, APEC economies increasingly see OGD as valuable to economic growth, dynamism, and competitivity.

MULTILATERAL DATA SHARING FRAMEWORKS

A number of OGD frameworks launched by regional, international, and multilateral organizations run parallel to each other and are complementary in the way they seek to facilitate governments to enable OGD. **Association of Southeast Asian Nations (ASEAN) Data Management Framework**: The ASEAN Data Management Framework (DMF) and Model Contractual Clauses for Cross Border Data Flows (MCCs) was developed by the Working Group on Digital Data Governance chaired by Singapore.[53] It contains key resources and tools for ASEAN businesses to utilize in their data-related business operations. The DMF provides a step-by-step guide for businesses, SMEs, to put in place a data management system, which includes data governance structures and safeguards.

OECD: The OECD first published its **Enhancing Access to and Sharing of Data** report in 2019 to examine the opportunities and challenges arising from data sharing in light of the emergence of AI, IoT, and other next generation technologies.[54] Following on from the report, a key deliverable of the phase three of the OECD's Going Digital project is its recommendations on **Enhancing Access to and Sharing of Data (EASD)**.

The EASD was adopted in October 2021 as the first internationally agreed upon set of principles and policy guidance for governments on how to maximize the cross-sectoral benefits of all types of data including personal, non-personal, open, proprietary, public and private while continuing to protect the rights of individuals and organizations.[55] The recommendations focuses on three main areas of: (i) Reinforcing Trust across the Data Ecosystem; (ii) Stimulating Investment in Data and Incentivizing Data Access and Sharing; and (iii) Fostering Effective and Responsible Data Access, Sharing, and Use across Society.

[53] PDPC (2021) ASEAN Data Management Framework and Model Contractual Clauses on Cross-border Data Flows, www.pdpc.gov.sg/help-and-resources/2021/01/asean-data-management-framework-and-model-contractual-clauses-on-cross-border-data-flows
[54] OECD (2019) Enhancing Access to and Sharing of Data, www.oecd.org/sti/enhancing-access-to-and-sharing-of-data-276aaca8-en.htm
[55] OECD (2021) Data governance: Enhancing access to and sharing of data, www.oecd.org/sti/ieconomy/enhanced-data-access.htm

DOMESTIC OGD FRAMEWORKS

Across APEC, economies increasingly see OGD as integral to successful next-generation digital government development, fostering economic and social development, competitiveness, and innovation. Some economies have policies and regulations specifically for OGD (open government, data sharing, data transfers), while others bundle OGD within broader data-enabling frameworks (e-government, digital transformation, digital commerce, and trade). Others still have a well-rounded, holistic approach to OGD and thus fall under both categories.

Table 4: Domestic OGD Frameworks

Measures Specific to OGD	
Brunei Darussalam	The **E-Government National Centre** maintains an open data platform data.gov.bn which publishes open government data from government agencies to encourage other agencies and the public to access and reuse the data.[56]
Malaysia	The two main policies for open government data are the **Public Sector Data Sharing Policy (DPDSA)** and the **National Data Sharing Policy (NDSP)**. The DPDSA guides public sector agencies on how to share data between other public sector agencies (G2G), with the business community (G2B), and with the people (G2C). This policy also provides guidance on implementing authentic, secure, and effective data sharing initiatives in accordance with a set of prescribed data sharing principles.[57] The NDSP is currently in the process of obtaining approval but is envisioned to set out Malaysia's long-term strategy designed to create a holistic, conducive, and inclusive data ecosystem to support Malaysia's socio-economic development agenda.[58]
Mexico	Mexico's most recent open government framework with implications for data sharing is the **Mexico Action Plan 2019-2022**.[59] The plan makes information regarding expenditure on social programs, including privately-run funds that use public resources, available to all. There are also commitments to opening data at sub-domestic levels of government.
Japan	In 2012, Japan's Information Technology (IT) Strategic Headquarters adopted its **Open Government Data Strategy** to promote the use of public data.[60] The government has also passed the **Basic Law for Promotion of Utilization of Public-Private Data** in 2016, requiring central and local governments to promote open data.
Papua New Guinea	Papua New Guinea's **Data Portal** png-data.sprep.org was launched in 2019 and focuses on environmental datasets that may be used for monitoring, evaluating, and analyzing environmental conditions and trends to support decision-making on environmental planning and forecasting.[61] While the focus is currently on environmental data, the portal is built to allow for more multi-sector and multi-ministry access and collaboration.
Peru	A series of Open Government initiatives have been launched and implemented in line with the **National Open Government Strategy 2017-2021**, which aims 'to promote innovation by creating public value with the reuse of open data, to contribute to economic and social

[56] Data.gov.bn (n.d.) E-Government National Centre, www.data.gov.bn/Pages/About.aspx
[57] MAMPU (n.d.) Public Sector Data Sharing Policy (DPDSA), www.malaysia.gov.my/portal/content/31181
[58] MAMPU (n.d.) National Data Sharing Policy (NDSP), www.malaysia.gov.my/portal/content/31182
[59] Open Government Partnership (2021) Mexico Action Plan 2019-2022, www.opengovpartnership.org/documents/mexico-action-plan-2019-2022
[60] IT Strategic Headquarters (2012) Open Government Data Strategy, https://japan.kantei.go.jp/policy/it/20120704/text.pdf
[61] SREP (2019) PNG Launches Data Portal And Data Sharing Policy For The Environment, www.sprep.org/news/png-launches-data-portal-and-data-sharing-policy-for-the-environment

	development, and to strengthen citizen participation, innovation, collaboration and improvement of public services.'[62]
The Russian Federation	Pursuant to **Decree No.601 on the Main Directions in Improving the Public Administration System**, signed into law on 7 May 2012, government ministries and agencies are required to provide access to open data contained in government information systems.[63] The Russian Federation's **Open Government Data Portal**, data.gov.ru, was launched in 2014.[64] The Portal currently contains over 27,000 datasets. In addition, the Gostech platform was launched in 2020 to facilitate and speed up the data-sharing process among government agencies and businesses, to allow for easier document processing.
Republic of Korea	**The Act on Promotion of the Provision and Use of Public Data** prescribes the government's open data policy to promote the provision of and use of public institution data to guarantee the rights of citizens to access and use the data, with the aim to improve the quality of life and develop the domestic economy.[65] The Act is also accompanied by an **Enforcement Decree** and **Enforcement Rules** which prescribe implementation of the Act.
Chinese Taipei	The **Open Government Action Plan 2021-2024** references international open data and data reuse policies to focus on prioritizing open data with high value, strengthen data standards and format quality, and establish processes to deal with public data needs.[66]
The United States of America	According to Title II of the **Foundations for Evidence-Based Policymaking Act 2018** (also known as the **OPEN Government Data Act**), government agencies are statutorily required to publish information online as open data, using standardized, machine-readable data formats on the United States government's data.gov platform.[67] The OPEN Government Data Act furthermore requires that metadata is also included in the data.gov catalogue.[68] Most recently, in January 2021, President Joe Biden issued a **Memorandum on Restoring Trust in Government Through Scientific Integrity and Evidence-Based Policymaking**, which re-emphasizes positions taken in the OPEN Government Data Act and expands them.[69]
Viet Nam	Viet Nam launched its open government data portal in 2020 at data.gov.vn following the passing of **Resolution No. 17** (on key tasks, solutions to e-Government development), which specifically prioritizes six databases to be linked through a common data exchange platform.[70] In 2020, the government also issued **Decree No. 47/2020/ND-CP** on management, connection and sharing of digital data of state agencies which prescribes the activities related to the management, connection, and sharing of digital data of state agencies, including providing open data by state agencies to organizations and individuals.[71]

[62] Secretaría de Gestión Pública (2012) Estrategia Nacional de Datos Abiertos Gubernamentales del Perú 2017-2021, www.peru.gob.pe/estrategia.pdf
[63] Data.gov.ru (2014) Decree 601, https://data.gov.ru/sites/default/files/documents/ukaz601_eng.pdf
[64] Data.gov.ru (2021) Home, https://data.gov.ru
[65] Ministry of Government Legislation (n.d.) Korea Law Information Center, https://www.law.go.kr/LSW/eng/engLsSc.do?menuId=1&query=%EA%B3%B5%EA%B3%B5%EB%8D%B0%EC%9D%B4%ED%84%B0%EB%B2%95&y=0&x=0#liBgcolor0
[66] Further details available here
[67] Congress.Gov (2018) H.R.4174 Foundations for Evidence-Based Policymaking Act of 2018, www.congress.gov/bill/115th-congress/house-bill/4174/text#toc-H8E449FBAEFA34E45A6F1F20EFB13ED95
[68] Data.gov (2021) Data Catalog, https://catalog.data.gov/dataset
[69] The White House (2021) Memorandum on Restoring Trust in Government Through Scientific Integrity and Evidence-Based Policymaking, www.whitehouse.gov/briefing-room/presidential-actions/2021/01/27/memorandum-on-restoring-trust-in-government-through-scientific-integrity-and-evidence-based-policymaking
[70] Online Newspaper of the Vietnamese Government (2019) Resolution No. 17 on key tasks, solutions to e-Government development, http://news.chinhphu.vn/Home/Resolution-No-17-on-key-tasks-solutions-to-eGovernment-development/20196/36846.vgp
[71] Vietnam Times (2020) New policy in Vietnam on digital data management, connection and sharing, https://vietnamtimes.org.vn/new-policy-in-vietnam-on-digital-data-management-connection-and-sharing-19547.html

Broad Data-Related Frameworks	
Canada	The **2018-2020 National Action Plan on Open Government** has a number of OGD recommendations currently being enacted.[72] The more recent **Digital Charter in Action** outlines government plans and citizens' perspectives on data governance, as well as the digital landscape across Canada.
Chile	The **Chile Action Plan 2020-2022** includes plans to introduce open government principles that would foster data sharing. Following on from engagements such as the **Open Government Roundtable** in September 2020, the government has made commitments that have not yet been formalized into a specific strategy.[73]
People's Republic of China	Municipal governments in Beijing, Shanghai, and other localities have launched their own open data portals with hundreds of datasets covering a variety of topics. The General Office of the State Council of China in 2018 released the "**Measures for Managing Scientific Data**" which requires all researchers to share data they generate on domestic repositories.[74] The Chinese National Committee for CODATA has also been working with the Ministry of Science and Technology to develop a domestic basic scientific data sharing network.[75]
Hong Kong, China	In 2018, the Office of the Government Chief Information Officer issued guidelines to all government bureaus and departments on its open data policy and implementation measures requiring a progressive opening and publishing of their data for free use by the public on the data.gov.hk portal.[76] Apart from government data, public/private organizations also share various types of Public Sector Information (PSI) on the portal.
Indonesia	The **One Indonesia Data Program** is being developed to encourage the implementation of data accessibility between government agencies and encourage transparency and accountability within the government itself to create more targeted policies and improving public services.[77] The program requires collaboration of various agencies to realize an Electronic-Based Government System for clean, effective, efficient, transparent governance and accountable.
Thailand	Management of data published as open data is outlined under the **Open Data Framework**.[78] Pursuant to the **Thailand Digital Government Development Plan (2020-2022)**, greater provision of data for public, business, and inter-agency use is a priority for the Digital Government Development Agency.[79] Meanwhile, the **Digitalization of Public Administration and Services Delivery Act B.E. 2562 (2019)**, or the Digital Government Act, requires government agencies to ensure that public services are to be provided through digital means, obliges them to accept

[72] Open Government Partnership (2018) Canada's 2018-2020 National Action Plan on Open Government, www.opengovpartnership.org/documents/canada-action-plan-2018-2020

[73] Open Government Partnership (2021) Chile Action Plan 2020-2022, www.opengovpartnership.org/documents/chile-action-plan-2020-2022

[74] China Government (2018) 国务院办公厅关于印发科学数据管理办法的通知, www.gov.cn/zhengce/content/2018-04/02/content_5279272.htm

[75] CODATA (n.d.) Data Sharing program in China, https://codata.org/data-sharing-program-in-china

[76] Hong Kong (2018) LCQ8: Opening up data of Government, public organizations and public utilities, www.info.gov.hk/gia/general/201811/07/P2018110700469.htm

[77] VOI (2021) Waktunya Merevolusi Pemberitaan https://voi.id/en/news/65210/suharso-monoarfa-about-one-data-indonesia-needs-collaboration-and-synergy-of-various-agencies

[78] Data.go.th (2020) Open Data Standard, https://data.go.th/pages/opendata-standard

[79] Royal Thai Government Gazette (2020) Digital Government Development Plan 2020-2022, https://www.dga.or.th/wp-content/uploads/2021/09/%E0%B8%AA%E0%B8%A3%E0%B8%B8%E0%B8%9B%E0%B8%AA%E0%B8%B2%E0%B8%A3%E0%B8%B0%E0%B8%AA%E0%B8%B3%E0%B8%84%E0%B8%B1%E0%B8%8D%E0%B9%81%E0%B8%9C%E0%B8%99%E0%B8%9E%E0%B8%B1%E0%B8%92%E0%B8%99%E0%B8%B2%E0%B8%A3%E0%B8%B1%E0%B8%90%E0%B8%9A%E0%B8%B2%E0%B8%A5%E0%B8%94%E0%B8%B4%E0%B8%88%E0%B8%B4%E0%B8%97%E0%B8%B1%E0%B8%A5-%E0%B8%9E.%E0%B8%A8.-2563-2565-%E0%B8%A0%E0%B8%B2%E0%B8%A9%E0%B8%B2%E0%B8%AD%E0%B8%B1%E0%B8%87%E0%B8%81%E0%B8%A4%E0%B8%A9.pdf

	documents submitted digitally, and lays the groundwork for an agency to oversee government-wide open data frameworks.[80]
Both Categories	
Australia	Australia's commitment to Open Data is formalized within the Australian Government **Public Data Policy Statement**, though open data practices have been informally adopted by government agencies since 2012.[81] **Australia's Vision 2025** involves leveraging OGD mechanisms to improve the relevance and timeliness of services (the "Tell Us Once" service, for example, allows users' details to be shared among relevant government agencies).[82] The **Data Availability and Transparency Bill 2022 was passed by both Houses of Parliament in March 2022**.[83]
New Zealand	The **New Zealand Open Data Action Plan** took effect in July 2017, following public consultation, and sets out goals and initiatives.[84] The aim of the plan is to develop an enabling open data environment to maximize the value of open government data.
The Philippines	In December 2020, the National Privacy Commission issued **Circular No. 2020-03 on Data Sharing Agreements**, pursuant to Section 21(a) of the **Data Privacy Act of 2012 (Republic Act No. 10173)** and Section 20 the **Implementing Rules and Regulations of Republic Act No. 10173**.[85] The circular provides guidance on data sharing agreements between data controllers. To facilitate data sharing among government agencies, the Anti-Red Tape Authority (ARTA) is leading an initiative to speed up the data-sharing process among government agencies, to allow for faster document processing.[86]
Singapore	The **Data Collaboratives Program** seeks to support businesses to explore how to implement and manage mechanisms that allow for safe and economically sustainable data sharing.[87] To help businesses innovate and get involved in data sharing, the government has developed a **Trusted Data Sharing Framework**. The program also includes a **Data Regulatory Sandbox** which allows businesses and their data partners to explore and pilot innovative use of data in a safe manner and consult government at the same time.

DIGITAL ECONOMY AGREEMENTS

As economies continue to explore the importance of cross-border collaboration on the digital economy, emerging OGD practices can be seen in digital economy and digital trade agreements:

Digital Economy Partnership Agreement: Introduces specific articles recognizing the need to facilitate public access to and use of government information.[88] Signed by Chile, New Zealand, and Singapore, the DEPA asserts the commitment of signatories to ensuring that government data is made

[80] Digital Government Development Agency (2019) Digitalization of Public Administration and Services Delivery Act, www.dga.or.th/wp-content/uploads/2021/02/6.pdf
[81] Prime Minister and Cabinet of Australia (2015) Australian Government Public Data Policy Statement, www.pmc.gov.au/sites/default/files/publications/aust_govt_public_data_policy_statement_1.pdf
[82] Digital Transformation Agency (2018) A roadmap for the future: Tell Us Once and Notifications, www.dta.gov.au/news/roadmap-future-tell-us-once-and-notifications
[83] Parliament of Australia (2021) Data Availability and Transparency Bill 2020, www.aph.gov.au/Parliamentary_Business/Bills_LEGislation/Bills_Search_Results/Result?bId=r6649
[84] Data.govt.nz (2020) New Zealand open data action plan https://data.govt.nz/toolkit/open-data/open-data-nz/open-data-action-plan
[85] National Privacy Commission (2020) Data Sharing Agreements www.privacy.gov.ph/wp-content/uploads/2021/01/Circular-Data-Sharing-Agreement-amending-16-02-21-Dec-2020-clean-copy-FINAL-LYA-and-JDN-signed-minor-edit.pdf
[86] Inquirer.net (2021) ARTA, other gov't agencies working on improving data-matching practices, https://newsinfo.inquirer.net/1461860/arta-other-govt-agencies-working-on-improving-data-matching-practices
[87] IMDA (2020) Data Collaboratives Programme, www.imda.gov.sg/programme-listing/data-collaborative-programme
[88] Ministry of Trade and Industry, Singapore (2021) Digital Economy Partnership Agreement, www.mti.gov.sg/Improving-Trade/Digital-Economy-Agreements/The-Digital-Economy-Partnership-Agreement

available to the public as open data, and signals a further commitment to collaboration within and across economies to identify sectors where open datasets with 'global value' can be used to facilitate technology transfer, talent formation and innovation.

United States-Mexico-Canada Agreement: Includes an article devoted to recognizing that facilitating public access to and use of government information fosters economic and social development, competitiveness, and innovation.[89] It highlights that parties choosing to make government data available to the public must endeavor to do so in a machine-readable and open format that can be searched, retrieved, used, reused, and redistributed. It also encourages signatories to cooperate to identify ways to expand access to and use of government data to enhance and generate business opportunities, especially for SMEs.

SUPPORTIVE DATA-ENABLING MEASURES AND MECHANISMS

Data is and will continue to be the lifeblood of the digital economy, yet challenges remain regarding the acceptance of OGD, due to entrenched attitudes towards the proprietary nature of data, and perceptions of the data economy as a zero-sum game. An uneven shift towards OGD creates the possibility that divergent standards of data formatting or storage may be adopted across different jurisdictions, which would hamper interoperability in the long run. There may also be varying levels of accessibility of data, or limits on reuse or regrouping of data for commercial purposes, and such measures may also hinder the growth stimulated by OGD initiatives.

Access to OGD therefore has implications across economic sectors, as limitations in access to government data can have negative effects on the utility, relevance, and inclusivity of data-related products that use insufficiently substantive pools of data. This can, in turn, disadvantage economies or communities whose economic, sociological, or even cultural specificities are not represented within more widely available datasets. There is thus a need for governments to promote and enable OGD initiatives through supportive regulations that create the right environment for successful OGD ecosystems to emerge.

This means strengthening the frameworks that support and encourage OGD (e.g., personal data protection, privacy, and cybersecurity), as well as working with other economies to ensure that the core principles of interoperability and access are upheld across different jurisdictions (specifically, through internationally recognized standards). Together, these data-enabling measures may constitute a first step towards more targeted, coordinated, and sophisticated OGD approaches.

Key Takeaway

As this section has shown, access to OGD and voluntary government data sharing have come to be recognized as increasingly vital drivers of the digital economy, and yet there remain policy and regulatory gaps regarding the formalized operationalization of OGD mechanisms—due mainly to entrenched attitudes towards the proprietary nature of data. This uneven shift towards OGD creates the possibility that divergent standards of data formatting or storage may be adopted across different jurisdictions, which would hamper interoperability—and therefore the dynamism of digital economies—in the long run.

[89] Office of the US Trade Representative (2020) USMCA—Chapter 19 Digital Trade, https://ustr.gov/sites/default/files/files/agreements/FTA/USMCA/Text/19-Digital-Trade.pdf

The following section provides some recommendations that will allow APEC policymakers to gravitate towards more targeted approaches to OGD, with an emphasis on placing such mechanisms at the heart of APEC economies' digital development agendas.

RECOMMENDATIONS

A growing recognition of the importance of OGD in an irrevocably globalized and digitalized world has prompted many governments to adopt more fundamentally open approaches to government data, with the aim to maximize access to promote innovative use cases and economic dynamism while maintaining rigorous standards of trust. As such, the OGD initiatives cited throughout this report will only continue to grow in scale, complexity, and number, given the continuing expansion of the global data economy.

For member economies and APEC to reap the multiple benefits of OGD, the following recommendations serve as a helpful guide towards meaningful and impactful OGD operationalization:

1. **Put OGD at the top of domestic and APEC-level digital agendas**: As APEC economies prepare and rollout their post-pandemic digital agendas, it is important to ensure OGD-enabling measures are adequately promoted and integrated at the domestic and multilateral levels. While governments have done well in publishing open government datasets, they are welcome now to take the next step from passive data sharing towards promoting active data collaboration opportunities and leading by example. This includes publishing government datasets, updating/strengthening foundational domestic regulations, implementing strategies that incentivize public sector organizations to drive voluntary OGD efforts, and conducting stakeholder consultations to ensure datasets are both useful and impactful. Governments also need to be prepared to step in to help fund initiatives which may not have commercial sustainability but produce a social benefit.

   While OGD initiatives can have a significant effect on economic integration within individual economies and across regions, a lack of concerted engagement and exchange at an early stage, especially in standardizing principles and formats of data exchange, would necessitate duplicated labor down the line. This is because accepted data formats or channels of exchange would not be interoperable or even readable across jurisdictions, limiting the degree to which separate jurisdictions are able to access and collaborate on data-related challenges using appropriately diverse and inclusive datasets. A lack of regional approaches to OGD can thus present first movers with a challenge, given the potential need to double-back on progress made if divergent regional approaches are adopted.

2. **Design an Open Data policy for effective stakeholder engagement**: Open Data policies serve two groups of users: governments and other "supply-side" organizations, and citizens and other data consumers. Each group gains distinct benefits and assistance from Open Data policies. For governments, ministries, and supply-side organizations, policies provide guidance, instructions, requirements, and tools for implementing Open Data. Policies often spell out which types of data may not be considered open and why, and how to safeguard sensitive information. They may also establish governance of the Open Data initiative, describe inter-agency working groups, and provide points of contact.

   For user groups comprised of citizens, civil society organizations, businesses, researchers, and data consumers, Open Data policies constitute a good regulatory practice (GRP); they clearly define which data are or will be made public, how and where to acquire data, standards for providing data and metadata (which also foster accountability), and how to engage with the government or producing agency. An additional benefit of Open Data policies is the insight they provide into a government's internal procedures for managing the Open Data initiative, which helps consumers better understand the data ecosystem. Since governments are often important

consumers of their own data, Open Data policies can be helpful to governments from the standpoint of both the consumer and producer.[90]

3. **Implement and sustain supportive policy frameworks**: Governments can further their OGD initiatives by establishing the necessary data protection, privacy, and cybersecurity frameworks to ensure personal and commercial data are adequately protected and enforced. Such frameworks should also be regularly assessed and updated to consider technological changes. Even where there are clear data privacy rules, there are still innovative means to encourage users to opt-in to share data—although their obligations and how data will be used need to be made clear. Simply put, data sharing should not be viewed in opposition or contradiction to robust data privacy recognition. Where data privacy rules place explicit restrictions on the collection and/or amalgamation of unvalidated data (i.e., data that may have already been provided with consent in one context but may need to be re-consented or re-validated under certain requirements), data sharing should still be seen as viable, as consent by design, or privacy by design, can be built into the process, but in such cases the obligations and uses of the data should also be made apparent to the data source.

   A modern data landscape enables privacy by design. Structured and secure data exchanges reduce the number of people in contact with data and the risk of leaks. Citizens can benefit from more transparency and active management of consent. In addition, governments can show what data are saved, and where, and provide a log of digital interactions. That enables users to opt in or out of use cases. Estonia's data tracker, for example, allows citizens to review data queries relating to their personal information, including the reason for access.

4. **Make datasets visible, accessible, and usable**: The accuracy, reliability, and timeliness of data are crucial to ensure the success of any OGD initiative. Likewise, data that is freely and easily available is likelier to be used. This entails providing data in a variety of machine-readable formats so that everyone—from a student with a slow Internet connection to a private-sector consultant—can leverage the data. The untapped potential of OGD can be unleashed if public data is open data by default. This will only happen, however, if it is truly open—i.e., if there are no restrictions (legal, financial, or technological) to its re-use by others. Every restriction will exclude people from re-using the public data and make it harder to find valuable ways of utilizing OGD. Governments also need to better assess the gaps local users face in data sharing including human capacity, non-native language challenges, lack of access to affordable analytics, and work to address these gaps.

   Other issues to consider for public datasets to be impactful include: (i) comprehensive metadata to understand the methodology and purpose of data; (ii)longitudinal data to enable the examination of trends over time; (iii)up to date datasets to ensure related findings are relevant; and (iv) datasets that cover as many sub-localities and sub-populations as possible, so that any derived work is both representative and inclusive.

5. **Promote the use of interoperable standards:** Standards play a key role in fostering cooperation between stakeholders, ensuring that stakeholders are aligned on their obligations regarding data management and help guarantee the interoperability of shared data by stipulating that it is of a quality and consistency which allows it to be used and reused. Standards here refer to the agreed-upon means of sharing data, which can include language, file-types and structure,

[90] World Bank (2020) Open Data Toolkit, http://opendatatoolkit.worldbank.org/en/starting.html

tagging, process, transfer, principles, rules, and definitions which form the basis for mutual understanding.

The two most important forms of standards are technical standards and agreement standards:

- **Technical standards:** these include the technical rules which determine file formats, the structure of shared data and how it is managed and shared, as well as methodologies and definitions which ensure consistency. A lack of standardization can make simple file transfers or comparisons across different sets of data unnecessarily complicated. Recognizing the importance of predetermined standards for data sharing, governments in Asia such as in Indonesia and in Malaysia are already formulating policies around data that use common standards to enhance interoperability between agencies. Similarly, in Viet Nam, the Development Plan for Data Exchange Platform specifies the need for common standards for data exchange and principles for IT applications to be consistent with the economy's e-government architecture framework.

- **Standards on agreements:** as data sharing and data collaboration are relatively new concepts, there are few standards on agreements or templates around data sharing terms and licensing. Furthermore, legal practitioners of data holders are seldom also data practitioners and are often trained to restrict access to data held by their organization rather than actively sharing it. Data ethics is also becoming an increasingly central aspect of data collection and use; it remains important that the principles which define how data is fairly collected, used, and shared are well-defined. And while standards are an important to data collaboration, their coordination and use needs to be agreed upon from the beginning to build a solid and consistent foundation.

Policymakers should endeavor to make it clear to agencies and data users that data standards should be used to enhance interoperability. Collaborations should also be forged with industry on the development, promotion, and use of internationally recognized standards, as well as on how to streamline and de-complexify the legal language used in data collaboration agreements.

6. **Strengthen governance frameworks**: Long-term impact requires proper governance frameworks, competent civil servants, high-level political commitment, and the recognition of the crucial role of the data ecosystem in extracting value from data. The value of open government data policies can be diluted if economies focus on the supply side and fail to promote open data re-use inside and outside the public sector, as value creation demands the prioritization of re-use. Knowing and stimulating demand therefore becomes essential for mobilizing and securing active inclusion of different actors such as citizens, public officials, non–governmental organizations, and businesses. Finally, without the adoption of the right monitoring and measurement efforts to demonstrate impact, open government data initiatives run the risk of fading away.

   APEC could help economies avert this by encouraging or coordinating the development of open data programs and OGD frameworks to take reference from relevant global standards to inform economy-level efforts. Relevant standards may include ISO/IEC 38505 for data governance and ISO27701 for privacy and information management.[91] Alternatively, frameworks such as the Findable, Accessible, Interoperable, and Reusable (FAIR) principles for scientific data

[91] International Organization for Standardization (2017) ISO/IEC 38505-1:2017, https://www.iso.org/standard/56639.html;

management and stewardship or the Open Contracting Partnership's Open Contracting Data Standard can be useful touchstones.[92]

7. **Implement OGD across government organizations to streamline and rationalize processes**: Governments can play a key role as data providers—both in the form of raw data and official statistics. However, many datasets published on open-data portals are taken from information silos. Interoperable and connected registers, with appropriate safeguards, allow for the publication of more comprehensive and insightful datasets. Government employees are often required to obtain data manually, both from other government agencies and citizens. Interoperable and connected data would allow governments to streamline this backend, reducing friction and cutting clearing times. The potential benefits would be substantial in both public-service delivery and periodic activities such as the census. In Germany, fully interoperable and connected government data were estimated to produce a 60 percent reduction in case-processing time for key public services. For the census, technologically mature economies, such as the Netherlands, pull data entirely from existing databases. This approach incurs up to 99 percent less costs than a traditional survey-based method.

8. **Put citizens' needs and experiences at the center of OGD initiatives**: When accessing a public service, citizens and companies often need to provide data and documents that they have already shared. If data collected across government were more accessible, public services could follow a "once only" principle, meaning data only needs to be submitted a single time to reduce manual inputs. Another benefit is the ability to deliver services proactively, with new data automatically triggering a response where required. Estonia has this functionality up and running—for example, the registration of a newborn child automatically leads to the provision of childcare benefits, with data from the tax registry determining how much money should be transferred and to which bank account.

9. **Incentivize public sector organizations to actively collaborate in the OGD space**: In addition to facilitating OGD between and within government organizations, it is important that there is constant communication with other sectors (private sector, non-government, academia, civil society). First, there is the need to foster collaborative ecosystems that put OGD to good use. This entails enabling the active participation of industry and the community by creating the ways and means for members of the public to directly contribute data. It also means using the principles of the 'wisdom of the crowd' to improve the provision of public services through crowdsourcing and building a sense of community involvement. Collaborative efforts in using data are now becoming increasingly crucial in solving global challenges including climate change and the COVID-19 pandemic. Data collaborations have notably underwritten cooperative efforts to find inclusive solutions to these major global issues, such as tracking the damage of excessive greenhouse gases and pollutants, and the joint development of vaccines.

10. **Follow guidelines and best practices around OGD**: Publishing and making data available is just the first step. To take better advantage of data and realize its value the data needs to be meaningfully used. The International Open Data Charter (ODC) is committed to making data open and freely available. Governments should work with such frameworks and ensure their OGD initiatives are in line with the ODC's six core principles:[93]

[92] Go-FAIR (2021) FAIR Principles, https://www.go-fair.org/fair-principles/; Open Contracting Partnership (2021) Open Contracting Data Standard, https://standard.open-contracting.org/latest/en/
[93] ODC (2020) Open Data Charter Principles, https://opendatacharter.net/principles

- Open By Default;
- Timely and Comprehensive;
- Accessible and Usable;
- Comparable and Interoperable;
- For Improved Governance & Citizen Engagement; and
- For Inclusive Development and Innovation.

In 2018, the ODC released its new strategy focused on "publishing with a purpose" in contrast to previous "publish and they will come" mindsets. The rationale behind this new approach is to make sharing data useable and looking for more targeted and purposeful endeavors to make use of the data.[94]

11. **Drive and support research and development (R&D) specifically for OGD**: The OGD-R&D relationship is a two-channel pathway: First, there is what government can do to ensure collaborative ecosystems emerge and drive investment and innovation across sectors and industries. Global expenditure on R&D exceeds USD2 trillion annually.[95] In 2020, the United States led all economies, spending USD609.7 billion, and Asia led all regions with $1.07 trillion in spending on R&D.

    Second, there is the value of effective and mature OGD mechanisms for the growth of the R&D industry. According to the World Economic Forum (WEF), "the knowledge needed for the next great scientific breakthrough may have already been written, but it may go undiscovered by tools that view knowledge as singular items to merely be found instead of parts of a collective intelligence."[96] To avoid this, WEF preconizes adopting a 'circular perspective' of digital assets in R&D, where knowledge is not being underutilized or wasted, but recompiled and re-used to create more knowledge that has been derived from the collective.

12. **Position OGD as a key tool for crisis readiness and response**: The COVID-19 crisis has shed new light on many of the organizational and cultural challenges for establishing a data-driven public sector. It includes the need to coordinate rapidly with different ministries and actors to collect data, which has proven a big challenge in a public health crisis, since public health data are commonly collected and held by regional and local government authorities. COVID-19 has also demonstrated the value of open data for policy inclusion, including the ability to rapidly analyze the impact of the pandemic on vulnerable communities and minorities. While the analysis of data has been at the heart of public sector response, the interpretation of different data is still largely fragmented, which calls for more attention to the communication of open data and need for increasing data skills across society.[97]

[94] ODC (2018) Publishing With Purpose, https://opendatacharter.medium.com/publishing-with-purpose-introducing-our-2018-strategy-ddbf7ab46098
[95] R&D World (2020) Global R&D investments unabated in spending growth, https://www.rdworldonline.com/global-rd-investments-unabated-in-spending-growth
[96] World Economic Forum (WEF) (2021) This is how open data and AI could boost the impact of scientific research, www.weforum.org/agenda/2021/04/ai-open-data-science-research-development
[97] OECD (2020) Open Data & COVID-19: Looking forward towards government readiness & reform, www.oecd.org/gov/digital-government/6th-oecd-expert-group-meeting-on-open-government-data-summary.pdf

APENDIX I: APEC MEMBER ECONOMY CASE STUDIES

This Appendix sets out case studies that were cited and/or used as evidence of OGD-driven or OGD-enabling initiatives across APEC member economies.

AUSTRALIA: MULTI-AGENCY DATA INTEGRATION PROJECT

Opportunities/ Motivation

From 2019 to 2021, the ABS, the Bureau of Meteorology, the Department of Health, Geoscience Australia, and the Department of Agriculture, Water, and Environment worked in partnership to analyze data from the Multi-Agency Data Integration Project (MADIP) to improve the government's understanding of the multiple risks associated with heatwaves.

The project involved the use of custom MADIP database containing demographic characteristics and death information, as well as indicators of chronic disease. The project was able to establish links with weather observations and environmental characteristics, such as dwelling type and distance from health services, to estimate the likelihood and impact of a person getting sick or dying during heatwaves.[98]

Background

The project was funded by the Data Integrated Partnership for Australia (DIPA), a three-year multi-million AUD investment to maximize the use and value of government data assets. The project was one of several reporting to DIPA through the Physical Environment Analysis Network (PEAN), which is a collaboration between Commonwealth agencies who are custodians of data related to natural resources, the environment, water, agriculture, farm, and biodiversity. DAWE was responsible for coordinating and facilitating the PEAN network.

MADIP is a secure data asset combining information on health, education, government payments, income and taxation, employment, and population demographics over time. MADIP is enabled through a partnership of six agencies—ABS, Department of Health, the Australian Taxation Office, the Department of Education, Skills, and Employment, the Department of Social Sciences, and Services Australia.

MADIP was established in 2015 in response to a review of the Commonwealth arrangements for data integration, that found more focus was needed to access substantial value inherent in public data. The MADIP data asset was further developed between 2017 and 2020 under DIPA.[99] MADIP data assets are accessible to the Commonwealth government, state government, academic institutions, and private institutions.[100]

Key Learnings/ Impact/ Next Steps

The multi-agency project built a domestic map of heat health vulnerability with various insights drawn from linkages of different open datasets. For example, the project found that approximately two percent of deaths are attributable to heatwaves each year; that contemporary housing, as measured by factors

[98] Physical Environment Analysis Network (2021) Reducing Illness and Lives Lost from Heatwaves Final Report https://www.pean.gov.au/sites/default/files/2021-10/BOM%20%282021%29%20Heatwaves%20report.pdf;
[99] Australian Bureau of Statistics (n/a) Multi-Agency Data Integration Project, www.abs.gov.au/about/data-services/data-integration/integrated-data/multi-agency-data-integration-project-madip
[100] ABS (n/a) MADIP research projects, www.abs.gov.au/websitedbs/d3310114.nsf/home/statistical+data+integration+-+madip+research+projects

such as building and construction type, has a stronger association with heat related deaths than housing from other periods; and that large rural towns have the highest elevated risk for heatwave deaths.

These findings and other insights helped provide an evidence base to support the development of better government services to help vulnerable Australians survive future heatwaves, including local interventions such as forecast warning systems.[101] The project demonstrated how existing data assets and emerging linked data can provide new opportunities for understanding complex social and environmental problems, particularly in the health domain.[102]

Additionally, it paves the way for closer and deeper collaboration between public-sector entities producing and holding key government datasets and private-sector organizations looking to leverage such datasets for the well-being of communities.

CANADA: TOWNFOLIO

Opportunity/Motivations

Townfolio is a platform and city marketing tool that aggregates publicly available data to build 'dashboards' of communities, allowing private businesses or development organizations to intervene in a precise and targeted manner.[103] Some of their data is drawn from government open data, meaning it includes the comprehensive and highly accurate census data.

The 'dashboards' and profiles of over 38,000 municipalities present a series of opportunities for businesses to locate their premises or seek arrangements with local partners across the United States and Canada.

Background

Since 2014, the Canadian government has operated a policy of 'open by default', meaning that non-sensitive data is released publicly.[104] The co-founders used open data to drive their business, thus facilitating other businesses' decision-making in an informed manner, and offering data-driven market research.[105]

Key learnings/Impact/Next steps

Townfolio was selected as a tech startup to attend the prestigious TechStars acceleration program, giving them access to greater funding opportunities.[106] To date, it has been largely well-received, though has come in for some criticism for its limited customization options compared with similar data aggregation services.[107]

---

[101] Australian Bureau of Statistics (n/a) MADIP Case Studies, www.abs.gov.au/websitedbs/d3310114.nsf/home/statistical+data+integration+-+madip+case+studies
[102] Physical Environment Analysis Network (2021) Reducing Illness and Lives Lost from Heatwaves Final Report https://www.pean.gov.au/sites/default/files/2021-10/BOM%20%282021%29%20Heatwaves%20report.pdf
[103] Townfolio (2021) About, https://jointownfolio.com/about
[104] Treasury Board of Canada Secretariat (2014) Directive on Open Government, www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=28108
[105] Open Government (2021) Townfolio—City Data as a Service, https://open.canada.ca/en/story/townfolio-city-data-service
[106] Markets Insider (2018) Townfolio Becomes First Saskatchewan Company to Attend TechStars, https://markets.businessinsider.com/news/stocks/townfolio-becomes-first-saskatchewan-company-to-attend-techstars-1027391666
[107] ETSI-BC (2021) Economic Development Resources for Data and Research, www.etsi-bc.ca/wp-content/uploads/2021/07/ETSI-BC-Economic-Development-Software-Report.pdf

Besides helping to pinpoint potential business opportunities for investors, the service also allows municipalities to market themselves on the platform, opening greater economic opportunities to different areas across North America.[108] It has the potential to expand to an international market of communities seeking to market themselves and businesses seeking new locations to set up.

This project showcases the importance of having comprehensive OGD policies and processes in place; they help local governments achieve great outcomes by harnessing and operationalizing OGD in a targeted manner, while ensuring the private sector can contribute by strengthening and amplifying such actions to the broader civil society.

CHILE: THE NATIONAL FOREST MONITORING SYSTEM

Opportunity/Motivations

The introduction of the National Forest Monitoring System provides transparent, consistent, and accurate data over time, allowing the dissemination of results of the interventions of the ENCCRV. It also constitutes a fulfillment of multiple international agreements, including the Paris Agreement on forestry and land use, the United Nations Convention to Combat Desertification and its mechanism for Land Degradation Neutrality, plus domestic Sustainable Development Goals.

It also ties the monitoring work of ENCCRV to that of the Aichi Biodiversity Goals of the Convention on Biological Diversity. This interoperability helps all involved move towards best practice in methodologies and practices, as well as building a global picture of counter-deforestation initiatives.[109]

Background

Chile has been officially working to reduce emissions caused by deforestation and forest degradation since 2010. In 2018, the National Forest Corporation (Corporación Nacional Forestal or CONAF) created the Monitoring and Measurement System (Sistema de Medición y Monitoreo, or SMM).

The SMM includes descriptions of the institutions involved, data sources, planning of activities, financing and sustainability strategy. All of these have a planning horizon until 2025, with potential for future extension.

Key learnings/Impact/Next steps

At a minimum, the project has encouraged data sharing and collaboration between stakeholders. There has also been a strong, integrated participatory process, which has tied together branches of government, academia, and civil society, which may provide a platform for future positive intervention.

There have been some questions pertaining to the quality of the data, mainly because estimating the greenhouse gas emissions from each activity is a difficult and imprecise process. This may hamper international reporting requirements since different government agencies around the world may measure these activities differently.

[108] Communitech News (2018) Startup Uses Open Data to Help Small Towns Attract New Businesses, http://news.communitech.ca/startup-uses-open-data-to-help-small-towns-attract-new-businesses
[109] Food and Agriculture Organization of the United Nations (2021) The National Forest Monitoring System as part of the National Strategy on Climate Change and Vegetation Resources in Chile, www.fao.org/3/cb4253en/cb4253en.pdf

However, because the design process was open and transparent, many of the processes involved in the design of this monitoring system can be replicated and improved upon. The fact that different stakeholders—including private-sector players—are included in the process is an important first step that may lead to closer collaboration that benefits all parties involved.

PEOPLE'S REPUBLIC OF CHINA: OPEN DATA CHINA

Opportunity/Motivations

Recognizing a gap in the market where businesses and citizens are able to readily access open data for collaborative use, Open Data China (formerly as an Open Knowledge Foundation local group) was formed in 2014 as a civic organization dedicated to promoting and building an open digital society.[110] The group works with governments, industry, start-ups, to nurture the open data ecosystem and foster collaborative data initiatives.

Background

Leveraging the experience and success from running the Shanghai Open Data Apps competition,[111] Open Data China launched a data collaboration project as part of the ODI-Microsoft Data Collaboration Peer Learning Network to enhance Fintech innovations by providing SMEs with access to financial data, help to develop a sustainable financial data sharing model and cultivate talents in data analytics and AI.[112]

The data collaboration project is a multi-stakeholder initiative with the participation of leading state-owned financial institutions, Shanghai AI Alliance under the supervision of the local government and accelerator AI SPACE.

UCloud and technology startup DotAI will assist in the establishment of the required cloud infrastructure and AI platform. The Shanghai Baiyulan Open Institution hosted by the Shanghai Jiaotong University will advise on the technical and legal infrastructure as their expertise is on open source and open innovation.

A physical data hub with clean rooms will be set up in the Zhangjiang Industry Park and jointly managed by AI SPACE for SMEs to access and perform data analytics in addition to using an online sandbox for conducting pilots.

Key learnings/Impact/Next steps

This cross-sector, public-private data collaboration can reduce the cost of Fintech development as it draws upon expertise from key stakeholders including the financial institutions, incubator, accelerator, infrastructure service providers, research and civic organizations that focus on data sharing.

With the deployment of a sandbox approach and the setting up of physical data clean rooms that facilitate big data analytics and product trials in a secure environment with flexible regulatory arrangement, SMEs and technology startups can expedite the launch of their Fintech products and

[110] Global Data Barometer (n.d.) Open Data China, https://globaldatabarometer.org/partner/open-data-china
[111] The competition focuses on open data innovation models between government agencies and SMES sharing data to solve urban issues.
[112] Open Data China (2021) A Journey of Building a Fintech Innovation Data Collaboration, https://report.opendatachina.org/pln-report-fintect-collaboration

solutions. Developers and students can have first-hand experience in employing advanced analytic tools and receive relevant AI trainings.

Based on earlier experience in forming a consortium that represented the collective interest of data providers, the project can also put into test various potential business models and identify the optimal one that can benefit the data providers and Fintech companies the most.

This project is a perfect illustration of the many advantages of including the private sector into OGD discussions and initiatives. Indeed, having access to certain government datasets allows industry players to turn datasets into products and services that benefit consumers and citizens on a large scale.

HONG KONG, CHINA: INTER-MODAL TRANSPORT DATA SHARING PROGRAM

Opportunity/Motivations

Hong Kong, China strives to be a world class smart city and the Hong Kong Smart City Blueprint has made this clear, as smart mobility stands out as a key focus throughout. This is unsurprising given the city already supports over 12.6 million passenger trips daily, and roads remain dense with 373 licensed vehicles per kilometer of road.[113]

At the same time, over 99 percent of the city's residents owns an Octopus travel card for digital payments, which provides rich data with power insights if managed well.[114]

The call for enabling more mobility solutions through evidence-based policymaking is clear, but the city needed a way understand the data across all the mode of transport. To achieve this, a proof-of-concept, known as the Intermodal Transport Data Sharing Programme, was initiated to establish the feasibility of data sharing using a Trusted Third-Party Model to overcome siloed data flow.[115]

Background

Policymakers and practitioners agree that an intermodal transport system is vital to plan for greener, cleaner, less congested transport systems and better serves the under-served areas. Leveraging on the rich data available requires bringing together data owned by both public and private operators.

The Intermodal Transport Data Sharing Programme set out to achieve this by establishing a data trust, where an entity is entrusted with the responsibility and technical capacity to manage data usage rights and other digital assets. For the proof-of-concept, a team at the Hong Kong University was designated to operationalize the data trust.

Key Learnings/Impact/Next steps

[113] Innovation and Technology Bureau (2020) Hong Kong Smart City Blueprint, https://www.smartcity.gov.hk/modules/custom/custom_global_js_css/assets/files/HKSmartCityBlueprint(ENG)v2.pdf
[114] Innovation and Technology Bureau (2017) Hong Kong Smart City Blueprint, https://www.smartcity.gov.hk/modules/custom/custom_global_js_css/assets/files/HongKongSmartCityBlueprint(EN).pdf
[115] Zhou et al. (2021) Intermodal Transport Data Sharing Programme, https://www.accesspartnership.com/cms/wp-content/uploads/2021/11/Intermodal-Transport-Data-Sharing-Programme-Final-Report-Oct-27.pdf

Within two years, the program has established a working model of aggregating anonymized data from both the public and private operators with impactful insights, especially on the rail-to-bus interchange dynamic.[116]

This was achieved through a clear data trust framework and Memorandum of Understanding with each operator involved. The success of this proof-of-concept outlines a clear path to greater, more impactful data-sharing models between public and private stakeholders.

JAPAN: OPEN DATA CHALLENGE FOR PUBLIC TRANSPORTATION

Opportunity/ Motivation

Tokyo is one of the most visited cities in the world, with over 10 million tourists on average visiting the city ever year, before the COVID-19 pandemic. The city is also host to major global events such as the Tokyo Summer Olympics and Paralympic Games in 2020 and the Tokyo Marathon in 2021, and is the site of major transportation developments such as the opening of the Tokyo International Cruise Terminal in 2020.

To this end, the city of Tokyo held an Open Data Challenge for Public Transportation with the aim of soliciting ideas from the general public to develop applications that would help make the city's public transportation systems (railway, bus, airline, and ferry) more accessible to visitors—including tourists, the disabled, and the elderly.

By making government data available to third parties in anticipation of the Tokyo Summer Olympic Games, the competition also hoped to develop a multi-lingual mobile application that would provide a wide range of services to domestic users and foreign visitors alike.[117]

Background

The Association for Open Data of Public Transportation has been promoting the openness of data related to public transportation since 2017, with the aim of making public transportation in Tokyo, purportedly one of the most complex systems in the world, easier to navigate for the public, including foreign visitors, the disabled, and the elderly.

The annual challenge was co-hosted by government agencies, local universities, and business innovation hubs, and received special cooperation from the railway companies, the Bureau of Transportation, and the Tokyo Metropolitan Government. Open data partners included the Geospatial Information Authority of Japan, the Japan Meteorological Agency, the Vitalizing Local Economy Organization by Open Data and Big Data, the Association for Promotion of Infrastructure Geospatial Information Distribution, and the Weather Business Consortium.

Types of data shared included static and dynamic data for railways (e.g., train/station timetable, and train location information), static and dynamic data for buses (e.g., station data and bus location information and congestion information), static and dynamic data for airlines (e.g., flight table and real-time arrival/departure information), data from ferry operators, data related to intra-station maps, and other data such as mobile population, mobile space statistics, and bike-sharing data.

[116] Zhou et al. (2021) Intermodal Transport Data Sharing Programme, https://www.accesspartnership.com/cms/wp-content/uploads/2021/11/Intermodal-Transport-Data-Sharing-Programme-Final-Report-Oct-27.pdf
[117] Tokyo Challenge (2021) Home, https://tokyochallenge.odpt.org/en/index.html

Key Learnings/ Impact/ Next Steps

Applications for the competition included, but were not limited to, smartphone applications, web services, and IoT gadgets. One of the grand winners of the 4th and latest Open Data for Public Transportation challenge was Tratal, a web portal that provides information on transportation service tailored to each individual user.

The web application allows individuals to check timetables, visualize fare differences based on routes, search for the nearest train station, bus stop, ferry port, or bicycle sharing dock, among other features. The portal garnered high praises from competition judges on its full use of open data on public transportation. Other prize winners were acknowledged for being user-friendly, and for using data to improve the quality of life of both residents and visitors to Tokyo.[118]

While relatively small, this project paves the way for further collaboration between public- and private-sector stakeholders, demonstrating the importance of stakeholder consultation in the path to fair, transparent, and impactful OGD outcomes.

REPUBLIC OF KOREA: OWL BUS

Opportunity/Motivations

Before the launch of the Seoul Metropolitan Government's Owl Bus services, the only transport service available were night taxis which were not only expensive, but also difficult to get. At the same time, designing the most optimal and efficient night bus routes was a challenge as authorities did not have reliable data on the commonly desired routes of late-night commuters.

Background

To more accurately identify movement patterns of commuters at night, the Seoul Metropolitan Government partnered with major telecommunications operator KT to access and analyze anonymized mobile communication data of over three billion mobile call logs and data from over five million tax rides to map the distribution of late-night commuters.[119]

The ubiquity of mobile phones in the Republic of Korea helped act as a proxy for the late night movement patterns, while their billing addresses were ascertained to be their home addresses and final destinations. Importantly, all the data that had been provided and analyzed was anonymized to ensure there were no infringements on privacy.

A night bus route was designed based on the travel pattern obtained and the Owl Bus service was born. Following the success of the initial pilots, the Owl Bus services and routes were expanded while commuters also responded with very high satisfaction scores.

Key learnings/Impact/Next steps

Since 2016, the Owl Bus services service an average of 7,900 passengers daily helping to reduce approximately 2.3 million individual car trips yearly and reducing an estimated 500 tons of greenhouse

[118] Tokyo Challenge (2021) Award, https://tokyochallenge.odpt.org/2021/award/index-e.html
[119] Susa (n.d.) Big Data in Transportation Policy, www.susa.or.kr/en/Big-Data-in-Transportation-Policy

gas emissions. Additionally, the Owl Bus services also led to an 11 percent increase in women's activities at night by making it safer and more affordable for them to travel at night.[120]

While this project was conducted on a relatively small scale, it highlights the importance of bringing the private sector into OGD processes and discussions; stakeholder consultation is indeed essential to ensuring that OGD is put to good use in an efficient and effective manner.

MALAYSIA: ZER0HUNGER

Opportunity/Motivations

Insufficient food is still a challenge in many parts of Malaysia, where the World Bank estimates that 5.6 percent of the population under poverty, or 1.83 million people still face hunger issues. At the same time, the social welfare groups that work towards addressing the needs of the hungry and poor often face challenges in pinpointing where the most marginalized groups are and what resources are required, or where other groups may also be targeting the same beneficiaries which may lead to unnecessary wastages.

Background

Zer0hunger works with partners to create visual heatmaps of hunger spots to better coordinate efforts and enhance the efficiencies and effectiveness of relief operations with other social enterprises. Mapping out where the most vulnerable groups are located helps Zer0hunger plan with its partners on how best to coordinate on-demand help as well as perform more transparent and verified beneficiary profiling to both avoid duplication and wastage, as well as the risk of scams.[121]

Through its online and mobile platforms Zer0hunger also plays a centralized coordinating role where interested participants are able to find out what resources, such as food, clothes, donations, etc., are required across different groups or locations, as well as indicate how they may contribute and eventually provide confirmation that aid has been delivered.

Using Zer0hunger's centralized platforms, partners can share information on their existing activities and requirements to avoid duplicate efforts as well as more equitable and efficiently disperse resources. According to its founders, as of the middle of 2021 less than 10 percent of the social enterprises in this area were participating in the project and there was thus still a lot of room for increased collaboration.[122]

Key learnings/Impact/Next steps

The first phase of the Zer0hunger plan is to continue to develop the platform to recruit and coordinate between all participants and partners including civil society and other social enterprises, government agencies, and private partners all with the shared objective of helping others in need. Data collection is also still ongoing, with 400,000 data points targeted for the end of 2021 to begin profiling and analyzing the data to enrich the data and identify the right solutions and resources.

[120] Development Asia (2019) Using Big Data to Design Night Bus Routes, https://development.asia/case-study/using-big-data-design-night-bus-routes
[121] Zer0hunger (n.d.) About www.zer0hunger.org/about
[122] NST (2021) Hunger no more: How data sharing can help tackle Malaysia's hunger issue, www.nst.com.my/lifestyle/sunday-vibes/2021/07/709478/hunger-no-more-how-data-sharing-can-help-tackle-malaysias

The next two phases include developing urban farming resources and working with partners to create new supply chains for their local communities or back into the Zer0hunger community and eventually a food bank.[123]

Through its role as centralizing platform, Zer0hunger helps participants coordinate and collaborate their efforts, where the sharing of data together with the collective expertise amassed helps their efforts to be as inclusive as possible.

MEXICO: NATIONAL DIGITAL PLATFORM ON PUBLIC PROCUREMENT

Opportunities/ Motivation

Public procurement represents about 25 percent of total government expenditure in Mexico. The General Law of the National Anti-Corruption System puts in place obligations on procurement transparency for the whole economy.

Specifically, the law requires that each state provide local procurement data on the National Digital Platform (PDN) to ensure public funds and budgets are properly collected and used. However, obtaining quality data from each of Mexico's 32 federal states, institutions, and autonomous bodies has proven challenging.

To address this issue, the National Anti-Corruption System Secretariat (SESNA) launched a centralized dashboard to track and visualize the way a public entity is fulfilling its open data requirements. The launch of the dashboard was accompanied by a library providing open source, easy-to-replicate tools to enable sub-domestic governments to overcome technical challenges when providing data on the domestic platform.

In 2019, SESNA started working with the UK Government Digital Services Global Digital Marketplace Program to run pilot projects in three states (Chihuahua, Jalisco, and Oaxaca) with a focus on helping the states to develop capabilities to report information concerning public officials involved in public procurement contracts, and sanctioned public officials and individuals, to the PDN.

The collaboration involved working with a local supplier partner to develop a shared and scalable solution to provide states' data to the PDN via an API. In addition to developing the API, the PDN team also supported knowledge transfer efforts to each pilot states' technical teams and created API documentation guides to reproduce efforts in other states.[124]

Background

The National Digital Platform is an initiative developed and administered by SESNA to eliminate information barriers, such that public data can be compared, accessed, and used to combat corruption. The platform populates six datasets from across federal and state government institutions and make them publicly accessible. Information gathered is consulted and cross-examined by the National Anti-Corruption System.

[123] Phoenix DX (2021) Joining forces to end hunger in Malaysia, https://phoenix-dx.com/joining-forces-to-end-hunger-in-malaysia
[124] Digital Buying Guide (2020) Increasing transparency and accountability: How Mexico is opening up and connecting procurement data, www.digitalbuyingguide.org/en/case-studies/increasing-transparency-and-accountability-how-mexicos-anti-corruption-secretariat-is-opening-up-and-connecting-procurement-data/

The datasets populated include information on: i) evaluation of assets, declaration of interests and proof of presentation of tax declaration; ii) public officials involved in public procurement contracts; iii) sanctioned public officials and individuals; iv) information and communication systems of the National Anti-Corruption System and the domestic auditing system; v) public complaints related to corruption; and vi) public procurement contracts.[125]

Key Learnings/ Impact/ Next Steps

SESNA's hands-on approach through pilot projects with states and launch of open-source library, with tools, manuals, and guides, has helped generate and standardized data at a local level, and allowed for quality data at the state level to be captured and shared on a domestic platform.

Although data currently populated on the PDN is still predominantly from the federal government, there is an ongoing momentum from several state governments (the three pilot states, as well as Sonora, State of Mexico, and Aguascalientes) to supply their data on the PDN.[126]

PERU: OPEN DATA AND KNOWLEDGE MANAGEMENT PLATFORM FOR COVID-19

Opportunities/ Motivation

Peru is one of several economies that leveraged OGD to communicate the socioeconomic impact of the COVID-19 situation to its citizens. Relatively early-on into the pandemic, the ministry of health (MINSA) started publishing open datasets related to COVID-19 cases and deaths on its open data and knowledge management platform on COVID-19 (*Datos Abiertos Minsa y Gestion del Conocimiento en COVID-19*).

Data was regularly updated and information on vaccination rates and vaccine manufacturer catalogue were subsequently added to the platform.[127] The open datasets by MINSA is published on the government's open data platform on COVID-19 (*Datos Abiertos Coronavirus*) which also publishes information on COVID-19 related procurement and budget expenses from the Ministry of Finance.[128]

Background

MINSA's open data and knowledge management platform is a collaboration with the General Office of Informatics/General Office of Statistics and Informatics (OGTI/OGEI) to support scientific, clinical, and epidemiological research on COVID-19 in Peru.

Since March 2020, the website has been publishing COVID-19 related information sourced from the National Health Institute (*Instituto Nacional de Salud*) and The National Center for Disease Control (*Centro Nacional de Epidemiología, Prevención y Control de Enfermedades*) in hopes of advancing the economy's fight against the virus. The website also serves as a repository for relevant information related to COVID-19 measures such as updates on digital health initiatives, health regulations, scientific and clinical research, and educational resources on public health measures.

Key Learnings/ Impact/ Next Steps

[125] National Digital Platform (n/a) About, www.plataformadigitalnacional.org/about
[126] Digital Buying Guide (2020) Increasing transparency and accountability: How Mexico is opening up and connecting procurement data, www.digitalbuyingguide.org/en/case-studies/increasing-transparency-and-accountability-how-mexicos-anti-corruption-secretariat-is-opening-up-and-connecting-procurement-data
[127] Datos Abiertos Minsa y Gestión del Conocimiento en COVID-19 (n/a) Home, www.minsa.gob.pe/datosabiertos/?tipo=1&op=21
[128] Datos Abiertos (n/a) Datos Abiertos de COVID-19, www.datosabiertos.gob.pe/group/datos-abiertos-de-COVID-19

The COVID-19 open data and knowledge management platforms helped provide transparency on government policies and actions taken during a public health crisis and served as an important repository of information on the economy's COVID-19 situation.

Peru's COVID-19 OGD experience is potentially useful to future OGD developments in two ways. First, it shows the Peruvian government's ability to use OGD to coordinate a nation-wide response in a relatively short time and address unexpected, large-scale crises. Secondly, it pushed public organizations to build the foundations of an OGD-driven platform that can be scaled and re-used in different settings to address wider socio-economic challenges such as poverty, crime, climate change, or natural disasters.

Additionally, lessons learnt from this OGD experience can help inform future OGD efforts. For example, while the government's COVID-19 OGD experience succeeded in raising situational awareness and in communicating the economy's health needs, it did not necessarily lead to open data collaboration between the public and private sectors. Future OGD efforts could potentially take this into consideration and encourage public-private sector collaboration across the open data ecosystem.

RUSSIAN FEDERATION: OPEN ELECTRONIC HEALTH RECORDS

Opportunities/ Motivation

Moscow's healthcare system is managed by the Moscow city government. Over 300 hospitals and outpatient clinics makeup the vast and complex public healthcare system for the city's over 12 million residents. In 2011, the city government launched an eHealth project that aimed to digitalize all healthcare organizations within the municipality.

In 2016, the city deployed a centralized EHR system to manage the health data of its citizens. The cloud-based centralized EHR system stores clinic data in a vendor-neutral, openEHR format. Prior to 2011, Moscow's healthcare services operated in isolation and much of the administrative processes were being done manually and in paper form.

Background

In 2016, the city government, through the Moscow City Department of Information Technology, deployed a centralized EHR platform which stored data in an openEHR format. The centralized platform allowed healthcare providers to digitize most of their paper-based document management processes, reduce time spent filling up unnecessary paperwork and patient wait time, and gain better access to information when needed.

The platform also provided healthcare providers with a tool to better manage their health data, notably by separating clinical data from process logs. It also allowed primary care clinics and hospitals to build applications on top of the centralized platform, which provided greater flexibility on the use of data stored.[129]

Key Learnings/ Impact/ Next Steps

When the COVID-19 pandemic struck, Moscow was able to leverage this central repository of digitalized patient care record to establish a comprehensive digital health platform within a relatively

[129] Better Care (n/a) Moscow City SIMI project, www.better.care/client-stories/moscow-city-simi-project

short time. The city was also able to quickly establish a single online registry of infected persons, available in real time and included personal records, referral, and treatment of the patient; a digital platform that automatically generated a time schedule for patients that required home visits; a specialized telemedicine center to support citizens; and a new system for epidemiological research.[130]

Moscow's initiative to establish a centralized platform that stored health data in an openEHR format demonstrated the ability for OGD platforms to innovate and build new services on existing functions where needed in a relatively short time.

Going forward, similar initiatives could be introduced to other states and cities across the economy, as hospitals look to digitalize their operations, and as part of Russia's domestic digital health transformation strategy.

Beyond this, open health data that has been anonymized can serve as a key source of information for medical research and better policy decision-making. For instance, open health data analysis can be used to track and monitor the spread of a disease or identify demographic groups that are particularly vulnerable to chronic diseases such as diabetes or heart attacks, which in turn can help policymakers craft more precise intervention and prevention measures.

SINGAPORE: OPEN DATA SETS AS APIS

Opportunity/ Motivation

Open government data is a priority area for Singapore's Smart Nation vision, with the understanding that open government datasets can help unlock economic value, enable quality research, and deepen public engagement.

To this end, the Monetary Authority of Singapore (MAS) has launched over a dozen sets of data from its monthly statistical bulletins as APIs to provide financial institutions and application service providers with opportunities to serve their customers better. Datasets include those frequently accessed such as exchange rates and interest rates.

Use case examples include financial institutions that leverage MAS data to benchmark themselves against the industry can use the MAS APIs to minimize costly manual data entry; application developers that use the APIs to create applications to compute exchange rates to help companies file tax returns; and users that automate the extraction of MAS's data to illustrate trends quickly and easily via the APIs.[131]

Background

The first set of MAS APIs were launch in 2016 and included datasets on domestic interest rates, exchange rates, credit and charge card statistics, money supply, assets and liabilities, loans and advances, deposits, information from the Singapore Exchange including price index, number of listed companies, turnover, and capitalization, among others. MAS has since progressively released more datasets as APIs and provides an option for the public to request for datasets.

The launch of MAS' APIs is in line with the government's push for government agencies to publish open APIs in hopes of encouraging public innovation and engagement. Other examples of open APIs released

[130] Better Care (2021) An Open Data Platform Enables Moscow to Respond Rapidly to the COVID-19 crisis, https://blog.better.care/an-open-data-platform-enables-moscow-to-respond-rapidly-to-the-COVID-19-crisis
[131] MAS (n/a) API, https://secure.mas.gov.sg/api/Search.aspx

by government agencies include real-time APIs on carpark availability published by GovTech; taxi availability and traffic images published by the Land Transport Authority; intellectual property applications and trends by the Intellectual Property Office of Singapore; pollutant standards index (PSI), weather readings and forecasts, ultra-violet index and fine particulate matter readings (PM2.5) by the National Environment Agency.

In addition, the Singapore government also maintains the Data.gov.sg website as a one-stop portal for publicly available datasets drawn from 70 public agencies. Dataset categories include the economy, education, environment, finance, health infrastructure, society, technology, and transportation.[132]

The Singapore Open Data License supports and promotes the use and re-use of public sector data to create value for the community and businesses. The Open Data License allows users to use, access, download, copy, distribute, transmit, modify, and adapt datasets or derive any analyses or applications, for commercial or non-commercial purposes. It also allows user to grant a sub-license of the dataset to enable others to use and access the application built on the OGD.[133]

Key Learnings/ Next Step

The launch of MAS's APIs allowed for more open collaboration among FinTech players, enable financial institutions and FinTech players to communicate and share data without human intervention, and overall serve as crucial enablers for financial institutions to build more customer-focused initiatives by allowing applications to be developed quickly and more responsively. This in turn has further facilitated the digital transformation of the economy's banking sector.[134]

Likewise, the establishment of the one-stop OGD portal, data.gov.sg has advanced the economy's Smart Nation ambition, and has to date provided the public with access to more than 1,600 high quality datasets and APIs from over 70 public agencies.[135]

A survey by the Economist Intelligence Unit that assessed the demand for OGD found Singapore ranked the highest in terms of daily OGD usage, and that quality of data and real-time APIs were the most important features of OGD initiatives. The survey further found that Singaporeans were more likely to acknowledge that OGD initiatives have created more business opportunities and placed the most trust in the government keeping their data safe and anonymous among those surveyed.[136]

CHINESE TAIPEI: AIRBOX

Opportunity/Motivation

The effects of ambient fine particulate matter (PM2.5) on public health are well documented, with the overabundance of such matter in environments being explicitly linked to up to 3.2m fatalities per year.[137] Long-term exposure to PM2.5 has been linked to premature death resulting from heart disease, stroke, respiratory diseases, and lung cancer, and is ranked as the sixth largest overall risk factor for premature

[132] GovTech (n/a) Products and Services, www.tech.gov.sg/products-and-services/data-gov-sg/ https://data.gov.sg/developer
[133] MAS (2019) Open Data License, www.mas.gov.sg/terms-of-use/open-data-licence
[134] MAS (2020) Application Programming Interfaces, www.mas.gov.sg/development/fintech/technologies---apis
[135] GovTech (2019) Data.gov.sg Factsheet, www.tech.gov.sg/files/products-and-services/Datagovsg-Factsheet-0319.pdf
[136] EIU (2017) Open Government Data: Assessing demand around the world, https://impact.economist.com/perspectives/sites/default/files/Open_Government_Data.pdf
[137] Apte, Marshall, Cohen et al. (2015) Addressing Global Mortality from Ambient PM2.5, https://pubs.acs.org/doi/10.1021/acs.est.5b01236

mortality globally. This places the risk from ambient PM2.5 exposure higher than the risk of death from malaria and HIV-AIDS combined.

Chinese Taipei notably suffers from exposure to high levels of PM2.5, with the period from October to March every year being consistently understood to bring high levels of air pollution.[138] Government authorities drew attention to the effects of ambient PM2.5 exposure on lung health in the wake of the COVID-19 pandemic, noting that damage to lung functions caused by such pollution could increase susceptibility to the COVID-19 virus as well, and compounding its symptoms in potentially lethal ways.

Background

Efforts to monitor air quality to inform research on air pollution have been stymied by the poor availability of granular data. Chinese Taipei's Environmental Protection Administration has monitored air quality across the island's major cities since 1980 using a network of 19 weather stations, and the government further developing a dedicated Air Quality Monitoring Network which included a large-scale deployment of air monitoring stations.[139] Both of these efforts have been noted as providing detailed information about broad, city-level air quality conditions.[140]

Key Learnings/Impact

This gap in data collection attracted the attention of Chen Ling-jyh of Chinese Taipei's Academia Sinica and Hsu Wuulong, the founder of an online community focusing on location-aware sensing systems.[141] The two decided to collaborate on the development of an open-source air quality sensor and gathered a community of makers to develop and iterate upon "AirBoxes" designed to collect air quality data from as many parts of Chinese Taipei as possible.

The AirBox project is not intended to replace existing air quality monitoring methodologies and metrics, but complement them and provide more granular data for use in big data analyses on public health.[142] The project is further intended to stimulate interdisciplinary innovation in public health, risk management, urban planning, atmospheric science and other studies.

Initial results were mixed, due to the small scale of their efforts. However, the municipal government of Taipei added the AirBox project to its list of Smart City projects, generating significant media and leading domestic manufacturing firm Edimax Technology, which was aiding in system integration for the project, to donate Airboxes to select municipalities across the island. Private citizens were also encouraged to "adopt" AirBoxes, leading to a significant rise in the number of air quality testing sites across the island.

The AirBox project has since expanded beyond Chinese Taipei, and in March 2020 boasted more than 15,000 devices in 58 economies.[143] The project's creators have also forged partnerships with research teams and government agencies in the United States, Germany, Thailand, and the Republic of Korea.

---

[138] *See footnote 38*
[139] Further details available here.
[140] See details here.
[141] *See footnote 39*
[142] Smart City Summit and Expo (2020) "AIR BOX"—PM2.5 Air Pollution Monitoring Device For Smart City, https://en.smartcity.org.tw/index.php/en-us/component/k2/item/59-air-box-pm2-5-air-pollution-monitoring-device-for-smart-city
[143] Academia Sinica (2020) AirBox: a participatory PM2.5 sensing system, www.iis.sinica.edu.tw/en/page/report/7980.html

Capitalizing on these partnerships, and the project's vastly increased purview, the AirBox team now operates an open-source data sharing platform for international PM2.5 data.[144]

Next Steps

Data generated by the AirBox program has been used as the basis for several further projects involving the development of algorithms, including a "clean air routing" algorithm designed to provide a travel route which minimizes exposure to air pollution. Vitally, the genesis of this project as a community-driven solution to a lack of granular data can serve as a model for similar projects in other APEC economies.

THAILAND: AGRI-MAPS ONLINE

Opportunity/Motivations

Even if it is not labelled as such, data has always been key to the planning processes which have always defined the agriculture sector. Knowledge of weather patterns and ecological conditions, as well as an awareness of soil conditions and the effects of geography on crop yield have always determined the success or failure of an agricultural initiative.

Today, this knowledge is simply more quantifiable, and easily capturable due to processes of digital transformation which function to produce large quantities of data. An example of this is projected crop yield. Algorithmic solutions to accurately projecting crop yield are an area of intense research, due to the implications of an accurate approach to estimating how much a given plot of land can produce.[145]

Such data, when strategically applied, is known to have a powerful effect, allowing farmers to understand and adapt to environmental and economic conditions more easily than has ever been possible before.

Background

The digital transformation of agriculture is nevertheless an uneven process, and farmers in some economies may not be able to easily access agricultural data, even if it is available. This naturally inhibits their ability to benefit from the use of this data to optimize planting schedules and can lead to mismanagement and lower profit—an outcome that can be especially catastrophic given the typically low profit margins small-scale farmers already contend with.

In developing economies like Thailand, where there is a tangible digital divide across rural and urban areas, access to the technological means by which data can be accessed can be a challenge. As connectivity in more remote regions improves, mobile devices and access to internet services has brought with it greater access to available resources—though even this may be of little help if centralized resources do not exist at all.

Key Learnings/Impact

Thailand's Ministry of Agriculture and Cooperatives (MOAC) introduced a mobile application called Agri-Maps Online, which collates basic agricultural information from across the ministry's different

[144] LASS Community (2021) PM2.5 Open Data Portal, https://pm25.lass-net.org
[145] Van Klompenburg, Kassahun, Catal (2020) Crop yield prediction using machine learning: A systematic literature review, www.sciencedirect.com/science/article/pii/S0168169920302301#s0055

departments and makes it easily accessible under a unified interface.[146] Collated data includes geospatial data for Thailand's 76 provinces, production and agricultural yield figures, soil conditions, optimal growing seasons, projected weather patterns and supply and demand forces vis-à-vis agricultural products.[147]

The Agri-Maps Online platform is intended to be used not only by regional farmers but also local administrators, who can use the bird's-eye view the application provides to plan the production of agricultural products and avoid creating gluts or shortfalls in production of various goods.[148]

The Agri-Maps Online project was developed in collaboration with Thailand's National Electronics and Computer Technology Center (NECTEC), under the National Science and Technology Development Agency. The project was piloted in 2015 by NECTEC under the name What2Grow and was initially focused mainly on helping farmers develop models for agricultural zoning and develop better strategies for planting alternate crops during off-seasons.[149] The pilot was successful, with participating farmers reporting higher earnings.

What2Grow and Agri-Maps Online are both intended to address the issue of diminished income amongst smaller-scale Thai farmers, which often results from market volatility and the lack of an adequately informed production management plan.[150] Alongside the presentation of this data for farmers, the development of the application also entailed a renewed focus on integrating information management systems within the MOAC.

Next Steps

The full inception of the Agri-Maps Online project in 2017 also saw the signing of an MOU between the MOAC and the Ministry of Science and Technology to continue developing the project. This has been followed by continuing development on the application since then, which is a heartening indication of the Thai government's commitment to promoting data sharing in the agriculture sector. This will only become more important as new data-driven technologies come to be used in Thailand's agriculture sector.

Data will be fundamental to the development of digital agriculture, which can see farmers attain efficiencies in land and resource use, while developing new sources of value addition and integrating new technologies such as automation, drones, and AI.

THE UNITED STATES OF AMERICA: POLAR-ICE PROJECT

Opportunity/Motivations

Most have an extremely limited understanding of Earth's polar regions—likely due to their inaccessibility and extraordinary geographical distance from the lived experience of most of the planet's population. However, the polar regions play an integral part in natural processes that enable life on earth to function

[146] Ministry of Agriculture and Cooperatives (2017) Agri-Map Online, https://agri-map-online.moac.go.th/login
[147] NECTEC (2017) Agri-Maps Online, www.nectec.or.th/innovation/innovation-mobile-application/agri-map-mobile.html
[148] NECTEC (2017) The Ministry of Agriculture and Cooperatives has officially launched Agri-Map Online nationwide, www.nectec.or.th/news/news-pr-news/agrimap_press.html
[149] NECTEC (2015) What2Grow, www.what2grow.in.th/tlogin/index.php
[150] NECTEC (2017) Ministry of Science joins hands with Ministry of Agriculture Going forward with the full Agri-Map project, www.nectec.or.th/news/news-pr-news/agrimap-mou.html

in the ways it does today, and even minute changes in these areas can have serious implications on the lives and livelihoods of people across the planet.

This is especially the case considering climate change, which has had, and will continue to have, a disproportionate effect on polar regions, which will resonate across the world. Polar regions are known, for example, to contain 68.7 percent of all the freshwater on the planet.[151]

As the ice deposits which contain this water melts, changes in the composition of polar oceans may upend ocean circulation patterns much further afield, in turn affecting weather patterns in ways that can have existential implications for human settlements across the world.

Background

Building engagement with polar regions nevertheless remains extremely challenging, due to the immense challenges involved with facilitating contact with these far-flung regions of the world. This is especially the case for educators seeking to teach about polar regions. Educational field trips are an all but impossible prospect, and even bringing individual educators to equip them with the relevant knowledge can be an untenably expensive prospect for most educational institutions.

A way to circumvent these limitations exists in the enormous quantity of data that is regularly produced due to ongoing scientific research projects in the polar regions.[152] Whether this data pertains to the evolution of ecosystems in these regions, or the effects of shifting ice shelves on ocean currents, such information can be used to inform narratives about polar regions.

Integrating data into broader storytelling opportunities can furthermore assist in developing data literacy in students—an extremely useful skill, given our increasingly data-driven societies.

Key Learnings/Impact

The Polar Interdisciplinary Coordinated Education (Polar-ICE) Project was created to help the public understand the impact Polar Regions can have on lives and livelihoods, while also bringing to light the work researchers are doing to improve human understanding of these distant regions. Funded by the National Science Foundation, an agency of the United States Government that supports research and education, Polar-ICE is intended as a collaborative effort involving both educators and scientists in creating, reviewing, and prioritizing polar science communication objectives for the purpose of engaging the public.[153]

Polar-ICE notably seeks to establish Polar Literacy Principles to underpin efforts to construct more impactful projects to engage the public and aid in the development of polar-focused STEM teaching curricula.

The Polar-ICE Project has thus developed and uploaded a wide array of data resources pertaining to polar research for educators. A notable resource developed for this purpose are Polar-ICE's Data Stories.[154] The Polar-ICE Data Stories are a series of storytelling resources which draw on specific

[151] McDonnell, Hotaling, Schofield, Kohut (2020) Key Concepts in Polar Science: Coming to Consensus on the Essential Polar Literacy Principles, www.current-journal.com/articles/abstract/10.5334/cjme.42
[152] Hunter-Thomson (2020) Bring on the Polar Data: Two Approaches to Connect Students with Polar Data through the Polar-ICE Project, www.current-journal.com/articles/abstract/10.5334/cjme.47
[153] Polar Literacy (2020) History of The Polar Literacy Principles, https://polar-ice.org/about-us/history
[154] Polar Literacy (2020) Polar Data Stories, https://polar-ice.org/polar-data-stories

research projects to communicate their relevance—as well as the wider relevance of polar research—in clear and understandable terms. These Data Stories also teach learners how to interpret data, and make it relatable to lived experience, while connecting projects to one another to inform a broader awareness of how research develops.

In a Data Story on changes in ocean patterns caused by shifts in polar regions, for example, Polar-ICE took data gathered by a research station on ocean currents and developed a visualization to aid learners in understanding how the research was conducted, and what implications it had. Notably, the data story linked the ocean pattern research to other research on the responses of animal life in the region, further developing an interactive map for learners to understand why these responses took place.[155]

Next Steps

Alongside accomplishing its primary objective of showcasing polar research, the polar data stories initiative also teaches learners why data is important, and how it can be used and interpreted to draw wider conclusions about the world around us. This can promote positive attitudes and teach good habits about the use and interpretation of data, which can aid in promoting climate consciousness while reducing the impact of digital misinformation.

VIET NAM: VIETTEL'S DATA MINING PLATFORM

Opportunity/Motivations

A particular challenge exists with regards to data-hungry governments and businesses situated in the developing world. The existence of an implicit bias towards certain languages in applications produced even in vital spaces like telehealth is not unknown.[156] When expanded to a domestic level, this means that entire domestic economies may experience handicaps when attempting to utilize international data solutions providers, due to mismatches in terms of the availability of contextually appropriate and linguistically accessible data.

This is a problem faced in Viet Nam, where a rapidly growing economy and developing middle class have created intense demand for data-driven public and private services. However, existing data solutions providers such as Google, Microsoft, and other multidomestic corporations focus largely on processing data produced in English and are thus unable to address the needs of companies from Viet Nam seeking to develop natural language processing for Vietnamese speakers.[157]

Background

To address this gap, telecoms group Viettel has launched the Viettel Data Mining Platform, with the aim of laying the foundation for wider applications of big data in government and businesses.[158] Viettel intends for the platform to be the first developed specifically for businesses in Viet Nam, allowing local entities to make more targeted decisions using data which is sensitive to the local context and language, while also being more affordable than foreign providers.

---

[155] Polar Literacy (2020) What Drives Patterns in Ocean Change?, https://polar-ice.org/polar-data-stories/what-drives-patterns-in-ocean-change
[156] The Verge (2020) Telehealth wasn't designed for non-English speakers, www.theverge.com/21277936/telehealth-english-systems-disparities-interpreters-online-doctor-appointments
[157] VietnamNet (2020) Nền tảng "Make in Vietnam" hỗ trợ doanh nghiệp ra quyết định thông minh, https://vietnamnet.vn/vn/thong-tin-truyen-thong/nen-tang-make-in-vietnam-ho-tro-doanh-nghiep-ra-quyet-dinh-thong-minh-698468.html
[158] Nhan Dan Online (2020) First 'Made-in-Vietnam' data mining platform debuted, https://en.nhandan.com.vn/scitech/item/9411702-first-percentE2 percent80 percent98made-in-vietnam percentE2 percent80 percent99-data-mining-platform-debuted.html

As with other data platforms, the Viettel Data Mining Platform provides real-time information or reports, sparing users from having to gather information from disparate sources. The Platform also reportedly integrates specialized knowledge from sectors such as marketing, asset management, finance, and risk management to help optimize operations in enterprises from those specific fields.

The Viettel Data Mining Platform is intended to be used alongside the Viettel AI Open Platform as a combined toolkit, which is intended to help government agencies and private organizations rapidly improve production and working methodologies.

Using sector-specific data and machine learning algorithms provided by the AI Open Platform, for example, businesses can expect recommendations on the removal of process bottlenecks, development of customer taste profiles, and other holistic business development tools.[159]

Key learnings/Impact/Next steps

The Data Mining Platform's aim of facilitating data sharing for government and business use are firmly in line with Viet Nam's National Digital Transformation Program, established in Decision No.749/QD-TTg by Prime Minister Nguyen Xuan Phuc in June 2020.[160]

Under the program, Viet Nam aims to become a fully digital society by 2030 through experimentation with new technologies such as big data and artificial intelligence, with the aim of overhauling government operations, improving business efficiency and improving service delivery to citizens.

[159] VietnamNet (2020) Nền tảng "Make in Vietnam" hỗ trợ doanh nghiệp ra quyết định thông minh, https://vietnamnet.vn/vn/thong-tin-truyen-thong/nen-tang-make-in-vietnam-ho-tro-doanh-nghiep-ra-quyet-dinh-thong-minh-698468.html
[160] OpenGovAsia (2020) Vietnam aims to become a digital society by 2030, https://opengovasia.com/vietnam-aims-to-become-a-digital-society-by-2030

APEC Project: CTI 05 2021S

Produced by

Ann Katsiak
Chief of Party, US-SEGA
Nathan Associates

Carrie Esko
Director of APEC Affairs
USTR

United States

For
Asia-Pacific Economic Cooperation Secretariat
35 Heng Mui Keng Terrace
Singapore 119616
Tel: (65) 68919 600
Fax: (65) 68919 690
Email: info@apec.org
Website: www.apec.org

APEC#223-CT-01.6