



RAISING STANDARDS

DATA AND
ARTIFICIAL INTELLIGENCE
IN SOUTHEAST ASIA

ELINA NOOR AND
MARK BRYAN MANANTAN

JULY 2022



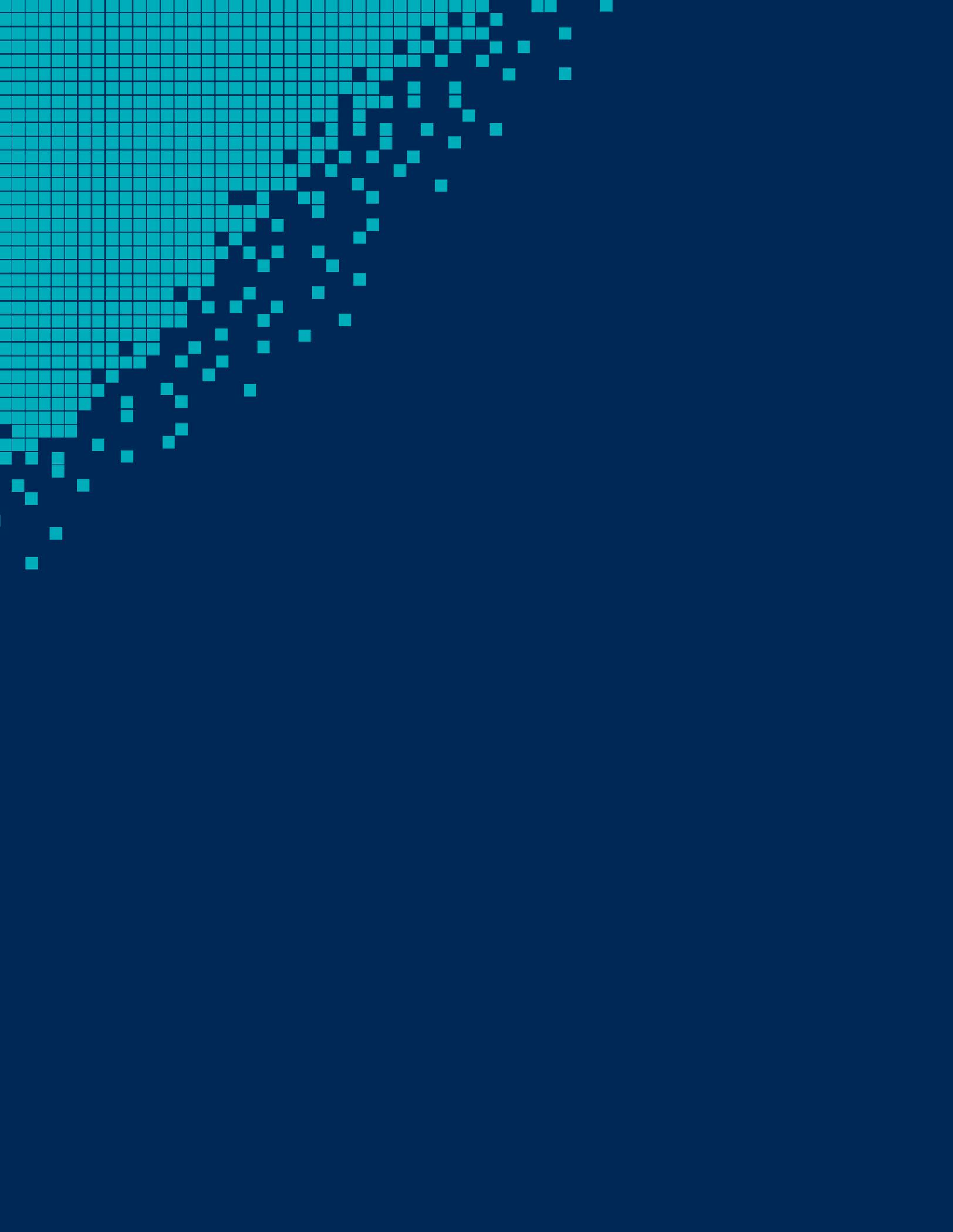


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AN ASIA SOCIETY POLICY INSTITUTE REPORT





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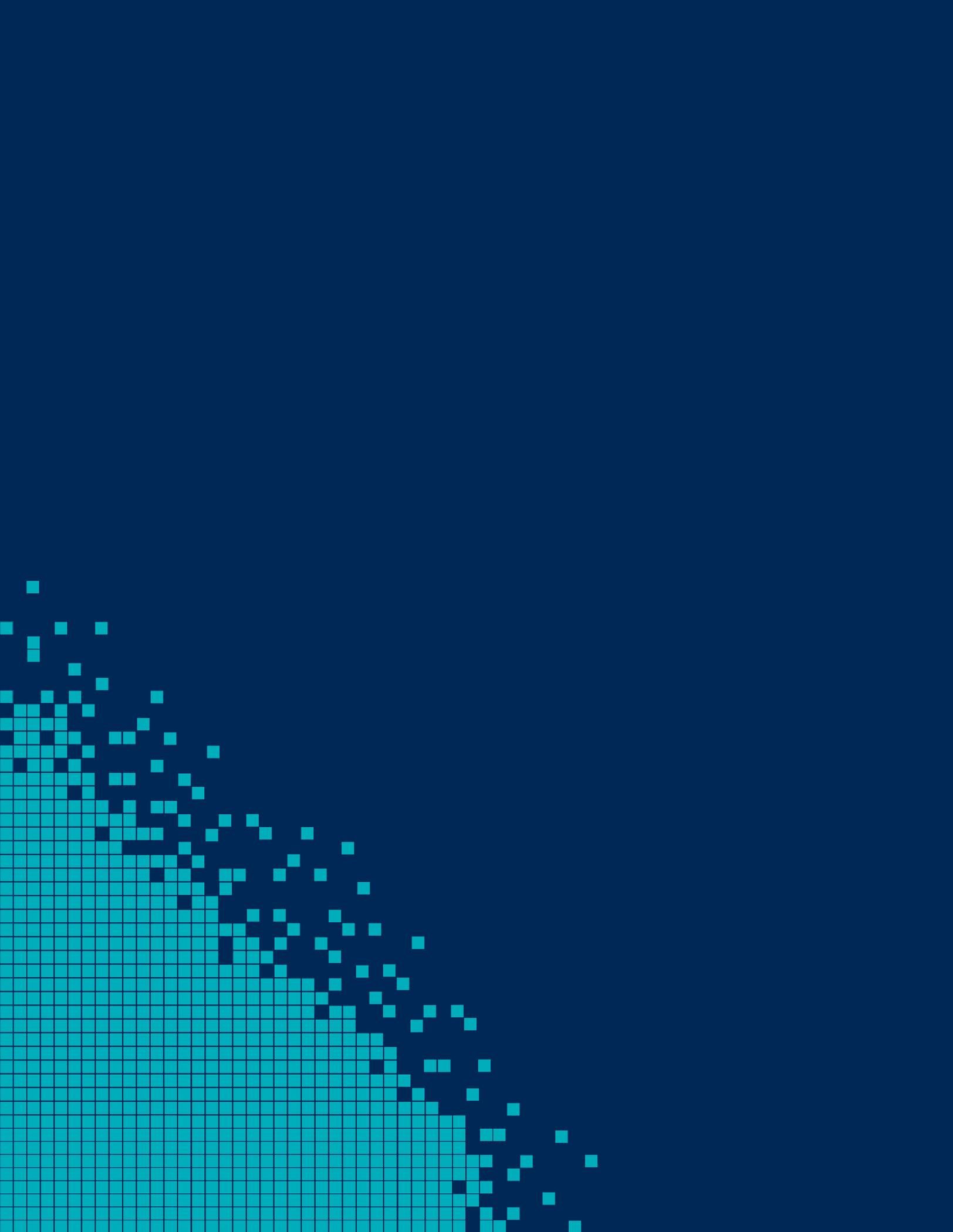
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>> ABBREVIATIONS

AI	Artificial Intelligence
AIDA	Artificial Intelligence and Data Analytics
APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
CBPR	Cross-Border Privacy Rules
CCA	Computer Crime Act
CLOUD	Clarifying Lawful Overseas Use of Data
CPTPP	Comprehensive and Progressive Agreement for Trans-Pacific Partnership
DEA	Digital Economy Agreement
DEPA	Digital Economy Partnership Agreement
DGA	Digital Government Development Agency
EEC	Eastern Economic Corridor
EU	European Union
FASTER	Fusion Analytics for Public Transport Emergency Response
GDPR	General Data Protection Regulation
GMV	Gross Merchandise Volume
GovTech	Government Technology Agency of Singapore
MAS	Monetary Authority of Singapore
ML	Machine learning
MICT	Ministry of Information and Communication Technology
MSMEs	Micro, Small, and Medium Enterprises
PDPA	Personal Data Protection Act
PDPC	Personal Data Protection Commission(er)
ICT	Information and Communications Technology
IEC	International Electrotechnical Commission
ILO	International Labor Organization
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
IoT	Internet of Things
ISAGO	Implementation and Self-Assessment Guide for Organizations
ISO	International Organization for Standardization
ITU	International Telecommunication Union
NAIS	National AI Strategy

NDID	National Digital Identity
NECTEC	National Electronic and Computer Technology Center
NGO	Non-Governmental Organization
NLP	Natural language processing
OECD	Organisation for Economic Co-operation and Development
OIML	International Organization of Legal Metrology
OPDC	Office of the Public Sector Development Commission
RAI	Autonomous Robotics and AI
RCEP	Regional Comprehensive Economic Partnership
SDGs	UN Sustainable Development Goals
SIM	Subscriber Identity Module
SMEs	Small and Medium Enterprises
TDRI	Thailand Development Research Institute
UN	United Nations

>> GLOSSARY

Artificial intelligence The ability of machines, usually computer systems, to perform task simulations that typically require high levels of human intelligence.

Big data The management of data sources that are of too high volume, velocity, variety, and value for traditional data-processing software and therefore require technologically advanced software.

Black box A system that produces results without a clear process.

Digitalization The process of incorporating digital technologies and data into economies and societies.

Digitization The conversion of analogue data and processes into a machine-readable format.

Digital economy Economic activities that use digital data and processes as key factors of production.

Fourth Industrial Revolution The transformation of the physical, digital, and physiological realms through technologies such as artificial intelligence (AI), robotics, blockchain and 3D printing.

Internet of Things A networked ecosystem that connects data-driven applications and devices with the physical world.

Machine learning The process by which machines, typically computer systems, construct algorithms and statistical approaches from historical data and make predictions for future situations.

>> EXECUTIVE SUMMARY

Southeast Asia has the opportunity to redefine inclusive development for the region by raising standards for data and ethical AI through multistakeholder approaches. If the current policy conversation does not evolve, the region risks ceding its voice to outsiders and reinforcing existing power structures that are unsuitable for the region's long-term wellbeing.

We offer, for consideration, a policy playbook based on five principles: agency, care, equity, inclusion, and reliability. Our recommendations are driven by the realities of how people interact with technology; the understanding that context matters for these dynamics; and the belief that data-driven technologies should advance human dignity.

This publication is the culmination of a year-long research project on two major, inter-linked pieces of the technological puzzle — data and artificial intelligence (AI) — in five Southeast Asian countries: Indonesia, Malaysia, Singapore, Thailand, and Viet Nam. Of importance to us was the extent to which data has contributed to inclusive development and ethics relating to AI in all five countries.

While data and AI are examined separately and in detail in 10 country chapters (five on data, five on AI), there are connecting threads throughout the narratives that are also reinforced in our policy playbook.

At the outset, the project sought to answer three primary questions related to data and AI:

- >> What are the **policy frameworks** in place for the use and regulation of data in the five countries of focus? What do they mean for the development and adoption of AI technologies?
- >> What has been the **impact** of data on the governance and economies of the five countries? What has been the impact of AI adoption on economic growth and societal changes there?
- >> What **challenges and opportunities** exist for the five countries to contribute more actively — even proactively — to international standard-setting, rule-making, and norms-development forums on data and ethical AI?

Seven findings emerged in the course of our research:

1. ON A MISSION WITH A VISION

All five countries recognize the promise and potential of digital technologies to advance economic growth, improve public administration, and empower individual citizens. Both the public and private sectors share an exuberance and earnestness to integrate digitalization as widely as possible across the economic, governance, and social spheres. This drive is evidenced by the numerous national policies, strategies, and plans either in place or being developed to incorporate digital technologies and data in economies and societies, as well as the many public-private partnership initiatives to build capacity and infrastructure.

These efforts are supported by a latticework of data-related legal and regulatory instruments in various levels of development. Malaysia and Singapore have well-established data protection laws; Thailand's came into effect on June 1, 2022; and Viet Nam's and Indonesia's draft legislation are being deliberated. Additionally, constitutional provisions, other laws, and sectoral rules govern the use of data in each of these countries.

All five countries have also plotted their AI journey over the next decade or more in official documents, although the trajectory for Malaysia and Thailand can be traced back to the 1990s. While the specific topic of ethics and AI is still nascent, with Singapore being the most forward-leaning of the pack, there is at least awareness across the region that the subject is an important one, even as countries grapple with its implementation at the national level.

2. ADOPTION AND ADAPTATION

Given variances in capacity and resources, countries have unsurprisingly implemented their policy and legal frameworks at different speeds and levels. In general, though, they have sought to keep pace with international technical and regulatory standards. The influence of the European Union's (EU) General Data Protection Regulation (GDPR), in particular, is clearly reflected in informed debates on data protection legislation in all five countries. This is largely due to the expansive reach of the GDPR, itself, but it is also testament to how plugged in the Southeast Asian states are into the global (digital) economy, which is serviced by the constant hum of cross-border data flows. Even Indonesia and Viet Nam have narrowed their data localization requirements in response to trade and industry pressures as well as to meet treaty obligations, as is the case for Viet Nam with its ratification of the CPTPP.

With the introduction of the Global Cross-Border Privacy Rules Forum under the APEC Cross-Border Privacy Rules (CBPR), it remains to be seen how member countries like Singapore, as well as Indonesia and Malaysia — which have previously expressed interest in joining the APEC CBPR — can facilitate interoperable approaches to data protection alongside other regional and international frameworks on data flows.

There is also an interest in how data regimes elsewhere, such as in India and China, will continue evolving and whether Southeast Asian states can adapt the patchwork of available frameworks in these different jurisdictions to suit local — perhaps even regional — needs and interests. Similarly, during stakeholder consultations, informants raised the possibility of closer coordination on the subject of AI ethics with neighboring states in the Association of Southeast Asian Nations (ASEAN) region, moving forward. This aligns with a growing desire in the region to assert strategic autonomy and explore alternative approaches, while remaining engaged with the operating economic, political, and security architecture.

3. SOCIO-TECHNICAL APPROACH

Worldwide, there is a growing imperative to advance a holistic approach to AI that considers the computational, human, and systemic factors permeating its development, testing, deployment, and scaling. In Southeast Asia, there are gradual attempts to link compartmentalized conversations between technocrats and the larger public to cultivate deeper trust and confidence on data-driven technologies. This socio-technical approach helps reorient the focus on digitalization at the community level, and bridge local and global knowledge on technology. In practical terms, community-driven dialogues prompt engineers and developers to consider the real-world effects of their codes and algorithmic models. These exchanges also empower local communities with agency and ownership of data-driven or AI-enabled solutions, from their development through evaluation stages.

4. MISSING PERSPECTIVES

Despite the nominally comprehensive national policy frameworks on both data and AI in the five countries, there remain significant gaps in substance and approach.

One significant gap relates to the framing of national discussions on data and ethical AI. The approach has been decidedly conventional; borrowing concepts, structures, and terms from abroad and localizing them where relevant. While convenient, especially given the pace of changes in data governance and AI uses worldwide, it fundamentally reduces Southeast Asian countries to derivatives of developments elsewhere despite divergent demographics, histories, and social realities. Importing — copying and pasting — concepts and phrases such as “privacy,” “personal,” “explainability,” and “transparency” into the local milieu does not always translate well or at all, notionally or linguistically. For example, concepts like privacy in close-knit communities can sometimes only be translated into awkward approximations because the individualistic interpretation of the word can seem alien.

Relatedly, although digital inclusion campaigns attempt to take into account women, children, the elderly, and even the differently abled (albeit inadequately), they often dis-

count indigenous and other marginalized communities along with their distinct perspectives of relating to the world. These campaigns also overlook or dismiss their level of willingness to even participate in a data-driven landscape in the first place. There is little to no discussion of this apart from within civil society networks.

5. BACK TO BASICS

Because discussions on digitalization have been so skewed toward the economic and development agenda, the goal to establish a prosperous, digital society seems uncontested, especially if there are apparent guardrails in place like data protection, AI ethics, and the UN's sustainable development goals (SDGs). However, without closer scrutiny of these safeguards, there arises the risk of a false sense of security or morality. There is little public debate about whose ethics are even being considered for application, whether conceptions of community data should be considered alongside individual data, or what impact assessments are being required to adhere to SDGs.

Government and non-government stakeholders will need to ask some fundamental questions related to the existing frameworks of data and AI ethics: What is the ultimate purpose that data-driven technologies serve? If, on the one hand, data-driven technologies are meant to be purely functional, do prevailing frameworks suffice? If, on the other hand, technology is meant to restore and empower human dignity, then do current frameworks support this objective? If not, what more needs to be done?

These questions may border on the abstract and philosophical but they form a critical basis upon which to develop an ethical framework for data and AI that goes beyond just augmenting the digital economy. An inclusive take on data and an ethical framing of AI can only resonate meaningfully if it is understood, and invested in, by the society it is meant to serve.

6. EXPAND MULTISTAKEHOLDERISM

Contributing a distinctly national or regional approach to inclusive data and ethical AI that accords with prevailing international standards presupposes the possession of a self-assured national or regional identity in the first place. Establishing that approach requires an awareness and embrace of contextual values, principles, even traditions.

In practical terms, it should widen multistakeholder participation beyond the “usual suspects” of policymakers, industry players, engineers, scientists, and lawyers. A rounded approach should also draw historians, linguists, social scientists, and creative artists, among others, to the table. Understanding the impact of technology on a nation throughout history is pertinent in light of warnings of data colonialism and surveillance capitalism. Learning the etymology of words can help translate a term like “algorithmic

justice” for effective resonance in local languages, dialects, and colloquialism.

7. INTER-REGIONAL OBSERVATIONS

Finally, exchanging lessons on innovative uses of data rooted in cultural practices with other developing regions and communities in Africa and Latin America can help enrich Southeast Asia’s own framing of unfolding conversations on data and ethical AI. For example, embedding data as patterns in traditional fabrics to communicate a message against gender-based violence has been trialed in Tanzania.

Democratizing the responsible use of data, ensuring that data represents some of the most marginalized members of society, and enabling open data to reach millions who live without easy access to mobile internet can contribute to the ultimate objective of digital technologies: augmenting human dignity.

This publication is a snapshot in time of developments and trends in five specific countries but with longer-term implications for the governance of technology in the region. It also calls into question Southeast Asia’s role in shaping the rules of the road at the international level as the region positions itself to be a thriving, networked hub for a digitalized future.

>> HOW TO READ THIS PUBLICATION

This publication is a compilation of two subject-matter reports on data and artificial intelligence (AI), respectively. Each report canvasses the landscape in five Southeast Asian countries: Indonesia, Malaysia, Singapore, Thailand, and Viet Nam.

While each country chapter can be read on its own, “Setting the context” provides a useful overview to understand the rationale for this project and resulting publication. We recommend starting here if you’ve progressed beyond the executive summary.

The first half of this publication centers on the treatment of data, while the second half focuses on AI. Whether you are interested in an overview of the data landscape or AI ethics in any or all of the five profiled countries, every chapter:

- >> Canvasses relevant policy and legal frameworks in development or in place;
- >> Traces the usage and impact of data and AI on government and society; and
- >> Assesses the challenges and prospects of data governance and ethical AI.

There are obvious synergistic ties between data and AI — data feeds and trains AI making it easier, in turn, for AI to detect and analyze patterns from massive troves of data. This connection is made in the country narratives throughout. But the ethical considerations of the data/AI convergence are outlined as recommendations in our policy playbook, which you’ll find right in the middle of this publication, bridging the two linked areas conceptually, visibly, and tangibly if you have a printed copy in hand.

This publication is an invitation to a conversation. We hope you’ll enjoy exploring and welcome your feedback.

>> INTRODUCTION: SETTING THE CONTEXT

Data is foundational to the expansion of knowledge, industry, and international ties. In the digital age, a data-driven economy and data-driven policies can contribute to greater prosperity; more responsive governance; and an informed, robust society.

The World Bank estimates that over the past 15 years, the [digital economy](#) — powered by e-commerce platforms and cross-border data flows — grew two-and-a-half times faster than global gross domestic product (GDP). Today, countries are training their sights on a Fourth Industrial Revolution that will merge the physical, digital, and biological worlds through technologies such as artificial intelligence (AI) and processes such as big data analytics.

But data is also an instrument of power, influence, and dominance. In the past, data collection in colonial outposts such as in Southeast Asia formed the basis for empire-building and expansion. Census surveys, sociological observations, and cartography exercises by colonial administrators and merchants alike framed the identities of native communities through stereotypical lenses which, when asserted and reasserted as truth, lay the justification for conquest. The digital parallels of some of these practices as they are playing out in today's world are stark: geo-tagging, biometric surveillance, algorithmic black boxes, as well as the abstraction, extraction, and commercialization of personal data.

While there is awareness of these risks in Southeast Asia, countries' data-driven policies, along with their corresponding legal and regulatory frameworks, are heavily driven by a digital transformation agenda mirroring the priorities outlined above: to grow the economy, improve public service, and enhance the quality of life for citizens.

This motivation is evident at the national level, as the country chapters in this publication elaborate, but also collectively at the regional level within the Association of Southeast Asian Nations (ASEAN) as blueprints such as the Masterplan on ASEAN Connectivity and the ASEAN Digital Masterplan demonstrate. Additionally, countries commit to ensuring a viable regulatory ecosystem for the digital economy through their participation in bilateral or regional economic arrangements like the Digital Economy Partnership Agreement (DEPA), the Regional Comprehensive Economic Partnership (RCEP), and the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP).

RETHINKING THE DIGITAL ECONOMY

The consideration of data and its life cycle, from creation to destruction, as well as all the policies that support it, are therefore packaged almost entirely in terms of the digital economy. Even when social well-being is accounted for in discussions on data protection and ethical AI, economic advancement remains the underlying premise and overarching goal. This results in a few blind spots.

WHY OPTIMIZE?

First, the amassing of data coupled with trained, automated, intelligent processes to make sense of all that data is treated as an inevitability to be welcomed so long as ethical and regulatory safeguards are in place. Keywords such as bias, transparency, accountability, explainability, and responsible AI reflect this utilitarian approach to data-driven technologies. But to what end? This is the central question absent in many national discussions.

Official documents touch on this by acknowledging the challenges of access and representation among unserved or underserved communities that have little-to-no internet connectivity and that are therefore unable to fully participate in the digital economy. However, advancing the digital economy and improving public administration are simply a means to an end. The ultimate objective of utilizing data-driven technologies should be the florescence rather than the exploitation of dignity, at the individual level, and the restoration of social justice rather than the exacerbation of existing inequities, at the community level.

For refugees, migrants, or differently-abled communities, this could simply mean using data-driven technologies for education that might otherwise not be available. For minority communities, it could mean weighing community- against individual-based approaches to privacy, since consent is impossible to obtain for big data processing. Paradoxically, for indigenous communities, it could mean relying on data-driven technologies to protect a traditional way of life with minimal dependence on digital data.

For many nations, recentering the focus of data collection and algorithmic application to dignity rather than optimization will require confronting uncomfortable realities in society

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in order to correct them through technology. These include bias, at best, and bigotry, at worst, with various gradients of discrimination, racism, and xenophobia in between.

Another way to think about the function of data-driven technologies is for it to enable rather than reduce human agency in the transition towards digitalization. For example, while public services

may work better on desktop, optimizing them for mobile devices would not only improve user experience but also allow many more to access government facilities online more quickly, frequently, and affordably on their phones (assuming internet access).¹

PEACE AND SECURITY

Second, the shared public-private sector focus on the digital economy and public services delivery in data-driven technologies has resulted in very little public exchange about the application of data and ethical AI in other areas, notably peace and security. For example, although the management and protection of personal data during peacekeeping operations bears particular import for personnel-contributing countries like Indonesia, Malaysia, Thailand, and Viet Nam, there is no specific discussion of it in any of the official documents we surveyed. And while national security and defense apparatuses are urged to incorporate AI into law enforcement and military activities, there are few publicly available guidance documents on how it should be done ethically.

More encouragingly, however, even though none of the five countries analyzed is party to the Convention on Certain Conventional Weapons (Viet Nam is a signatory), all have either participated as an observer to UN meetings on lethal autonomous weapons systems, delivered a position statement on the matter, or associated themselves with statements by ASEAN and/or the Non-Aligned Movement. Still, these discussions have not widely permeated domestic policy deliberations, despite countries' purchase or development of their own unmanned systems for aerial, ground, and maritime defense.

REFRAMING PERSPECTIVES

Third, the conventional framing of data and technologies like AI that Southeast Asian countries have adopted also means that the analytical structures to understand and govern them have been borrowed or imported from elsewhere and adapted for domestic application. This is not necessarily a bad thing. However, it would be better if states contributed standards rooted in their respective developmental, socio-political, and ethical perspectives.

Southeast Asia is a significant market in the digital landscape. The region was the “most hooked” to the internet in 2020, with the number of new users reaching almost 10 percent. Globally, it ranks third behind China and South Asia in total number of internet users. Southeast Asian consumers are also becoming “mobile-first,” with 887 million mobile connections. This means that 132 percent of the region's total population are wired to digital technologies.²

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SETTING SOUTHEAST ASIAN STANDARDS

As our country chapters explain, neither Southeast Asian governments nor industry players — tech unicorns, notwithstanding — are yet adequately, let alone proportionately, represented in international normative or standards-setting bodies. This is due, in large part, to a lack of expertise and resources, compounded by competing priorities in government. However, so long as the region remains a marketplace and a rule-follower rather than a rule-shaper or even rule-maker, the data-driven technologies it will rely on and the governance frameworks underpinning those will not be its own. For instance, the International Organization for Standardization (ISO) has not elected a [principal officer](#) from Southeast Asia since Singapore's **Liew Mun Leong** served as president in 1997–1998.³

A 2020 [report](#) by the Global Partnership on AI and the Future Society mapped 214 initiatives related to AI ethics, governance, and social good in 38 countries and regions. Of that figure, 58 percent originated from Europe and North America.⁴ This discrepancy is replicated in snapshots of market capture in other areas. Worldwide and in Southeast Asia, US tech companies have a commanding lead in search engines, social media platforms, cloud-hosting services, data centers, operating systems, and submarine cables. Chinese companies — relatively new entrants to the digital tech scene — trail behind, increasingly carving a niche in e-commerce and mobile payments.

This concentration of power and influence in the hands of very few players is already shaping the contours of increasingly data-centric reality for Southeast Asia. Without regional nations framing their own contextually-relevant normative or technical standards on data and AI, there is a risk that data-driven technologies designed and applied abroad could be ill-suited for local application, given the distinct social composition of each of these countries. Even domestically produced platforms and systems modeled after existing ones developed and trained elsewhere could result in unintended consequences.

Additionally, if US-China technological decoupling intensifies, the costs of adapting to technical and other standards concluded without national or regional input could be much higher for smaller Southeast Asian states compelled to choose between different governance models. With data transmitting internationally through space (satellite navigation systems), cyberspace (networks, hardware, and software applications), and under the sea (submarine cables), and with Western and Chinese firms dominating all these domains, Southeast Asian countries could inadvertently find themselves further entangled in great power competition on multiple fronts.

For all these reasons, Southeast Asia — beginning with the five countries surveyed in this project — should broaden its outlook on data and related technologies such as AI beyond the digital economy. Governance is, after all, more than prospering the populace.

The region's determination of its digital future begins with a recognition that it should proactively shape that path in its own image, in equal partnership with willing partner governments abroad as well as with industry players at home and elsewhere. The next few decades of Southeast Asia's data-driven environment should incorporate a long, holistic, and clear-eyed deliberation of technology. It should also draw multidisciplinary ideas from Jakarta to Johannesburg, Kuala Lumpur to Kisumu, Singapore to São Paulo, Bangkok to Bengaluru, and Ho Chi Minh City to Hong Kong.

By first taking a step back to assess the data-driven landscape in Southeast Asia and then by raising questions about what is missing from mainstream discourse, we offer some principled and concrete suggestions for the way ahead in our policy playbook. We hope to prompt reflection on how Southeast Asia can raise the standard(s) for data and ethical AI, and in the process, redefine inclusive development for the region.

SECTION 1

>> DATA



INDONESIA

1. BACKGROUND

In January 2020, President **Joko Widodo** submitted Indonesia's Personal Data Protection bill ("Rancangan Undang-Undang Perlindungan Data Pribadi" or PDP) to the country's House of Representatives for deliberation. The bill, strongly modeled on the European Union's General Data Protection Regulation (GDPR), would be the country's first comprehensive law on privacy and personal data, if passed. It would also, according to the Ministry of Communications and Informatics (KEMENKOMINFO), guarantee "national security and sovereignty."⁵

The rationale for the PDP bill seems intuitive, given the scattered nature of Indonesia's data protection and privacy landscape at present. Experts contend that the basis for the protection of personal data and privacy lies in the country's foundational document itself. While the word "privacy" may not be explicitly mentioned in the country's constitution ("Undang-undang Dasar Negara Republik Indonesia 1945" or UUD 1945), Article 28(G) guarantees every individual the right to the protection of their person, family, respect, dignity, and property.⁶

At least 30 other regulations, including sector-specific ones in telecommunications, finance, and banking, as well as health, provide for similar guarantees of privacy and data protection. The most frequently cited regulations concerning the use of electronic data are Law No. 11 of 2008 on Electronic Information and Transactions (EIT Law), amended by Law No. 19 of 2016; Government Regulation No. 71 of 2019 on the Implementation of Electronic Systems and Transactions (GR 71); and Minister of Communications and Informatics Regulation No. 20 of 2016 on Personal Data Protection in Electronic Systems (Reg. 20). However, scholars argue that these only offer minimal protection.⁷

As with its regional neighbors, Indonesia's efforts at consolidating its data protection and privacy landscape are driven by the impetus to leverage the international digital economy. KEMENKOMINFO's 2020 annual report references personal data as a "high value asset/commodity in the era of big data and digital economy," and laments the "many cases of leakage and misuse of personal data, especially in the Digital Financial Technology sector," that point to the need for a PDP law.⁸ Indonesia's presidency of the G20 in 2022 and identification of digital transformation as a key pillar of its agenda only underscores the urgency of the bill's passage at the domestic level.

However, what sets Indonesia apart from its neighbors is the imperative of human rights as an additional and equal basis for instituting a comprehensive set of laws to protect personal data and privacy in the country. The same annual report by KEMENKOMINFO explicitly affirms personal data as "part of the human rights that has been mandated by

the state through the 1945 Constitution.”⁹ Commentators also point to Indonesia’s international and regional human rights obligations under the International Covenant on Civil and Political Rights, which Indonesia ratified in 2005, and the Association of Southeast Asian Nations (ASEAN) Human Rights Declaration, as compelling Jakarta to protect personal and privacy rights.¹⁰

Despite these pressures to advance the PDP bill and its prioritization for enactment within the National Legislation Program (“Program Legislasi Nasional”) in 2020 and 2021, it remains with the House of Representatives for further consideration, as of the time of writing.¹¹

2. USAGE AND IMPACT

There is keen recognition that data will be the engine of a vibrant and inclusive digital economy for Indonesia. Data is also being used to institute more efficient public services at the federal and local levels, covering provinces, regions, and cities. That potential, however, remains vastly untapped due to structural challenges such as the country’s sheer geographic spread and topography, as well as a lack of awareness and trust among the public about safeguarding data.

Data for the digital economy

The combination of Indonesia’s market size and youthful demographics offers tremendous growth prospects for the country’s digital economy. With over half of Indonesia’s nearly 300 million population on the internet and the bulk of Indonesians aged between 18 and 39 years old, according to the 2020 census survey, little wonder that the country’s Internet economy — powered by e-commerce — nearly doubled between 2019 and 2020.¹²

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Yet uneven digitization across the country remains a barrier to greater digital economic growth. As in other regional countries, MSMEs form the backbone of Indonesia’s economy. They contribute about 60 percent of GDP and provide employment for about 97 percent of the nation’s 117 million workers. Of that 97 percent, women comprise 64.5 percent. However, only 13 percent of MSMEs adopt the Internet for marketing and delivering their products and services.¹³

Moreover, approximately 60 to 70 percent of Indonesians living in the eastern region of the country are inadequately connected due to infrastructural issues. Even those living in the three most populous islands of Sumatra, Java, and Bali face significant Internet access difficulties if they reside in non-metropolitan or rural areas. Indonesians with ter-

tiary education are five times more likely to connect than those without, and those from low-income families are three times less likely to have Internet access compared to those from prosperous families.¹⁴

These structural challenges notwithstanding, e-commerce in particular has offered income diversification opportunities for women and youth.¹⁵ In a survey of over 2,000 respondents examining the impact of COVID-19 on women-owned micro- and small businesses in Indonesia by United Nations Women and Pulse Lab Jakarta, slightly over half (54 percent) of women-owned microbusinesses were found to use the Internet to sell products compared to 39 percent of those owned by men. Similarly, 68 percent of small businesses owned by women were online compared to 52 percent owned by men.¹⁶

The lack of a consolidated PDP law, however, means that the protection and privacy of personal data is observed unevenly even as the popularity of e-commerce rises. A [2018 study](#) by the Institute for Policy Research and Advocacy of 10 information and communications technology-based enterprises in Indonesia found discrepancies between their privacy policy and terms of service, on the one hand, and the principles of personal data protection, on the other. Whereas some foreign companies had already begun incorporating GDPR provisions into their terms of business, a number of local enterprises had not yet done the same because there was no legal obligation to do so. A low level of understanding of the concept of privacy and consumer data protection was also a contributing factor.¹⁷

Additionally, a lack of trust in online transactions and payments, compounded by numerous high-profile data breaches, including of the popular e-commerce site Tokopedia in 2020, have only worsened apprehensions about the safety, security, and privacy of online transactions. Provisions in the PDP bill are meant to allay some of these concerns by tightening breach notifications. Individuals would also be granted more rights, such as those to revoke consent, to demand that personal data be deleted, and to object to automated decision-making.

Although Indonesia has often been cited as favoring data localization over freer flows of data, under GR71, the [mandate](#) for local storage of electronic systems and data only applies to “public electronic system operators,” which essentially refers to state administrative agencies. Private electronic system operators are allowed to manage, process, or store such systems and data abroad, provided there is coordination with KEMENKOMINFO. This requirement is echoed in Reg. 20, which obliges notification by the operator prior to transfer, as well as a report post-transfer.¹⁸ These regulations mark a relaxation of an earlier directive for electronic system operators providing public services to locate a data center in Indonesia for the purpose of enforcing protection and national sovereignty over the data of its citizens.¹⁹

Under the PDP bill, data transfers abroad would be subject to four conditions: an equivalent or higher level of protection in the destination country; where international agreements apply; with the availability of a contract between parties offering appropriate safeguards; and where the data subject has consented to the transfer.²⁰

Given the importance of data to the global digital economy, Indonesia's G20 presidency in 2022, and Jakarta's own thematic push within the G20 for inclusive economic development, KEMENKOMINFO anticipated there would be discussions about cross-border data flows within the G20's Digital Economy Working Group. In these working group meetings, deliberations on the future of interoperability of data practices across countries revolved around the definition of trust and four general principles: transparency, legitimacy, fairness, and reciprocity. Unsurprisingly, differing perspectives on data policy emerged, with some countries either not yet having formulated policies consistent with the free flow of data or deciding to "maintain their preferred domestic policy framework" for other reasons.²¹

Data for public policy

Indonesia has long recognized open data as a critical aspect of more accessible, responsive, and accountable governance. The country is, in fact, a founding member of the Open Government Partnership, and in its 2013/2014 chairmanship of the platform focused domestic and international attention on its open data policies and practices.²²

In 2014, Indonesia launched its national open data portal, which now contains over 90,000 datasets on areas of governance, ranging from the economy and industry to culture and religion.²³ The uptake, use, and impact of the portal initially fell short due to limitations in the availability and quality of data. A report from the Executive Office of the President revealed a lack of standard data management practices across government agencies and, consequently, little collaboration or coordination among them in sharing data.²⁴

In 2019, Presidential Regulation No. 39 was issued to introduce the One Data policy for the production of accurate, up-to-date, integrated, and easily accessible data to be shared among central and regional agencies. This was to be done through compliance with data and metadata standards, including classification and adherence to data interoperability, among others.²⁵ The One Data policy would complement Presidential Regulation No. 95 on e-government released a year earlier.²⁶ Several provincial and municipal governments such as in Bojonegoro and West Java also launched their own open data portals.

There is, therefore, a recognition of the importance of data by government. But as even KEMENKOMINFO has conceded, there remains a lack of appreciation about the integration and interoperability of data and electronic systems needed for more efficient governance. This will be discussed below. What Jakarta is certain about, however, is that a growth in e-government services and volume of data will require specific cloud infrastructure in the form of a national data center to be maintained by the government itself. There are

plans to build the first such center in Bekasi, West Java, with a groundbreaking target set for 2022 and operations to begin in 2023. Additional national data centers have also been outlined for the new capital city in East Kalimantan, Batam in the Riau islands, and Labuan Bajo in East Nusa Tenggara.²⁷

The possibilities of harnessing big data for more robust, transparent, and accountable governance are already evident in examples such as the [National Citizen Feedback Dashboard](#). Working together with the central government, Pulse Lab Jakarta scaled up an earlier provincial feedback system to the national level. Using short messaging service (SMS) and Twitter, the team developed a dashboard to collect, process, analyze, and visualize citizen feedback on a range of topics from the bureaucracy to social welfare. The presidential staff office welcomed the feedback as complementary to reports from line ministries, and useful for short- and medium-term policy planning and monitoring.²⁸

CASE STUDY

UTILIZING CITIZEN FEEDBACK DATA TO ENHANCE LOCAL GOVERNMENT DECISION-MAKING AND POLICYMAKING

Pulse Lab Jakarta, a joint data innovation facility of the United Nations (Global Pulse) and the Government of Indonesia, conducted advanced data analysis on citizen feedback from official channels and on social media in order to generate insights which could contribute to local government decision-making and policymaking. The citizen feedback systems they drew data from include LAPOR!, the national feedback system in Indonesia through which citizens could lodge a complaint via short messaging system (SMS), the Internet, and other provincial-level systems. Feedback from Twitter was also collected and analyzed, after refining and removing spam and irrelevant tweets.

Analysis on the datasets allowed for local policymakers to understand the shifts in priorities and concerns of citizens over time. Between June and July of 2013, there was a spike in concerns regarding the unequal distribution of a social protection program. Geographical information was collected and analyzed, allowing the lab to pinpoint the province in which these concerns were being raised. Nusa Tenggara Barat province, one of Indonesia's poorest regions, was identified by the analysts, and the data relayed was able to facilitate local authorities in planning an appropriate response. On top of aiding in policymaking, Pulse Lab Jakarta encouraged local governments to publish their citizen feedback analysis on public dashboards in order to enhance transparency and help constituents understand how their feedback is processed.

3. CHALLENGES AND PROSPECTS

In May 2020, a hacker [leaked](#) the details of 15 million users of Tokopedia, before selling the site's entire user database (said to number about 90 million accounts) on the dark web.²⁹ In May 2021, the Healthcare and Social Security Agency suffered a [data breach](#) in which the personal information of 279 million Indonesians was allegedly offered for sale on an online forum. The data included identity card numbers, names, email and home addresses, and even salaries.³⁰ In August 2021, the Ministry of Health's electronic health alert card (eHAC) program [exposed](#) the data of more than one million people and that of 226 hospitals and clinics in Indonesia as a result of inadequate data privacy protocols. Since the eHAC application was used to test and trace entrants into Indonesia, data such as traveler identity, test type and result, passengers' doctors, and hospital details were left on an open server.³¹

These three major data compromises in the space of just over a year jeopardized millions of personal records and underscore the urgency of a comprehensive law on data protection and privacy in Indonesia. Experts have urged for enforcement of the bill to be strengthened by an independent data protection authority. However, as informants also note, there is a need for greater awareness in at least three other areas: the importance of data protection and privacy, the complexities of inclusion in a country as geographically spread out and ethnically diverse as Indonesia, as well as the growth of the country's data landscape in as sustainable a manner as possible.

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Independent oversight in the PDP bill

Indonesia's draft PDP has numerous features that make it among the strongest data protection and privacy laws in Asia. A key piece missing from the bill, however, is the matter of an independent data protection authority (DPA). Although earlier versions of the bill included a DPA, the latest draft places enforcement powers in the hands of the minister of communications and informatics. The desire to have a [leaner administration](#), rather than multiple agencies that would drive up costs, is said to be a primary reason for this approach.³² The preference for authority to reside with the minister also accords with the status quo of Indonesia's enforcement of data-related laws. However, this practice is said to have been a "conspicuous failure," with only warnings issued in the past and to no deterrent effect.

With only 10 of 143 countries (as of 2020) having data privacy laws that omit a separate DPA, [specialists](#) argue that even a strong data protection regime means little without the existence of an independent authority to oversee and enforce the law separate from the executive.³³

Awareness

While there is recognition among bureaucrats of the importance of data for efficient public administration, there is less of an appreciation for the need to curate quality data in order to facilitate engagement between the government and citizens, as well as the processes to collect, classify, and verify the accuracy of various datasets.

This involves setting baseline protocols and standards for various datasets held by different agencies. It also entails understanding what is needed to ensure or verify the accuracy of datasets. Civil servants may view the requisite procedures as additional administrative work, especially during times of crises and other pressures. Integrating these steps as part of digital record-keeping and having dedicated personnel, or data stewards, could lessen the bureaucratic burden.

Studies suggest that open data initiatives should be context-specific and designed methodically with clearly defined goals. The selection and deployment of relevant technology solutions should then follow an incremental

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approach to allow for scalability and sustainability. This process should also involve community leaders and other non-technical stakeholders, particularly since the onus to understand the local context when designing technical solutions now seems to be on software developers and engineers. But advocates also acknowledge that technology has its limita-

tions and that having people access, understand, interpret, and visualize data is equally valuable in promoting more inclusive data governance.³⁴

Similarly, greater consciousness about data protection and privacy would go a long way toward internalizing and socializing good practices among the public while awaiting the codification of the PDP bill. A [2021 survey](#) by KEMENKOMINFO and Katadata Insight Center revealed that more than 60 percent of respondents did not even know about the draft PDP and only 31.8 percent of enterprises were aware of the bill.³⁵ Informants explained that in Indonesia, privacy is often viewed as a western notion. Many Indonesians have few qualms about disclosing personal information, such as their date of birth or contact details, to a third party or on social media. In fact, although privacy as a legal concept only really crystallized during Indonesia's colonial era, there are historical accounts of household privacy in Javanese and Balinese society even earlier.³⁶ Still, there are difficulties with explaining the significance of protecting personal data or keeping it private in the modern context, given contrasting social conventions. In a strategy document to implement data protection regulations in Indonesia that predated the PDP Bill, KEMENKOMINFO had already acknowledged the need to socialize existing laws among the public.³⁷

Data complexities and inclusion

In a country with about 17,000 islands and thousands of ethnic groups and tribes, even collecting and classifying data can be a challenge. Indonesia's census bureau recorded [1,331 tribal categories](#) in 2010. Determining ethnicities can itself be a tricky exercise, but even when categorized, the agency has to code these myriad categories for tribe names, other names or aliases, sub-tribe names, and even sub-names of sub-tribes.³⁸

Given these layers of identity, large segments of society — particularly vulnerable and undocumented communities — can fall through the cracks in the process of digitization. Indonesia's electronic identity card, e-KTP, is issued on the basis of documented proof of identity. Minority groups, including indigenous tribes and inhabitants of remote areas of the vast archipelago, who often have a historical distrust of government, may not have such documents. Nor would marginalized communities fleeing violence or abuse, such as refugees and transgender individuals, since the issuance of the e-KTP is predicated on the availability of other documents of identification. Without an e-KTP, these communities can find themselves [systematically sidelined](#) from social, healthcare, and other public services. The e-KTP, for example, was required for access to the COVID-19 vaccine program during the pandemic.³⁹

But even the requirement for more conventional forms of identification, such as the identity card (KTP) or family card (KK), can be an entry barrier to the digital ecosystem. Some farmers and motorcycle taxi drivers have been precluded from joining application-based companies because of their lack of documentation. Additionally, although some online enterprises require data to expand their business, that data is not always readily available. For instance, TaniHub, an agricultural start-up, has found it difficult to reach regions where data on farmers is scant.⁴⁰

Where data is either unavailable or denied to members of the public, proponents of data altruism argue that individuals or companies could voluntarily provide data for reuse for the common good, such as for scientific research or improving public welfare.⁴¹ One example is the use of drone technology to collect aerial mapping data on illegal mining activities in West Kalimantan. Such mining was violating indigenous land rights and resulting in environmental damage. It was eventually prosecuted in court using drone-mapping data.⁴²

Sustainability

Indonesia captured the largest share (38.7 percent) of USD19 billion invested in Southeast Asia's [start-up scene](#) between the first half of 2019 and that of 2021.⁴³ The financial technology (fintech), e-commerce, and education technology (edtech) sectors received the most funding, with giants like GoTo, Bukalapak, and Traveloka dominating the list in Southeast Asia. Indonesia is also [projected](#) to account for more than 50 percent of the Southeast Asian e-commerce market by 2025.⁴⁴

An outgrowth of the country's burgeoning tech landscape is a rising demand for cloud storage. That demand was first met at scale by Alibaba, which built a data center in 2018 then another in 2019. Other cloud service providers like Amazon, Google, Microsoft, and Tencent have [followed suit](#).⁴⁵

With most of Indonesia's data centers located in Jakarta — the capital city received over 60 percent of data center investment in the country in 2020 — and plans to increase the number of data centers in the country as a part of the Ministry of Industry's "Making Indonesia 4.0" roadmap, there will need to be alternative locations for these buildings in other parts of the country. This is especially so with the flooding problems in the capital and the potential strain on the electricity grid in and around Jakarta, given the amount of energy needed to power these data centers.

Experts [assert](#) that the whole process of building data centers should be reconsidered, from the beginning during the design stage, to near completion of construction, as opposed to being an after-thought to retrofit the structure. It should, for example, take into account power usage and efficiency along with the risk of natural calamities and changes in the environment.

4. CONCLUSION

Indonesia's pending PDP bill promises to strengthen and consolidate the country's fragmented data protection landscape, if the outstanding question of an independent DPA can be resolved. Significantly, it would align the nation's data-driven aspirations with a comprehensive regulatory regime that would compel a rethink of concepts like personal data and privacy among the public in a modern, digital setting.

As with many other countries in Southeast Asia, Indonesia faces structural challenges related to infrastructure, access, and digital literacy. But these are complicated by the nation's size, spread, and diversity on a scale that few other regional countries have to grapple with.

The good news is that Indonesia's largely mobile-first population has proven highly adaptive to technology, and the government is determined to institute changes that will advance inclusive digital transformation. Its commitment to evolving discussions on global standards, in this regard, is reflected in its participation as an observing member in the International Organization for Standardization and the International Electrotechnical Commission Joint Technical Committee 1/SC 42 on artificial intelligence, as well as its [re-election](#) to the International Telecommunication Union (ITU) Council for the period 2018 to 2022. Indonesia has, in fact, been consecutively elected to the ITU Council four times since 2002.⁴⁶ The country's G20 presidency and focus on an equitable digital economy at the international level this year should help catalyze its own domestic progress with renewed urgency.

INDONESIA

SELECTED LEGAL INSTRUMENTS RELATED TO DATA PROTECTION

Category	No.	Law
Cybersecurity	1	Government Regulation No. 71 of 2019 – Provisions of Electronic Systems and Transactions
Data Protection	2	Minister of Communication & Informatics Regulation No. 20 – MOCI Reg. 2016 *Implementing regulation of Reg. 71
	3	Penal Code 1982 (Kitab Undang-Undang Hukum Pidana)
	4	Personal Data Protection Bill – introduced in January 2020
	5	LN 2008/58; TLN No 4843 Electronic Information and Transactions
Information Technology	6	Electronic Information and Transactions (EIT) Law – Amended 2016
E-Commerce	7	Government Regulation No. 80 of 2019
	8	Minster of Trade Regulation No. 50 of 2020
Sectoral Law	9	Law No. 36 of 1999 on Telecommunications as partially amended by Law No. 11 of 2020 on Job Creation
	10	Law No. 10 of 1992 on Banking as amended by Law No. 10 of 1998
	11	Law No. 8 of 1995 on Capital Markets
	12	Law No. 14 of 2008 Disclosure of Public Information
	13	Law No. 36 of 2009 on Health
	14	Law No. 23 of 2006 on Residence Administration as amended by Law No. 24 of 2013

MALAYSIA

1. BACKGROUND

Malaysia's data regulations and policies stretch back to the early days of the country's digitalization journey. In 1996, the government unveiled the Multimedia Super Corridor (MSC) initiative. This, in turn, prompted the establishment of the Malaysia Digital Economy Corporation (MDEC) to support the MSC's rollout, the passage of supporting legislation such as the Communications and Multimedia Act (CMA) 1998, and a commitment to cross-border data flows to facilitate domestic and international trade and investment.⁴⁷

Since then, Putrajaya (the nation's administrative capital) has rolled out numerous corollary programs to push forward the country's digital transformation through the use of data and technology. These include the National Broadband Initiative (2010), Digital Malaysia (2011), National Policy on Science, Technology & Innovation (2013–2020), Big Data Analytics (2013), Open Data (2014), National Internet of Things Strategic Roadmap (2015–2025), National eCommerce Strategic Roadmap (2016–2020), Digital Free Trade Zone (2017), Industry4RWD: National Policy on Industry 4.0, and Malaysia Smart City Framework (2019–2025).

Malaysia's approach to data has thus primarily been driven by economic and development impetuses. From the protection of individual user data to its treatment of Big Data, Putrajaya has anchored related policies and laws to advance the national digital economy. MyDIGITAL, the government's latest initiative, is a reflection of this very objective. Through its action plan, the Malaysia Digital Economy Blueprint, data will form the basis upon which a refined people-private-public partnership will be conducted among the rakyat (people), business, and the government.

Importantly, both the government and stakeholders who were consulted on the Blueprint recognize that Malaysia's data regime and digital transformation should be undergirded by a holistic regime of inclusivity (no one left behind from digitalization), ethics (the ethical use of data and digital tools), and trust (the assurance of privacy and cybersecurity in the growth of the digital economy). In that regard, the [Blueprint](#) is envisioned to complement both the 12th Malaysia Plan (2021–2025) and Shared Prosperity Vision 2030 (SPV 2030), as well as Malaysia's commitment to the UN SDGs. All these documents outline the challenges of wealth and income disparities, technological adoption, and environmental preservation.⁴⁸

These ideals are not new; rather, they are an extension of Malaysia's earlier [Vision 2020](#) introduced by the then prime minister **Mahathir Mohamad** in 1991.⁴⁹ However, with the achievements of Vision 2020 having [fallen short](#) of the stated aims,⁵⁰ there are risks that

the country's aspirations in a data-based environment could entrench and accentuate unresolved fault lines as much as they could help resolve them. Putrajaya is aware of at least some of these, yet there remain implementation gaps to be addressed, as discussed below.

2. USAGE AND IMPACT

Malaysia is betting big on data for two primary purposes: increasing economic prosperity and advancing public administration. This is evident in government policies such as the Blueprint, which charts a 10-year path till 2030 of three objectives, six overall thrusts, 22 strategies, 48 national initiatives, and 28 sectoral initiatives. It is also reflected in the many laws pertaining to commerce and trade, banking and finance, and entrepreneurship in the digital space. In the public sector, Putrajaya hosts a Public Sector Open Data Platform and is relying on its Big Data Analytics program to improve the delivery of government services.

Data for the digital economy

As with many countries in Southeast Asia, micro, small, and medium enterprises (MSMEs) form the backbone of Malaysia's economy. Between 2016 and 2021, MSMEs accounted for 97.4 percent of all establishments in Malaysia, registering an average annual growth rate of 5.2 percent. [Microenterprises](#) formed the largest category of MSMEs during that time period, growing at an average rate of 5.6 percent every year.⁵¹ In 2021, this [segment](#) made up 78.6 percent (964,495 firms) of all MSMEs, with small businesses accounting for 19.8 percent (242,540 firms) and medium-sized enterprises comprising the balance of 1.6 percent (19,459 firms).⁵² In 2020, [SMEs contributed](#) 38.2 percent to GDP and employed 48 percent of the national workforce.⁵³ Enabling these businesses to participate more efficiently in e-commerce and digital trade using data-based solutions is, therefore, a priority for the Malaysian government.

To date, studies suggest that MSMEs have not gone much further than computerization; that is, while they have utilized some computing software to facilitate their operations, they have not integrated digital tools to scale productivity. For example, in a [survey](#) of over 2,000 SMEs representing all sectors and regions in Malaysia, 44 percent responded that they used cloud computing but mainly to store personal documents, pictures, and videos in software such as Dropbox rather than to drive process improvements. While 54 percent used some form of data analytics, 67 percent of that figure were referring to spreadsheet applications such as Excel. The 46 percent that did not use any data analytics for their business did not feel that it was necessary, or they were unfamiliar with how to collect and analyze data.⁵⁴

At the heart of data usage for the digital economy must be a trusted, enforceable framework of policies and regulations as well as a secure, resilient information network. Malaysia's Personal Data Protection Act 2010 (PDPA) — another outgrowth of the MSC —

is the country's cross-sectoral law to protect personal data in commercial transactions. Under this law, personal data protection extends to information such as an individual's name, identity card or passport number, bank account numbers, and contact information. It includes "sensitive personal data" relating to an individual's race, religion, health, political opinion, or record of actual or alleged offenses, as well as personally identifiable information that may be gleaned from an "expression of opinion" about the particular person.

Although the PDPA applies to all who process data as part of a commercial transaction, the Act mandates the registration of 13 classes of data users (or types of businesses) and applies to the life cycle of personal data processing, including control, recording, alteration, transfer, storage, erasure, and destruction.⁵⁵ Given the various industry practices relating to how personal data is processed in different sectors, the [Personal Data Protection Standard](#) was issued in 2015 by the Personal Data Protection Commissioner as a minimum requirement comprising three standards related to security, retention, and data integrity.⁵⁶ The Commissioner is also empowered to direct the formation of data user forums and related codes of practice for particular sectors in accordance with the PDPA. In 2017, [four codes of practice](#) were finalized and registered with the Commissioner for the banking and financial, utilities (electricity), insurance, and communications sectors.⁵⁷ In 2021, [two more codes of practice](#) were published for private hospitals in the healthcare industry and the utilities (water) sector.⁵⁸

The PDPA aims to connect the individual user back to the wider ICT-enabled ecosystem by protecting personal data in the conduct of business. Through its seven principles of data protection, the PDPA is also intended to enhance public confidence in information security and network integrity.⁵⁹ Yet, gaps in the ambit of consent, as well as it not being mandatory to notify the authorities when a data breach occurs, undermine the potential strength of this legislation, particularly in light of the significant data incidents discussed below.

SEVEN PRINCIPLES IN MALAYSIA'S PERSONAL DATA PROTECTION ACT 2010

- 1 Personal data should be adequate, relevant, and not excessive. To be processed only with consent and for a lawful purpose
- 2 Written information should be provided for why the data is being processed, collected, or disclosed
- 3 Disclosure must be made for the stated purpose and with consent or advanced notice
- 4 Personal data must be protected from misuse, loss, unauthorized access, and destruction
- 5 Personal data should not be kept longer than necessary
- 6 Personal data should be accurate, current, and verifiable
- 7 The right to access personal data should be provided

Stakeholder consultations reveal that while there is greater cognizance of the PDPA among more mature sectors like banking/finance and private healthcare, many of Malaysia's MSMEs lack attention to good privacy or data protection practices. Hardening cyber defences or putting in place good data protection standards are not always top priorities for MSME entrants looking to reduce expenditure and capture market share.

Moreover, for cost, ease, and speed reasons, MSMEs lean heavily on informal channels to conduct and grow their businesses. A significant majority (71 percent) of SMEs [surveyed](#) in 2018 were found to rely on social media platforms like Facebook, Instagram, and WhatsApp for communication and marketing purposes.⁶⁰ A similar [survey](#) in 2019 found that number to be higher at 77 percent, with 78.3 percent preferring to use Facebook; 61.5 percent, WhatsApp; and 54.3 percent, Instagram for online business.⁶¹ Unfortunately, business owners or agents sometimes solicit potential customers or add telephone numbers to WhatsApp chat groups for mass advertising without prior notification or consent.

Of equal, if not greater, concern is the fact that the PDPA [does not presently apply](#) to the federal and state governments; personal, family, and household affairs; data processed outside of Malaysia; non-commercial transactions; or credit reporting agencies.⁶² These exemptions are a point of contention, as discussed below.

On the international front, Malaysia's participation in the TPP, first, then its signing of the CPTPP in 2018, demonstrates a continuing embrace of free trade as well as the enabling regulatory regimes for that. Although Putrajaya's ratification of the CPTPP is still pending executive evaluation of the agreement, the government has committed to strengthen cross-border data transfer mechanisms and facilitate seamless data flows, as outlined in the Blueprint. The document, in fact, goes further in targeting all new trade agreements entered into by Malaysia to incorporate cross-border data protection elements by 2025. To accomplish this, some amendments will have to be made to local laws, including to the PDPA. While the PDPA does not preclude the transfer of personal data abroad if certain conditions are met, the Personal Data Protection Department (PDPD) is concerned about the risk of a breach occurring during transfer. In a 2020 [review exercise](#) of the PDPA, the Commissioner sought public input on issuing guidelines to implement cross-border data transfers safely and securely.⁶³

The government has also [affirmed its support](#) for regional efforts to facilitate cross-border data flows; in particular, the ASEAN Framework on Digital Data Governance, the ASEAN Data Protection and Privacy Forum, and the ASEAN Model Contractual Clauses.⁶⁴

Stakeholder consultations reveal that while there is greater cognizance of the PDPA among more mature sectors like banking/finance and private healthcare, many of Malaysia's MSMEs lack attention to good privacy or data protection practices

Data for public policy

The very first thrust of the Blueprint is to modernize the public sector through the use of data and digital technologies. This effort is not new, rather it is a restatement of numerous other past and existing plans to achieve the same goal. In fact, as far back as 1999, a Public Sector Data Dictionary Committee was created to develop a dictionary containing both generic and application-specific data for use across all of government. By establishing guidelines about the elements, structures, and codes of data that should be captured, the dictionary sought to create a standard to be adopted by all agencies.

In 2011, the Malaysian Administrative Modernization and Management Planning Unit (MAMPU) implemented the Public Sector Data Center project, creating data center services for centralized ICT operationalization throughout the government. In 2014, a Public Sector Open Data Portal was introduced as a one-stop service center for citizens to search and download open government data sets. There are more than 12,000 data sets, including on elections, international trade, crime, education, and the environment, contributed by nearly 400 government departments and agencies. The Ministry of Health also offers official COVID-19 data in Malaysia on an open platform online. Daily and static data on cases, testing, contact tracing, vaccinations, and deaths are all available for analysis.

Despite these continuing initiatives, digital adoption rates in the public sector have remained low because of a lack of an accompanying shift in bureaucratic outlook. As the Blueprint [acknowledges](#), “There is an urgent need to change the culture of the civil service and encourage embracing a digital-first mindset.”⁶⁵ Consultations with informants revealed a continued preference for analogue or paper-based practices as well as a talent shortage in data analytics in government as stumbling blocks to digitalized public administration, at present. The Blueprint represents a more streamlined attempt to shift gears on the utilization of data for public services delivery.

CASE STUDY

MYLAKE: A DATA REPOSITORY FOR LAKES

In 2012, the Malaysian National Water Council established a data repository called MyLake for lakes in Malaysia. A project by the National Hydraulic Research Institute of Malaysia (NAHRIM), the data repository serves to benefit government stakeholders and research communities in Malaysia by storing ecological, spatial, and meta data on lakes as well as their ecosystem. The database operates on a server which allows for the sharing of big data among federal, state, and local agencies. However, the current version of MyLake only allows for one party to upload or download data at any one point in time, and data sharing is done in silos (one-to-one data integration between

two parties, instead of sharing with the community on a platform). This poses a problem for data sharing, as the agencies are vulnerable to integration issues when one party does not have access to the most updated database from another party.

Experts from NAHRIM proposed a big data integration approach to improve MyLake; specifically, for MyLake to act as “a central data exchange offering a unified data access interface” which would allow all agencies to access the same database at the same time, preventing data inconsistency. With more accurate, consistent, and up-to-date data, MyLake would be able to serve stakeholders better in their strategic planning regarding water resource management and serve as a model for other big data integration projects in the government.

A National Big Data Analytic Center (NBDAC) is also in the pipeline to ensure that administrative planning and decision-making processes are based on data analytics, in line with Putrajaya’s overall digital government initiative. The Blueprint makes clear that data usage should be maximized for improved, evidence-based policy analysis and development. By 2025, [50 percent of data](#) must be machine-readable, with access to real-time and aggregated data through open Application Programming Interface (API) produced by the respective ministries and agencies.⁶⁶

One of the targeted outcomes of the Blueprint is for Malaysia to improve its standing in open data global rankings. However, [as some have cautioned](#), although rankings are a validation of progress and an incentive to improve efforts in certain areas, they can conversely have a detrimental effect on government policy and development given the different benchmarks, methodologies, and scoring employed in various lists.⁶⁷ Any substantiation of headway made in Malaysia’s open data initiatives through global rankings would have to be closely scrutinized for its actual impact on the efficiency of public service.

By 2024, Malaysians and permanent residents will have a National Digital Identity (NDID) to supplement their current chip-based identity cards. Through biometric technology, the NDID will function as a form of digital identification and self-authentication for conducting online transactions. In a [2020 public consultation](#) conducted by the Malaysian Communications and Multimedia Commission (MCMC) as the lead developing agency of the NDID framework, over 35,000 respondents, from individuals, government agencies, and private organizations, made clear that their top three areas of concern related to the implementation of the NDID were data privacy, security of transactions, and platform reliability. This was notwithstanding the fact that 97 percent of respondents thought the program would be beneficial (60 percent voted “very beneficial” and 37 percent chose

“moderately beneficial”) and 94 percent were interested to use the NDID in transactions with both the public and private sectors.⁶⁸ The NDID program will purportedly be equipped with privacy- and security-by-design features. However, as it stands, Malaysia’s data protection regime is insufficiently robust to enforce those assurances.

3. CHALLENGES AND PROSPECTS

The converging opinion among stakeholders is that although Malaysia is a regional front-runner in its data protection regime, the country’s laws and regulations need to evolve to reflect a more complex digital landscape.⁶⁹ The gap between Malaysia’s governance capacity and the country’s aspirations could stymie its ambitions for a complete digital transformation by undermining trust in both the online and offline spaces.

This risk is underscored by several realities: significant data breaches without commensurate penalty or recourse, existing gaps in the PDPA, as well as the inclusion or exclusion of vulnerable communities in Malaysia’s data-driven and digitalization agenda.

Data breaches and lack of recourse

In 2014, a [massive data breach](#) of 46.2 million mobile numbers registered with several Malaysian telecommunications companies resulted in a leak of customer details and SIM card information, including unique International Mobile Equipment Identity (IMEI) and International Mobile Subscriber Identity (IMSI) numbers. The leak was only uncovered three years later when the data appeared for sale in a popular online forum. The information also included three medical databases totaling well over 80,000 records containing personal information.⁷⁰

In 2019, a major media and entertainment company suffered a [data breach](#) of its subscribers’ identity card details containing personal and sensitive information. It was the second breach in 18 months, with the first compromising the records of 60,000 subscribers. Data from that breach was sold for RM4,500 (about USD1,000) for 10,000 records.⁷¹

In 2021, the data of four million Malaysians grouped by year of birth from 1979 to 1998 was [stolen](#) from the National Registration Department (NRD) through the Inland Revenue Board’s (IRB) website and listed for sale at 0.2 Bitcoin.⁷² Both the minister of home affairs, who oversees the NRD, and the IRB denied that data from their agencies had been compromised. However, the IRB, along with other government agencies, is a client of the myIDENTITY shared platform or API through which data from the NRD is shared.

In May 2022, a [local tech portal](#) flagged that the same perpetrators allegedly behind the NRD leak had announced the sale of the personal data of another 22.5 million Malaysians, this time those born between 1940 and 2004. This database, as large as 160GB and contain-

ing information such as full names, identity card numbers, addresses, and photographs, was offered at USD10,000 in Bitcoin. The sellers claimed to have obtained the data from the same myIDENTITY portal as before and [posted](#) the personal data of the minister of home affairs, **Hamzah Zainudin**, to make a point. Once again, the minister denied there had been a breach of the NRD's database, and although the minister of defense acknowledged the concerns of many over the report, he insisted that the leak would not jeopardize national security.

The vulnerability of APIs was [spotlighted](#) again more recently when users of Malaysia's COVID-19 contact-tracing application, MySejahtera, complained about receiving unsolicited and even prank messages, heightening suspicions of a system or data breach. The Ministry of Health assured the public that there had been no leaks in the MySejahtera database and that there had instead been an abuse of the API.⁷³

Lawsuits may, of course, be filed in the event of such breaches. However, the damage brought about by a leak of personal information may have already been done and the outcomes of such legal action may not always be commensurate with the harm caused or grant sufficient redress to the victims. In the case of the 2014 telco breach, above, a suit was filed against the Malaysian Communications and Multimedia Commission and a private company. The case was [settled](#), but the terms of the settlement were not disclosed, even though the incident was one of Malaysia's biggest data leaks.⁷⁴

Gaps in the PDPA 2010

All these cases involving both the private and public sectors, as well as the questions raised about the rollout of the NDID, accentuate the current shortcomings of the PDPA. Under the present iteration of the law, the PDPA excludes the federal and state governments — an anomaly that was perhaps justified originally, but is increasingly difficult to defend given the outsized and still growing role of government in collecting personal data for a range of reasons. The PDPA also applies to only commercial activities, so that any harm incurred from data shared for non-commercial transactions or with credit reporting agencies (which are exempted from the scope of the PDPA) could undermine the intended safeguards of the law. The pending implementation of the NDID bears out these concerns, as does the potential expansion of MySejahtera beyond COVID-19-specific use.

The purpose and reach of the NDID mean that it will be used by both the government and private sectors to verify and authenticate identities for online transactions. The PDPA [would not extend](#) to cases where the NDID would be used for non-commercial activities — for example, in furtherance of corporate social responsibility or the provision of financial support — even though these undertakings would still require the processing of individuals' personal data. Additionally, the NDID's linking of various databases containing personal information to be shared among public and private entities blurs the applicability of the PDPA and its protections. The absence of a mandatory breach notifi-

cation in the PDPA also raises serious questions about the consequences of a compromise to these connected databases.⁷⁵

Malaysia's MySejahtera app, developed in response to COVID-19, has 38 million registered users and its database is one of the largest in the world. Given the previous indication by the minister of health, **Khairy Jamaluddin**, that the ministry could expand the use of the app to store personal medical records as proposed by the Malaysian Medical Association, the question of amending the PDPA to apply to the government has become even more pressing.

The PDPD is, itself, very much aware of these gaps. Prompted by the then minister of communications and multimedia, **Gobind Singh Deo**, the PDPD initiated a [public consultation](#) in 2020 to strengthen the enforcement and implementation of the PDPA in light of “growing cases of data breaches involving the multi-type of data users from different sectors.”⁷⁶ There was also a recognition that the government needed to ensure the PDPA was in line with other personal data protection developments regionally, as well as in the European Union, to promote e-commerce and the digital economy. The PDPD's consultation sheet tabled 22 points for consideration on issues ranging from data portability and data transfer to privacy-by-design, applying the PDPA to government, and imposing mandatory data breach notification. Workshops were also held with industry professionals, academics, and government stakeholders. While there has been no express movement since this stage of consultation, review of the PDPA is expected to be completed by the [2025 timeline](#) outlined in the Blueprint.⁷⁷

If a [2019 IPSOS survey](#) on data privacy is any measure, Malaysians will welcome a stronger PDPA, even if those polled were more trusting of companies' and the government's use of personal data (48 percent) than the global average (36 percent). Two-thirds of Malaysians (66 percent) surveyed felt that measures to reassure consumers about sharing personal data were impactful, especially when the risks involved were clearly understood and when the products/services met the person's needs.⁷⁸

Inclusion

To its credit, the Blueprint dedicates a whole pillar (Thrust 5) to creating an “inclusive digital society.” One of the strategies outlined to achieve this is to establish a centralized database on vulnerable groups to measure digital inclusion or exclusion levels in the country and to bridge that digital divide. The Blueprint identifies vulnerable groups as the B40 (or Bottom 40 percent income group earners), women, and people with disabilities.

The idea is to provide these constituents with opportunities to become digital entrepreneurs in order to uplift their socioeconomic status and to earn a livelihood with dignity. The Blueprint's target is to integrate 875,000 MSMEs into e-commerce by 2025. [Women-owned](#) MSMEs currently constitute only one-fifth of total MSMEs and of this

figure, 97 percent are in the services sector.⁷⁹

In 2017, the [number of persons](#) with disabilities registered at the Department of Social Welfare totaled under half a million people. Slightly over a third (35.2 percent) were physically disabled, while those listed as having learning disabilities and visual impairment constituted 34.8 percent and 8.9 percent of the total, respectively.⁸⁰

Although the Blueprint does not go into detail about the kinds of training or counseling opportunities that will be offered to these vulnerable groups, the PDPD and the Personal Data Protection Commissioner already actively conduct road shows and state-by-state training about the provisions of the PDPA. Larger resources invested in awareness-raising among these and other vulnerable groups about their data rights will be key as increased protections are sought under the PDPA. Of importance will be explaining the essence of concepts such as “privacy” or “data subjects,” which generally have a presumed legal baseline, whether as defined in the EU’s GDPR or in the PDPA, but that may be unfamiliar in a rural, community-based setting in Malaysia. These terms, along with their import, also resonate very differently in English than in colloquial dialects.

The government’s efforts at inclusion, notwithstanding, there is almost never any mention of Malaysia’s indigenous population (*orang asal* or *orang asli*, meaning “original people”) in reports or policies on the country’s digital agenda. The Blueprint does not explicitly include them in the list of vulnerable groups.

In the [national census](#), *orang asal* and *orang asli* are collectively grouped as Bumiputera (“sons of the soil”) along with the country’s dominant ethnic group, the Malays.⁸¹ Disaggregated, however, they represent 14 percent of Malaysia’s 32 million population — a not insignificant segment of society. Yet, unfortunately, as with many other indigenous communities elsewhere, they face considerable challenges in preserving and defending their ancestral lands and ways of life. In 2019, Google Earth worked together with Jaringan Orang Asal SeMalaysia (JOAS), an umbrella network of 21 community-based NGOs focused on indigenous peoples’ issues in the country, to release a [nationwide mapping initiative](#) of *orang asal* communities in peninsular and east Malaysia. JOAS met with these villagers and trained them to use Google’s tools for this mapping exercise, and to retell their stories in order to raise awareness about their plight.⁸²

The digital economic goals of Malaysia’s Blueprint may not be the ideal or even preferred vision of progress for everyone. As such, the ethical and inclusive professions in the country’s policies should account for these different perspectives if the ultimate objective of data collection and usage is to uphold equity, human dignity, and empowerment, instead of entrenching marginalization.

But data is not the sole preserve of the state and there are civic initiatives like Sinar Project, which uses open technology and open data to help improve governance and policy analysis, as well as to encourage greater public participation in national affairs.

Sinar Project provides a platform for collaborative open data on elected representatives and politicians, local government issues, and legislative tracking. Interestingly, one of its [projects](#) aimed at political and government transparency was built on open data standards originally deployed for a similar initiative in Kenya.⁸³

4. CONCLUSION

Malaysia's data governance regime is pump-primed to advance the economy and trade in an international digital ecosystem. While the country has enjoyed an early mover advantage through its legal and policy regimes, Putrajaya also recognizes that those frameworks have to be updated for the country to adapt to evolving, and in some cases differing, trends on data governance.

The Blueprint is a big step in this direction with its recognition of ethics, inclusion, and sustainability. The review of the PDPA, if pushed through, will also nudge Malaysia closer

toward its goal of easing e-commerce and digital trade more securely. Effective implementation will hinge on enduring political commitment and sufficient resources dedicated to executing reforms.

Two questions loom for policymakers: whether Malaysia will simply be a compliant adherent to global standards on data governance — adopting and adapting laws where necessary; or whether it will play a more proactive role in reframing those parameters as principles and approaches are being contested on the international stage

However, in the longer-term, two questions loom for policymakers: whether Malaysia will simply be a compliant adherent to global standards on data governance — adopting and adapting laws where necessary; or whether it will play a more proactive role in reframing those parameters as principles and approaches are being contested on the international stage. The 2020 PDPA consultation paper references other jurisdictions for comparison and consideration of review. But in carving a more equitable economic future for the country through

digital tools, Malaysia could reflect on whether a fresh paradigm might instead be warranted — one in which the perspectives of long-marginalized and vulnerable communities might be meaningfully represented (not just subsumed) — and what alternative proposals or standards might be called for to realize that vision.

MALAYSIA**SELECTED LEGAL INSTRUMENTS RELATED TO DATA PROTECTION**

Category	No.	Law
Cybersecurity	1	Financial Services 2013
	2	Direct Sales and Anti-Pyramid Scheme Act 1993
	3	Official Secrets Act 1972
Data Protection	4	Personal Protection Data Act (PDPA) 2010
	5	Public Consultation Paper No. 01/2020 – Review of the PDPA
	6	Computer Crime Act 1997
	7	Digital Signature Act 1997 (DSA 1997)
	8	Registration of Business Act 1956
	9	Companies Act 2016 (CA 2016)
	10	Communications and Multimedia Act 1998
E-Commerce/Trade	11	Electronic Commerce Act 2006 (ECA 2006)
	12	Consumer Protection Act 1999
	13	Guidelines for Foreign Participation in Distributive Trade Services In Malaysia (Amendment) 2020
	14	Consumer Protection (Electronic Trade Transactions) Regulations 2012 (CP Regulations 2012)
	15	Contracts Act 1950
	16	Financial Services Act 2013 and Islamic Financial Services Act 2013
	17	Electronic Government Activities Act 2007
	18	Guidelines on Taxation of Electronic Commerce Transactions (E-commerce Taxation Guidelines)
	19	Sales Good Act 1957
	20	Trade Descriptions Act 2011
	21	Price Control and Anti-Profiteering Act 2011

SINGAPORE

1. BACKGROUND

Since 2012, Singapore's policy and regulation frameworks for data protection and privacy have undergone revisions and updates to reflect the changing digital landscape. The Personal Data Protection Act (PDPA) 2012 and a subsequent amendment to the Act, the [Personal Data Protection \(Amendment\) Act 2020](#), established a general data protection law in Singapore which governs the collection, use, and disclosure of individuals' personal data.⁸⁴ The Personal Data Protection Commission (PDPC) oversees the enforcement and administration of data protection policies and laws in Singapore. Through the PDPA, the PDPC mandates all private entities to recognize both the right of individuals to protect their personal data and the need of organizations to collect, use, and disclose personal data.

The PDPA contains two main sets of provisions with which private organizations are required to comply: one covers data protection, and the other the Do Not Call Registry, which allows individuals to opt out from receiving marketing messages on their phones. The [amendments](#) in 2020 introduced stronger protections for processing personal data through a revised consent framework based on legitimate interests and business improvements, and new data portability obligations, in line with similar regulations laid out in the EU's GDPR.⁸⁵ It also aimed to strengthen accountability through mandatory data breach notifications and enhanced the enforcement powers of the PDPC. Other related laws and regulations put forth by the PDPC include the Personal Data Protection Regulations 2021.

Singapore participates in multiple digital economy frameworks. It concluded a [Digital Economy Partnership Agreement](#) (DEPA) with Chile and New Zealand in 2020, the same year Singapore and Australia's Digital Economy Agreement (DEA) entered into force. Recently, Singapore concluded its DEA negotiations with the United Kingdom and South Korea.⁸⁶ Singapore has also signed the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) and the Regional Comprehensive Economic Partnership (RCEP).

Overall, these digital partnerships and agreements serve to facilitate regional and multi-lateral free trade and address digital trade issues to enhance Singapore's competitiveness. DEAs [allow](#) Singapore to “align digital rules and standards and facilitate interoperability between digital systems”⁸⁷ of the countries involved in digital trade, especially for data flows. Cross-border data flows are critical to an increasingly digitalized world, and especially in the fast-rising digital economies of Southeast Asia. ASEAN member states are [expected](#) to gain a dramatic economic boost from digital trade and e-commerce, adding approximately USD1 trillion to their overall gross domestic product by 2030.⁸⁸ However, with such optimism comes practical challenges in safeguarding personal data and consumer rights.

As Singapore punches above its weight in setting the stage for the region's overall digital economy, it has advocated for regulatory and regional frameworks to preserve the core tenets of data privacy and security. Through its minister of communications and information and minister-in-charge of cybersecurity, Singapore plays an active role at the ASEAN Digital Ministers Meeting to shape ongoing digital initiatives that include the ASEAN Data Management Framework,⁸⁹ Model Contractual Clauses for Cross Border Data Flows,⁹⁰ ASEAN CERT Information Exchange Mechanism, and the Digital Masterplan 2025.⁹¹

2. USAGE AND IMPACT

Data is at the heart of Singapore's ambition to become a leading Smart Nation in the Asia Pacific. But to understand the inherent socio-economic value of data for Singapore, one must take two broad views. First, data as the primary commodity fueling Singapore's rapid growth in the digital economy. Second, data as an integral factor to the city-state's formulation, implementation, and evaluation of public policies.

Data for digital economy

As mentioned, Singapore has been very proactive in signing up to various bilateral DEAs and regional trade arrangements to facilitate data transfers, research and development, and institutional collaboration to support its digital economy. In a [study](#) published by the Asian Development Bank over a two-decade period (Period 1: 2000–2012 and Period 2: 2014–2019) on the contribution of the digital economy to select countries' GDP, Singapore recorded the largest digital economy in terms of GDP share in Southeast Asia, averaging at 8.2 percent from 2000 to 2010.⁹² Notwithstanding its slight dip to 6.8 percent from 2014 to 2019, the study concludes that digital products and industries will continue to make a substantial contribution to Singapore's overall economic activities.⁹³

Despite the onslaught of the COVID-19 pandemic, Singapore's digital economy [bounced back](#) in 2021 with a 35 percent growth amounting to a Gross Merchandise Value (GMV) of USD15 billion from USD11 billion in 2020. If the current trend of economic recovery persists, Singapore might be on track to reach a GMV of USD27 billion by 2025.⁹⁴ With a regional average of 80 percent, Singapore has the highest [share](#) of digital consumers out of all internet users per country in Southeast Asia at 97 percent, due to increasing usage of digital services in the e-commerce and digital financial services sector.⁹⁵ Pre-pandemic, 10 percent of Singapore's GDP was [derived](#) from digital products and services like cloud services, Internet of Things (IoT), and Artificial Intelligence (AI).⁹⁶ In the post-pandemic era, Singapore's capacity to generate, capture, and use data will determine the continuing viability of its digital economy, and based on the trends assessed, its data generation is heading inexorably upward. As the world's leading digital hub for business, finance, transportation, logistics, and advanced manufacturing and technology, Singapore's

sustained reliance on and integration of highly interconnected platforms from AI, IoT, Blockchain, to 5G will only accelerate its production of high densities of data. Combined with its digital capital of talent, skills, resources, and digital infrastructure, Singapore is well-positioned to develop new forms of technology and applications.⁹⁷

Data for public policy

The Organisation for Economic Co-operation and Development (OECD) considers data as a strategic asset which can be applied in practical ways that create public value in three areas — anticipation and planning, delivery, and evaluation and monitoring — making the case for data-driven policymaking in the public sector.⁹⁸ In other cases, big data analytics allow governments to improve resource optimization, tax collection, and forecasting and predicting.⁹⁹

Data has been foundational to Singapore's formulation, implementation, and evaluation of public policies, shaping the government's governance structure, management, and operations. The OECD identified Singapore's Fusion Analytics for public Transport Emergency Response (FASTER) initiative as a case study on data's public value in addressing emergencies, crises, and developing situations in the context of overcrowded and ageing transport infrastructure. Through FASTER's anonymized location-based information combined with traffic feeds, Singaporean

authorities can draw insights from transport networks, enabling the deployment of additional buses or advisories to customers when large crowds are detected.¹⁰⁰

Data science tools such as real-time data, data visualization, and machine learning are also being used for evidence-based policymaking. Other examples of how Singapore harnesses data to design and evaluate public policies include Pulse of

the Economy, launched by the Government Technology Agency of Singapore (GovTech), which uses high-frequency big data drawn from rail systems, electricity consumption, social media sentiments and, online apps to develop new indicators for economic and urban planning.¹⁰¹ Singapore's Smart Nation initiative has also made Open Government Data available, allowing publicly available datasets from 70 public agencies, geospatial resources, and e-services tools to be used to create data-driven solutions.¹⁰²

Data has been foundational to Singapore's formulation, implementation, and evaluation of public policies, shaping the government's governance structure, management, and operations

3. CHALLENGES AND PROSPECTS

As the promise of data becomes deeply embedded in Singapore's socio-economic progress and governance processes, key concerns and risks over data privacy and security have also started to surface.

Gaps in data governance regime and incidents of data breaches

In recent years, the Singaporean government has allowed commercial businesses and tech developers to access citizens' data through the [Open Data Resources](#) portal. Under its Smart Nation strategy, which includes the National Digital Identity, e-payments, and the Smart Nation Sensor Platform, Singapore has [utilized](#) common and open platforms like the MyInfo app to create an integrated ecosystem that facilitates seamless digital transactions for public and private services.¹⁰³ Under the updated PDPA, local companies and organizations can use consumer data [without prior consent](#). This means that local businesses can use, collect, and disclose data for legitimate purposes like business improvement and research and development.¹⁰⁴

The government's Smart Nation strategy has faced intense scrutiny following the fallout from incidents of data breaches,¹⁰⁵ most notably the [SingHealth controversy](#) in 2018 that exposed the medical records of almost two million patients.¹⁰⁶ Additionally, civil society organizations have raised concerns about the "gold rush" surrounding the use of data without clear-cut industry guidelines. The non-profit Internet Society [sounded](#) the alarm on the double-edged sword that undergirds the city-state's rapid digital transformation.¹⁰⁷ On the one hand, companies in Singapore are very enthusiastic in collecting and extracting data to generate new business models, while on the other hand, the collection process can be very invasive, and even extends to mundane and trivial transactions.¹⁰⁸ This raises severe issues over surveillance, especially among consumers who lack knowledge about the extent and reach of industry's data extraction.¹⁰⁹

In response, the government rolled out the [Trusted Data Sharing Framework](#) to reinforce consumer confidence that sharing datasets among businesses adheres to legal, technical, and regulatory standards and methodologies. The Infocomm Media Development Authority clarified that the [framework](#) is only a guide for data-sharing agreements for the industry and not a tool for compliance to the PDPA.¹¹⁰ Adopting the framework, the Association of Banks in Singapore [released](#) its Data Sharing Handbook for Banks and Non-Bank Data Ecosystem Partners to produce a common approach in planning and implementing data-sharing arrangements.¹¹¹ The Monetary Authority of Singapore also called for operational resilience among financial organizations through the revised Technology Risk Management Guidelines, which aim to [mitigate](#) technology risks and disruptions to businesses and ensure swift recovery.¹¹² The revised guidelines will [aid](#) better understanding of cyber risk at the senior management level, dealing with third-party service providers, enhancing cyber threat intelligence and software development, and

managing IoT devices.¹¹³ In 2019, the Ministry of Communications and Information also considered including a [data portability](#) component as part of the PDPA, to give consumers more control over their data and facilitate interoperability across different sectors to benefit start-ups as well as small and medium-sized businesses.¹¹⁴

Furthermore, the Singaporean government has also beefed up its enforcement of the PDPA. A non-profit group, Nature Society, was fined SGD14,000 (just over USD10,000) due to a data breach in November 2020 which affected the personal data of 5,131 people. The PDPC [noted](#) that the organization lacked written policies and practices on data privacy laws and did not have a data protection officer.¹¹⁵ Similarly, in March 2022 Yoshi Mobile was [fined](#) SGD21,000 (just over USD15,000) after an investigation revealed that customers' personal data had been exploited without their consent for financial gain.¹¹⁶

Despite these interventions and initiatives, the ambiguity surrounding data-sharing remains a key concern in Singapore's growing debate on data privacy and security. One main area of contention is the exclusion of the public sector from the country's data protection act. Public sector agencies are expected to comply with a different set of mechanisms and guidelines under the Government Instruction Manual on Infocomm Technology and Smart Systems Management and the Public Sector (Governance) Act.

Erosion of public trust

Public worries on data privacy and security reached a fever pitch at the height of the COVID-19 pandemic, crystallized by the controversy over the [TraceTogether app](#).¹¹⁷ Concerns and criticisms have [erupted](#) over the Singaporean government's use of the app beyond its original purpose of contact tracing.¹¹⁸

Contrary to its initial claims, the government [soon admitted](#) that the data collected by the contact-tracing cloud solution could also be used for law enforcement under the Criminal Procedure Code.¹¹⁹ Minister of State for Home Affairs and Sustainability and the Environment **Desmond Tan** [admitted](#) in Parliament that the Singapore Police Force can obtain TraceTogether data for criminal investigations.¹²⁰ Although he assured the public that strict measures were being enforced to safeguard personal data, the government's backtracking on its initial claims led some [users](#) to delete the app.¹²¹

This has undermined the Singaporean government's credibility, especially among vulnerable groups like [migrant workers](#) who were mandated to install the app.¹²² This latest controversy has put the spotlight on Singapore's broader Smart Nation initiatives, and specifically on longstanding issues of trust and privacy vis-à-vis data surveillance. The state's [extensive reach](#) has been painted as "big government" possessing techno-authoritarian power.¹²³

The controversy over the TraceTogether app has exposed growing public concern about increased surveillance. In retrospect, the public backlash over the TraceTogether app may be symptomatic of the larger challenges that underwrite Singapore's placing of corporate and political-security interests above the individual's rights to privacy and the provision of public goods. The perceived lack of transparency on the part of the government has put into question the tradeoffs that come with Singapore's ambition to become a Smart Nation and growing public expectations of privacy rights.¹²⁴

With its rapid digitalization, Singapore is standing at the crossroads of how to sustain its digital economic growth, while also confronting the growing needs of its society for privacy and transparency.¹²⁵ To its credit, the Singaporean government has paid close attention to the issue, addressing inclusion, gender parity, and the digital divide. It has revised existing laws, and crafted frameworks and guidelines after public consultations with key sectors across society. The Infocomm Media Development Authority (IMDA) has launched the SG Women in Tech initiative to diversify the workforce in the tech industry, as well as the Seniors Go Digital program, to mobilize digital ambassadors and get more senior citizens on board the digital transformation track. Mindful of the resource constraints among small and medium enterprises (SMEs) on cybersecurity capacity, IMDA established the SMEs Go Digital program, which provides consulting chief technology officers to assess and help implement digital plans. A Start Digital pack is also available to provide SMEs with easy-to-deploy digital solutions for a specific contract period.

Despite such practical interventions, it appears that finding the balance between individual privacy and the collective good remains elusive in Singapore's ongoing digital and data revolution. As the fault lines surrounding data surveillance rupture, there is a growing consensus among the academic experts, industry representatives, and civil society practitioners interviewed for this study that it is imperative that there is a paradigm shift to bridge the current gaps and shortcomings on how data security and privacy is conceived of in the context of Singapore.

Inclusion and equity

The controversy over the TraceTogether app has illuminated the interrelated concepts of digital equity and data citizenship, whereby the citizen's voice is amplified in order to tackle the potential disruptions of technology, while emphasizing pragmatism to build trust. Digital equity far exceeds the digital divide. The latter perpetuates a binary division between the haves and the have-nots, thus limiting the discussion on access and digital literacy. As mentioned, the Singaporean government has embarked on key initiatives to bridge the gap for vulnerable and underserved communities like women and the elderly, but its top-down approach could be complemented with more bottom-up initiatives to jump-start digital equity.

Framing the current issues and developments in Singapore from a digital equity perspective will empower society to consider more community-based or grass-roots types of approach toward data, beyond its economic value. Digital equity is a far more complex continuum that considers the interaction of social, economic, and technological variations

Framing the current issues and developments in Singapore from a digital equity perspective will empower society to consider more community-based or grass-roots types of approach toward data, beyond its economic value. Digital equity is a far more complex continuum that considers the interaction of social, economic, and technological variations. It means acquiring knowledge, capacity, and mechanisms to bring a whole-of-community approach. The COVID-19 pandemic has further highlighted the gap between the rich and poor in the city-state. The implementation of home-based learning revealed a shortage in household access to digital devices. It also underscored often overlooked yet salient factors, such as the physical environment, connectivity issues, and parenting skills that cannot be addressed merely by the distribution of laptops and tablets.

On data citizenship, experts also evaluated the role of data on public policies and as an economic commodity that should benefit not only tech firms, but the entire community. According to one informant, Singapore's adoption of the means-testing approach in granting financial assistance based on household income has revealed lapses on inclusivity in the data collection process. It was found that it can disproportionately exclude underserved communities in hard-to-reach areas. This complicates the delivery of social services, which may appear to be good on paper, but is not as efficient in practice. For instance, over-reliance on data captured by digital tools may not provide the whole picture about who deserves financial assistance based on household income. Digital literacy also remains a key challenge in other segments of society. There were instances when families signing up for broadband services ended up paying more because they lacked the digital competency to understand the terms and conditions stipulated in such arrangements.¹²⁶

Sensitivity about using big data for either commercial or public research is further evident when one looks at Singapore's pursuit of biomedical and health research. Although the current explosion of data in Singapore's healthcare sector considered another engine of economic growth, and will help combat the strain of its ageing population on its healthcare system, the issues of research ethics and safeguarding patients' privacy remain significant challenges.¹²⁷ In spite of the Singaporean government's proactiveness on its data privacy laws, its selective approach of applying the PDPA, which exempts government agencies and institutions, continues to raise suspicion. In the aftermath of the very public fallout from health-related data breaches in the city-state, an NGO called Big Brother Watch cautioned about the possibility of a further erosion of trust in the government's ability to secure individual medical health records.¹²⁸

CASE STUDY

DATA PRIVACY CONTROVERSY SURROUNDING COVID-19 CONTACT TRACING APP

In March 2020, Singapore launched TraceTogether, its nationwide COVID-19 contact-tracing application. The app uses Bluetooth to ping close contacts, and the information is then encrypted and stored privately. This information would then be decrypted by the Ministry of Health should the user test positive for COVID-19.

The government announced that the use of the app or a similar TraceTogether token for non-smartphone users would be made mandatory. In the initial days following the launch of the app, Vivian Balakrishnan, the minister in charge of Singapore's Smart Nation initiative said, at a press conference in June 2020, that the "TraceTogether app... and the data generated, is purely for contact-tracing. Period." However, it was later revealed that the data collected from TraceTogether could be accessed by the police for criminal investigations. At that point, such data had already been used in investigations regarding a murder case.

While such a level of surveillance is not necessarily surprising to Singaporeans, there was anger and displeasure over the fact that the government had made false claims regarding the level of data protection and privacy users of the application received. The government then worked on passing new legislation that would limit police access to contact-tracing data for investigations in seven classes of offenses only.

Despite claims of its robust data regulation practices, by at least one metric Singapore was [found](#) to still have relatively weak data privacy and security compared to the Philippines.¹²⁹ Singapore's technocratic approach, which promotes open-data platforms to achieve transformative governance, has also been accused of [perpetuating](#) the status quo instead.¹³⁰ There is an expectation that data can spur new ways of tackling social problems, whereas it often reinforces the same structural inequities.¹³¹

Amid growing interest in privacy and consent, advocates of data citizenship have called for a review of the current data-sharing frameworks in Singapore. The distinction between data ownership, control, and management has disintegrated with the growing power of data brokers and controllers. Data controllers have blurred the process of capturing and analyzing data into a single transaction. In any single transaction, the public is dealing with unknown and multiple entities. Citizens can no longer identify or distinguish who

controls their data. One informant suggested exploring alternative data approaches to challenge the dominant private-sector driven model, which overwhelmingly benefits big tech companies. Large ICT firms have the tendency to hoard or over-share data that could expose individuals and communities to undue risks without their knowledge or consent. Devising more community-based data arrangements can make the value creation surrounding data more equitable, and that can benefit the larger public compared to the winner-takes-all model of major western-based tech firms.¹³²

To be fair, most of the informants recognized the Singaporean government's varied initiatives to address issues such as inclusion, access, and diversity, but building human agency starts not just with top-down strategies but also with an empowered community. The Singaporean government has started to organize dialogue oriented around community engagements. It has launched the Alliances for Action, an industry-led coalition of [25 alliances](#) that unites a multi-stakeholder task force from key communities, as well as the private and public sectors.¹³³ It aims to mobilize local communities to identify solutions on complex social problems. But one expert pointed out, "the devil is in the details," as the government continues to have a heavy hand in selecting the people who participate in these forums, thus influencing the overall outcomes and directions. Nevertheless, multistakeholder activities like [Alliances for Action](#) are a good start.¹³⁴

As a concrete way forward, one of the experts stressed the importance of reorienting discussions on data privacy and security to the community level. This involves finding alternative governance structures that can complement state-driven interventions. Creating a network of knowledgeable and aware communities can reframe discussions on digital equity, ensuring stronger buy-in from the public rather than just compliance.

4. CONCLUSION

As data-driven technologies mature, their socio-economic value can bring exponential benefits. However, potential harms can also arise from such prospects. For highly industrialized countries like Singapore, the paradox is even more evident and glaring. But despite Singapore's enthusiasm in embracing data as the backbone of its economy and society in the context of Industry 4.0., it has maintained a pragmatic outlook on its potential benefits, risks, and harms. It has been very methodological in addressing these issues from a regulatory perspective, reinforced by periodic assessments and adjustments of laws, guidelines, and regulations in consultation with the public and the private sectors.

Reflecting on our conversations and consultations with experts on these issues, they seek to advance a more radical paradigm shift that goes beyond regulation or multi-stakeholder consultation, given Singapore's vast intellectual and social capital. The overwhelming spotlight on a technocratic approach often obfuscates the imperative to arrive

at a new social consciousness in the digital age, whereby ordinary citizens are cognizant of their digital rights that transcend offline and online platforms. The proposed paradigm shift necessitates a rethinking of what it means to be a digital citizen or native in the emerging digital society. A digital society where citizens are not only treated as passive subjects but proactive agents who can participate in a meaningful way.

Although imperfect, a community-based approach can lay the foundation for pragmatic and alternative paths towards realizing data governance frameworks that can help achieve data equity and digital citizenship. Embarking on the proposed radical shift will not be easy, especially for Singapore, whose track record of success among its ASEAN peers owes much to its political stability and relatively tight control of both governance and reforms. However, Singapore has started to think seriously about such issues and has carefully laid the initial groundwork. The next challenge ahead is finding the right balance between progress and parity to build a profound and equitable digital Singapore.

SINGAPORE

SELECTED LEGAL INSTRUMENTS RELATED TO DATA PROTECTION

Category	No.	Law
Cybersecurity	1	The Computer Misuse Act (Cap. 50A) 1993
	2	The Cybersecurity Act 2018
Data Protection	3	Personal Data Protection Act of 2012
	4	Personal Data Protection (Amendment) Act 2020
E-Commerce/Trade	5	Electronic Commerce Act 2006
Sectoral Law	6	The Banking Act 1970, revised 2003
	7	Code of Practice for Competition in the Provision of Telecommunication Services 2005
	8	The Private Hospitals and Medical Clinics Act, revised 1985

THAILAND

1. BACKGROUND

Thailand has been discussing crafting its data protection legislation for over 20 years. But the dawn of IR 4.0, marked by the emergence of new frontier technologies, accelerated the pace for Bangkok to consolidate a legal framework on data privacy and security under the [Personal Data Protection Act B.E. 2562 \(2019\)\(PDPA\)](#).¹³⁵ However, progress has been incremental due to the push and pull effects of various internal and external factors.

Published on 27 May 2019, Thailand's [PDPA](#) is the country's first consolidated law on data protection. Key principles under the PDPA are highly influenced by the European Union's (EU) General Data Protection Regulation (GDPR), especially its extraterritorial applicability.¹³⁶ The PDPA acknowledges individuals' right to control how their personal data is collected, stored, processed, and disseminated by data controllers.¹³⁷ It provides lawful grounds for the processing of personal data and defines the duties and responsibilities of data controllers and data processors.¹³⁸

Under the PDPA, there is no mandate on data localization, but the data protection obligations apply to all organizations that collect, use, or disclose personal data in Thailand or of Thai residents, regardless of whether they are formed or recognized under Thai law, and whether they are residents or have a business presence in Thailand.¹³⁹ This means that the extraterritorial effects of the PDPA apply to all data controllers and processors, even if they do not maintain any physical foothold in Thailand.

After the PDPA's publication in the Government Gazette in May 2019, the Personal Data Protection Commission (PDPC) was established to oversee its enforcement. Composed of 10 members from various fields, ranging from the legal, health, information technology, and human resources, to the military, the PDPC is currently drafting the PDPA's sub-regulations.¹⁴⁰ Upon the PDPA's enactment on June 1, 2022, businesses were given a grace period of [one year](#) to set up new guidelines and establish or adjust their practices to comply with the PDPA.¹⁴¹

Thailand's PDPA [builds](#) on existing and quite similar laws and regulations surrounding data protection and privacy, such as the Computer Crime Act of 2007 (CCA) and the Cybersecurity Act of 2019, which stipulates the specific requirements and obligations on government agencies and private organizations involved in critical information infrastructure to prevent, protect, and manage cyber risks, as well as to employ threat response and detection.¹⁴² The PDPA and the Cybersecurity Act are designed to complement one another, guiding businesses, regulators, and government agencies through the unfolding technological transformation in Thailand. Both [pieces of legislation](#) are also expected to form the foundation for Thailand's "standards-based" digital economic base in the short and long haul.¹⁴³

Despite the momentum surrounding the PDPA, its implementation has faced significant delays. Although it was planned to go into effect in 2021, an amendment to the Royal Decree led to its postponement for another year, moving the enforcement date to June 1, 2022. Internally, this delay stemmed from the setbacks of the COVID-19 pandemic and lack of human capacity at the governmental and institutional level. On the external front, pressure to comply with international regimes — in particular, the EU’s GDPR and the APEC Cross-Border Protection Rules (CBPR) — delayed Thailand fast-tracking the implementation. But amid growing concerns and speculation about another postponement, the PDPA did in fact go live on June 1, 2022.

2. USAGE AND IMPACT

Despite the drawn-out implementation of Thailand’s data governance regime, its digital economy has grown dramatically over the past decade. In 2018, Thailand’s digital economy accounted for 17 percent of its GDP.¹⁴⁴ The digital content industry serves as the main driver of Thailand’s digital economy, mainly comprising gaming, big data, and animation. Characterized as a hyperconnected nation, 69.5 percent of Thailand’s population are online, of which 74.2 percent of those aged between 16 and 64 have purchased a product through e-commerce or have accessed online services.¹⁴⁵

Data for the digital economy

Like most countries in Southeast Asia, the COVID-19 pandemic affected Thailand’s economy, which contracted by 0.3 percent in the third quarter of 2021.¹⁴⁶ With strict lockdowns and telework set-up, the pandemic forced public and private organizations to migrate to online platforms, which experienced a growth of 300 percent in 2021, alongside increased reliance on cloud services.¹⁴⁷ Notwithstanding the aftershocks of the pandemic, and political concerns in the country, the digital economy remains on track to further expand and reach USD57 billion by 2025.¹⁴⁸

The steady rise of Thailand’s digital economy is mainly driven by its current economic model, Thailand 4.0. Launched in 2016, Thailand 4.0 focuses on innovation and the adoption of advanced digital technologies powered by big data to devise new engines of growth for the country to overcome the middle-income trap.^{149,150} Specifically, it aims to stimulate industrial transformation through the establishment of the Eastern Economic Corridor (EEC) to attract foreign investors and boost productivity in the short- to medium-term.¹⁵¹

With Thailand’s increasing digital connectivity and internet penetration, demand for hyperscale data centers and cloud technology continues to rise. Data centers and the cloud industry will be crucial to support Thailand 4.0 initiatives. Given its rapid pace of digitalization, Thailand’s big data market is expected to grow due to rising investment in the country’s data center market of up to USD1 billion and USD700 million in cloud services by 2026.¹⁵²

As big data becomes increasingly vital to the success of Thailand 4.0, the Thai parliament's recent enforcement of the PDPA will be instrumental to ensure sustained growth of its digital economy. Ideally, the PDPA can provide the proper guidelines for businesses on data storage protocols, data logs, and unauthorized access, boosting the upward trajectory of Thailand's digital economy. With the implementation of the PDPA, businesses and organizations are now legally compelled to adopt adequate policies and procedures to protect against massive data breaches that could expose thousands of personal records. If the PDPA is implemented correctly, large firms and SMEs can potentially avert or minimize possibly unquantifiable reputational damage, resulting in public backlash and loss of investor confidence.

As Thailand vies to become ASEAN's digital hub, the implementation of the PDPA is a significant step in permitting the movement of critical data within and beyond the country's borders. The PDPA sets the stage for Thailand to strengthen formal discussions on data flows through mechanisms such as model contractual clauses or equivalency certifications with other countries or jurisdictions. Furthermore, the PDPA's implementation also enhances Thailand's competitive standing in the digital economy, putting it in a better position to maintain and even attract more foreign investment from important markets like the EU. As one informant shared, previous bans and restrictions by the EU that impacted Thailand's fishing and civil aviation industries have been cautionary lessons for the country's booming tech industry¹⁵³ — making the implementation of the PDPA in line with international data protection regimes like the GDPR a top and urgent priority.

In the foreseeable future, the PDPA's implementation will help lower the risk of Thailand's vulnerability to cyber threats. Businesses can mitigate additional costs and even fines. More importantly, it can help the tech industry to truly optimize the benefits and opportunities of cross-border data flows or venture into joint research and development contracts with foreign entities, all of which will benefit the 10 priority industries under Thailand 4.0. At the regional level, Thailand's productive participation on digital trade could be increased through its membership of the Regional Comprehensive Economic Partnership (RCEP) or by eventual accession to the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP).

Yet despite the projected benefits and advantages of the PDPA's enforcement, it remains to be seen how it can be genuinely implemented to deliver practical outcomes, given the lack of human and technical capacity, especially among government agencies and regulators, to guarantee compliance among all concerned.¹⁵⁴ Also, as noted, during its initial rollout the private sector faced the complex and dizzying task of implementing and interpreting provisions of the PDPA.¹⁵⁵ A 2020 PDPA [survey](#) conducted by PwC among private companies in Thailand found that although 75 percent of companies were aware of the PDPA's policies and procedures, 51 percent were still in the initial stages of implementation and 34 percent were still contemplating how to implement it.¹⁵⁶ The majority of companies (60 percent) had not yet appointed a data protection officer, while 30 percent

had not even set up a dedicated team for data privacy tasks.¹⁵⁷

Interpreting the PDPA was also a major challenge among businesses. Due to the limited guidance available at that time, 46 percent of the surveyed companies were just integrating the new policies on data protection into existing marketing processes or privacy notices. Ensuring compliance under the PDPA will be the next challenge for government and regulatory agencies. As businesses and organizations adjust to the PDPA, it remains uncertain how the government will respond to potentially mounting inquiries due to issues relating to available manpower and expertise — issues that will be further tackled below.

Data for public policy

Under its Open Government Data model and its related policies and initiatives, the Thai government has begun to harness the value of big data for public policy interventions. In 2013, it established the Digital Government Development Agency (DGA) and the Office of the Public Sector Development Commission (OPDC) to lead its Open Government Data initiative. The DGA is tasked with managing the [Open Government Data center](#) that gives easy access to members of the public and private sectors on relevant government data. Under the Open Government Partnership, the Thai government has encouraged the private sector, academia, and civil society to build an ecosystem that promotes the usage of the Open Government Data center.

The DGA coordinates with various government agencies on the selection of high-value datasets and encourages public participation.¹⁵⁸ In 2015, the Thai government published its first Open Data Strategy, with 10 principles to guide public sector organizations in releasing government data for public access and consumption. As of May 2022, the Open Government Data of Thailand hosted [5,858 data sets](#) catalogued in various data groups from the economy, finance, and agriculture, to education.

Similarly, the Digital Economy Promotion Agency considers data as a critical component to drive new business models and promote innovative collaboration between the public and private sectors. The Ministry of Digital Economy and Society plans to collate [datasets](#) from 20 ministries to create a centralized big data management system to monitor the progress of government projects and combat corruption.¹⁵⁹ Government data will be categorized into sensitive or national security data, important data, and general data. The end goal is to create a [data analytics system](#) to create a digital ecosystem.¹⁶⁰ The government also plans to [share](#) the datasets with the [broader public](#), especially the private sector and the local start-up community, so that they can use government data to develop solutions.^{161,162}

The Digital Economy Promotion Agency considers data as a critical component to drive new business models and promote innovative collaboration between the public and private sectors

Despite its intent, the Open Government Data initiative has been less successful in attracting public support. The lukewarm approach to using the data center among government agencies at the departmental and provincial levels has militated against their increased adoption of more data-driven policies. [Deficiency](#) in the government's technical and administrative support impedes its usability. The lack of a standardized approach to submitting data in machine-readable formats also inhibits data searchability and interoperability.¹⁶³

The use of data also played an important role in how the Thai government combatted the spread of COVID-19 within its borders. Thailand's initial success in its [pandemic response](#) was aided by a robust contract-tracing capacity through the Rapid Response Teams, Village Health Volunteers,¹⁶⁴ and a mobile application known as [MorChana](#).¹⁶⁵ The Department of Disease Control and the Office of the National Broadcasting and Telecommunications Commission used the Bluetooth-powered MorChana to monitor and track the geolocation of individuals, identify high-risk infection sites, and prompt rapid responses from health authorities.¹⁶⁶

Although the app was not voluntary, it [lacked solid provisions](#) on consent, privacy risk assessment, and encryption, raising a whole range of data privacy and security issues.¹⁶⁷ From the onset, the mobile app stated that only public health authorities could access the data. However, the extent of the government's power to collect, use, or disclose users' personal data was unclear.¹⁶⁸ A [comparative study](#) on Southeast Asia's contact tracing apps showed that MorChana was the most intrusive. It used the greatest number of permissions to access an individual's mobile phone features — camera, device, app history, location, microphone, photos, media, files, and phone storage — for contact tracing, but did not provide a substantive explanation on its privacy notice.¹⁶⁹

Mounting data privacy concerns over MorChana were evident in the very [low numbers](#) of the app's downloads. Addressing data-privacy related issues, the Thai government [reconfigured](#) the app. But this was still not adequate to gain public confidence that the new version of MorChana protected their privacy sufficiently.¹⁷⁰

Although MorChana as a service was terminated on June 1, key lessons can be drawn about the highly problematic management of data in Thailand. As the PDPA was still not fully enforced at that time, there was no legal oversight on data collected from, and stored by, MorChana. Given the storage of MorChana's data on U.S.-based Amazon Web Services, there were concerns about the implications of America's 2018 Clarifying Lawful Overseas Use of Data (CLOUD) Act for foreign access to Thai data.¹⁷¹ Conversely, the plan to openly share government data for commercial use with private entities could also be affected by its lack of defined parameters. If not managed under regulatory oversight, this situation could be exploited and result in possible data breaches.

Taken altogether, the delays in implementing the PDPA not only incurred possible monetary losses, but also endangered civil liberties through unwanted surveillance both by

the Thai government and, possibly, other external actors using third-party contractors. As the PDPA comes into force, there are high expectations that the public and private sectors will no longer rely on ad hoc rules and procedures mainly influenced by the EU GDPR.¹⁷² In the long run, the PDPA's enforcement could potentially repair public trust. But one must remain only cautiously optimistic given the outstanding challenges, which will be further outlined below.

CASE STUDY

DATA BREACHES IN THE BANKING SECTOR

In August 2018, cyberattackers stole data belonging to more than 123,000 customers from Kasikornbank (KBank) and Krungthai Bank (KTB) in what appeared to be “the first massive data leak to hit [Thai] financial institutions.” The stolen data included corporate client and retail consumer data, but not financial transaction data. Immediate action was taken by the banks following the cyberattack. KTB president **Payong Srivanich** stated that the bank set up a war room and started inspecting the data breach within 12 hours of detecting the attack. Data breaches like these have prompted the Thailand Banking Sector Computer Emergency Response Team (TB-CERT), a unit under the Thai Bankers' Association (TBA), to investigate how to strengthen the cybersecurity system of the banking sector.

Security experts have raised concerns about Thailand's lack of readiness in cybersecurity. However, Thailand's newly enacted PDPA should provide clearer guidance and standards on data protection and security.

3. CHALLENGES AND PROSPECTS

Before the implementation of the PDPA this June, some members of the public and private sectors had developed their own codes of conduct.¹⁷³ The healthcare sector struggled the most to adopt and comply with the PDPA's pending implementation, given the long shadow of the pandemic. Migrating to online channels and setting up data protection procedures could impact the healthcare industry's day-to-day operations. Luckily, SMEs were exempted from the urgency to enforce the PDPA because of their limited size and resources.¹⁷⁴ As Thailand anticipated the PDPA's implementation, parallel discussions that revolved around consent, surveillance, inclusion, and equity also gained momentum — deliberations that will continue as the PDPA seeks to deliver on its promise to raise the bar for data protection.

Gaps in the PDPA guidelines

As digitally savvy citizens, Thais are increasingly becoming deeply concerned about their individual rights to privacy, demanding more transparency from the government and the private sector. As discussed previously, the main impediment to the enforcement of the PDPA was a lack of capacity within the ranks of the government but, additionally, some in the banking and finance sector were also initially resistant to the high standards of data protection involved.¹⁷⁵ Fortunately, a sizeable majority in the private sector sees the value of the PDPA, despite their lack of technical understanding on data protection standards. Industry considers the PDPA as a positive development rather than a burden. Companies view the PDPA as an important instrument to maintain and expand their market share within and outside Thailand, especially in the EU. Interestingly, digital brands use the PDPA to set them apart from their competitors and create an image of legally compliant and transparent entities.¹⁷⁶

Despite the positive outlook of the private sector and the public on the PDPA's implementation, there are still major issues with the PDPA itself. On the surface, it appears that Thailand is utilizing the GDPR, both as a compliance mechanism to maintain its market access and digital competitiveness, especially in critical markets like the EU, but also simultaneously using it to project a veneer of legitimacy — that it truly will promote the fundamental digital rights of its citizens. Closer scrutiny reveals that certain provisions in the PDPA afford the Thai government some preferential exemptions, while also allowing it to exercise a relative degree of flexibility to expand its powers should it deem necessary. For instance, the PDPA mandates the outright exclusion of public authorities involved in national security, law enforcement, and the National Credit Bureau.¹⁷⁷ The [definition](#) of personal data is also unclear as to whether it covers IP addresses and cookie identifiers. Furthermore, the PDPA does not define anonymized or pseudonymized data.¹⁷⁸ On the matter of cross-border data transfers, the PDPA has a [high penalty](#) for non-compliance, which could result in imprisonment for a term not exceeding one year.¹⁷⁹

At the operational level, government officials and employees are not fully equipped to implement the PDPA because of a human capacity shortage. Government agencies are not well-versed on the technicalities of data protection and are still in the very early stages of understanding concepts like data portability. Added to this are the usual bureaucratic challenges which impede intergovernmental co-ordination. High standards are ideal, but without adequate human capacity on the ground to implement them, enforcement becomes weak and fragmented.

State surveillance and censorship

Harmonization of the PDPA guidelines with existing laws, such as the Cybersecurity Act and the Computer Crime Act (CCA), presents another challenge, particularly over the contentious issues of censorship and surveillance. Thailand's passage of the [Cybersecurity Act in 2019](#) faced resistance from civil liberty advocates, internet

companies, and business associations.¹⁸⁰ The controversial internet security law, decried as “cyber martial law,” allows the National Cybersecurity Committee to summon individuals for questioning, as well as enter any private property without a court order, in case of actual or anticipated “serious cyber threats.”¹⁸¹

Critics claim that this law would allow Thailand’s military-led agencies to access private data, computer networks, and devices. The law would also afford the government the ability to further censor critics and easily categorize them as threats to national security.¹⁸² Opponents argue that the CCA imposes unnecessary limits on freedom of expression and curtails individual rights to information. Similarly, it is also highly intrusive, compelling business organizations to provide information on the online activity of their staff and clients.¹⁸³

The alleged excessive use and abuse of data-driven technologies for surveillance and censorship stretches as far as Thailand’s Southern Border Provinces. Human rights activists have cited the increasing use of biometric registration to conduct monitoring and racial profiling of ethnic Malay Muslims.¹⁸⁴ The proliferation of surveillance technologies, combined with militarization of the area, have led to further mistrust among members of the ethnic minorities of the government’s deployment of biometric technologies for data collection.¹⁸⁵ One informant said that he hoped the PDPA would serve as a check and balance to the cybersecurity law and the CCA, arguing that the law would be critical for supplying regulatory and judicial oversight against possible abuse of power, particularly in terms of seizing personal data and surveillance.¹⁸⁶

The proliferation of surveillance technologies, combined with militarization of the area, have led to further mistrust among members of the ethnic minorities about the government’s deployment of biometric technologies for data collection

Inclusion and equity

As public policies become increasingly reliant on datasets collected through smart sensors and e-government service delivery platforms, some ethnic or tribal communities are not able to productively participate, due to low or no knowledge of connecting to or using ICT networks and infrastructures.¹⁸⁷ This eventually results in poorly designed, or worse, discriminatory public policies, because data points and indicators are sourced through flawed and partial processes. The exclusion of indigenous groups not only aggravates their impoverished conditions, but also further complicates sensitive issues on customary rights to land ownership.¹⁸⁸

With their plight left unheard and often neglected in national laws and policies, indigenous communities have become more proactive in asserting their rights to land, territory, and natural resources. Through a network of ethnic community partnerships across the Mekong region, in collaboration with non-governmental organizations and

academic experts, over [80 villages](#) across Thailand have started to produce their own community maps.¹⁸⁹ The proactiveness of indigenous communities in the land-mapping process helps ensure that data collated in hard-to-reach villages are reflected and aggregated at the national level. Highlighting the indigenous communities' agency is critical. It helps correct, at the very onset, the [propagation of stereotypes](#) that are often linked to data or images captured and disseminated through new media or open-source tools like geo-tags. These stereotypes often then go on to be perpetuated by government census bureaus or external parties such as international donor partners.

On female empowerment, Thailand's promulgation of [the 2015 Gender Equality Act](#) was a significant step in closing the gender data gaps that have consequences in the formulation of gender-responsive policies. However, the bill's impact has been [limited](#) due to its "exemption for possible gender discriminatory practices for reasons of religious principles or national security." Deeper criticisms of the law stem from its [absent definition](#) of "gender, gender status, gender orientation, violence from sexual cause and sexual assault,"¹⁹⁰ which puts members of the Lesbian, Gay, Bisexual, Transgender, Queer, and Intersexed (LGBTQI) Community at the higher risk of [gender-data exclusion and discrimination](#).¹⁹¹ It raises the barriers for the LGBTQI community to assert their rights to health, education, and work, while failing to provide legal barriers against harassment, bullying, and discrimination.¹⁹²

Whereas Thai universities, workplaces, and media organizations have become increasingly tolerant of [gender diversity](#), government online portals and services will need to improve their gathering and dissemination of sex-disaggregated data.¹⁹³ Embedding clearer definitions of gender in the country's Open Government Data initiatives, as well as in other existing public-private partnership programs, can better contribute to meaningful policy dialogue on health, education, financial, and digital inclusion based on historical and accurate data.

According to its Voluntary National Review of the 2030 Agenda for Sustainable Development, Thailand [boasts](#) of marking milestones under the UN Sustainable Development Goals (SDGs).¹⁹⁴ However, it has also [acknowledged](#) the limitations of its self-formulated SDG indicators, based on the availability and quality of data from civil registration, vital statistics, censuses, and surveys, as well as information from open data systems, big data and remote sensing¹⁹⁵. This judgement is further corroborated by the Voluntary National Review's exposition of Thailand's prevailing challenges in gathering complete, secure, and impartial data across its geographically and ethnically diverse population. Therefore, the PDPA's implementation will be fundamental to anchor Thailand's approach in developing inclusive and equitable policies to propel a sustainable digital economy.

4. CONCLUSION

After much delay and anticipation, Thailand's PDPA is now online. However, to fully harness the benefits of its newly-minted data governance regime, Bangkok will still need to address fundamental issues in the pipeline; from clarifying provisions of consent and training human personnel, to addressing the need for more inclusive digital development. Amid rising concern over state surveillance, the enforcement of the PDPA could help repair the deteriorating trust deficit between the government and the local Thai population. There is cautious optimism that the PDPA can insulate Thai citizens from unwarranted government censorship and the private sector's mismanagement of users' data.

But as Thailand positions itself as a regional contender in the rapidly growing internet economy, the larger question that looms over Bangkok is how it will evolve from being a follower to becoming a trendsetter in the international standards landscape. The formulation and the implementation of the PDPA is a good starting point, showing Thailand's ability to draw best practices from international standards like GDPR and applying its distinct modifications. The longer-term challenge for Thailand is how it can capitalize on digital economic integration to assert its agency, as well as preserve a level of autonomy, while reacting to unfolding international norms on data governance.

THAILAND

SELECTED LEGAL INSTRUMENTS RELATED TO DATA PROTECTION

Category	No.	Law
Cybersecurity	1	Cybersecurity Act of 2019 (CSA)
	2	Cyber Crime Act
Data Protection	3	Personal Data Protection Act 2019
Privacy	4	Computer Crime Act 2007
E-Commerce	5	Electronic Transactions Act of 2001
	6	Direct Sale and Direct Marketing Act
	7	Consumer Protection Act of 1979
	8	Unfair Contract Terms Act of 1997
	9	Payment Systems Act of 2017

VIET NAM

1. BACKGROUND

Viet Nam's landscape of data governance is a collage of legal instruments variously reflected in the country's constitution, criminal code, civil code, and a raft of sectoral and procedural regulations.

Taken together, the Ministry of Public Security's (MPS) much-anticipated Draft Decree on Personal Data Protection ("draft PDPD") and the Draft Decree on Sanctions against Administrative Violations in Cybersecurity ("draft cybersecurity decree") constitute the government's ambitious effort at consolidating its numerous regulations into one comprehensive law.

The [draft PDPD](#) was released for public consultation in February 2021 and was originally scheduled to take effect in December 2021.¹⁹⁶ At the time of writing, the draft PDPD is still pending enactment, although a revised version appears to have been approved with the government's issuance of Resolution No. 27/NQ-CP in March 2022. That version has yet to be disclosed. It appears that with the Resolution's authorization of the MPS to further develop the PDPD in consultation with the Standing Committee of the National Assembly (SCNA), other amendments may be possible. As of the time of writing, this process seems likely to cause further delay to the enactment of the PDPD as the MPS is not due to [submit the final version](#) of the PDPD to the government for issuance till May 2022.¹⁹⁷

Similarly, the draft cybersecurity decree was released for comments from September to November 2021, with an expected promulgation date soon after. As of the second quarter of 2022, however, its enactment remains forthcoming. Paradoxically, although this document offers clarifying guidelines to several provisions of Viet Nam's controversial Law on Cybersecurity 2018, the draft cybersecurity decree differs from the Law on Cybersecurity by taking a narrower approach to data localization, perhaps in response to industry's forceful [representations](#).¹⁹⁸ Given the decree is meant to operationalize the law, it will be interesting to see how this divergence is resolved when the final version of the decree takes effect.

The government's data localization requirement has been one of the most scrutinized aspects of its data governance framework, seen by business and industry as prohibitive to the development of a robust and secure digital economy, but viewed by the government as fundamental to preserving digital sovereignty and "[social order and safety](#)."¹⁹⁹ For Hanoi, striking a balance between the two is proving an urgent challenge, particularly in light of its commitments under the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) and the country's newly-issued [National Strategy for Development of Digital Economy and Digital Society by 2025, Orientation to 2030](#).

Prime Minister **Phạm Minh Chính**'s January 2022 decision ([Decision 06/QĐ-TTg](#)) “to approve the Scheme on developing the application of data on population, identification, electronic authentication data for national digital transformation in the 2022–2025 period, with a vision toward 2030” paves the way for a full-fledged personal data protection law that would be more comprehensive than the PDPD.²⁰⁰ The decision directs the MPS to conduct research and consultation to draft such a law by 2024.

2. USAGE AND IMPACT

Consultations with informants revealed that tensions between the utility of data flows to advance the economy, on the one hand, and its implications for national security, on the other, pervade the discourse on data governance in Viet Nam.

Data for the digital economy

Viet Nam's goal is for the digital economy to account for 20 percent of its gross domestic product (GDP) by 2025. In the first half of 2021, one year into the pandemic, more than half (55 percent) of the country's eight million [new digital consumers](#) logged on from non-metro areas. Its e-commerce sector grew 53 percent year-on-year in 2021 and its overall internet economy is projected to reach USD57 billion in value by 2025.²⁰¹

Viet Nam's goal is for the digital economy to account for 20 percent of its gross domestic product (GDP) by 2025

Yet, despite this bullish commercial outlook, Hanoi remains conscious about the headwinds it faces, especially against the backdrop of recovery from the pandemic, in order to achieve the 20 percent digital economy goal it set out for itself over the next three years. That would require maintaining an average annual growth of the digital economy at about 20 percent, a rate three times higher than the expected annual GDP growth.

Under normal circumstances, the Ministry of Information and Communications [estimates](#) that the digital economy will account for only 10.4 percent of GDP by 2025, with the ICT, telecommunications, and internet economy together accounting for about 7.9 percent of GDP. With an emphasis on digital transformation, the digital economy could reach 19.9 percent of GDP. A “breakthrough scenario”, however, could see the digital economy contributing 26.2 percent to GDP, surpassing the 20 percent target rate. This would warrant the concerted development of national strategies and programs; the review and amendment of certain laws, mechanisms, and policies; and an acceleration of the implementation of the National Digital Transformation Program, including skills training.²⁰²

Over the last few years in Viet Nam, there has been growing recognition that domestic reforms will have to be made in order for this digital transformation to keep pace with the government's agenda.²⁰³ Since data drives digital transformation, Hanoi must achieve

a fine balance between enabling data flows for ease of business and regulating it enough to ensure data is protected. In the face of domestic constraints, external pressures sometimes help. In November 2018, Viet Nam ratified the CPTPP. On January 2019, the CPTPP entered into force in the country, starting the [five-year clock](#) for Hanoi to realign its data localization requirements with its obligations under the CPTPP's e-commerce chapter.

Viet Nam's position on data localization is primarily outlined in three of its legal instruments: the [Law on Cybersecurity 2018](#), the draft cybersecurity decree, and the draft PDPD. Of the three, the Law on Cybersecurity is broadest in scope. Article 26 states that all domestic and foreign enterprises offering services “on telecommunication networks or the internet and value-added services in cyberspace in Viet Nam” must locally store data related to those services for a period specified by the government. Foreign companies must also establish a branch or representative office in Viet Nam. There are no exceptions to this provision.

By contrast, Article 26 of the draft cybersecurity decree narrows the scope of localization to when the foreign provider has full knowledge that their service or platform is being used to commit offences and the provider fails to mitigate or remedy the situation.²⁰⁴ Additionally, the mandate for localization only applies to foreign companies engaged in certain services. These include telecommunications, data storage, domain name service, e-commerce, online payment, social networking and media, and online electronic games. However, this list remains an expansive one and [industry players](#) have urged for localization to be restricted to only the most sensitive national security data, if necessary, and for localization to exclude enterprises that do not disseminate information to the public, such as enterprise software and cloud service providers.²⁰⁵

The initial version of the draft PDPD circulated for public comments stipulates four conditions determining the transfer of personal data from Viet Nam abroad. These are consent from the data subjects, storage of the original data in Viet Nam, proof of the recipient country having at least equivalent personal data protection levels (the “adequacy” requirement), and a written approval for transfer from the Personal Data Protection Commission (PDPC). The draft PDPD also requires data controllers or processors that transfer data abroad to store data transfer history for three years.²⁰⁶

An exemption may be applied to all these conditions. However, this exemption is itself conditional on consent from the data subject, PDPC approval, a commitment of data protection from the data processor, and/or a commitment from the data processor to apply data protection measures. It is unclear if the data transferor will need to meet any or all four conditions to be exempt.

Since the approved version of the draft PDPD has not yet been released, the question remains whether these provisions will make the final cut of the decree, given the foreseeable compliance costs and delays businesses will face.²⁰⁷ In its [comments](#) on the outline of the draft PDPD in November 2020, the Asia Internet Coalition, comprising technology

giants such as Airbnb, Amazon, Expedia Group, Facebook (Meta), Google, and Grab, expressed concern that the restriction of cross-border data flows would not only hinder investment and innovation but could also result in greater cyber insecurity.

Data for public policy

Viet Nam's digital transformation plans for improved public services delivery can be [traced back](#) to the mid-2000s.²⁰⁸ In 2018, frustrated by the slow implementation of the 2010–2020 Master Program on Public Administration Reform, the then prime minister **Nguyễn Xuân Phúc** (now Viet Nam's president) established a high-level national committee for e-government comprising ministers and industry leaders to improve public administration and the business environment, as well as eradicate fraud and corruption. The government even [reached out to Japan](#) for support in fast tracking the operationalization of Viet Nam's e-government policy.²⁰⁹

In June 2021, the prime minister issued the country's very first e-government strategy ([Decision No. 942/QĐ-TTg](#)), with specific efficiency targets to be achieved by 2025. These include requirements for people to declare their data only once, for at least 80 percent of administrative documents to be wholly processed online, for 100 percent of state agencies to provide online services around-the-clock, for 100 percent of officials to have digital identities, and for each citizen to possess a digital identity and QR code.²¹⁰ Significantly, the strategy calls for an assertive push to develop national databases on Viet Nam's population, land, and enterprises, with specialized, sectoral data on finance, insurance, agriculture, and health, among others, in order to achieve its [goal](#) of being [ranked](#) by the United Nations as one of the world's top 30 countries in e- and digital government by the year 2030. In 2020, Viet Nam ranked 86th out of 193.²¹¹ This 2021 strategy is simply one component of the government's larger national digital transformation plan, in addition to its various other resolutions and strategies on the Fourth Industrial Revolution and sustainable development.²¹²

In response to the COVID-19 pandemic, Viet Nam rolled out [several digital health applications](#), most of which were new, although at least one had long been in existence and was adapted to account for the coronavirus. The national electronic Communicable Disease Surveillance system (eCDS) was the first nationwide, computerized collection of case data on hospital admissions. It was developed in 2004, and over the years surveilled outbreaks of dengue; hand, foot, and mouth disease; severe acute respiratory infections; and Zika. However, the limitations of the eCDS in capturing follow-up case information prompted the Ministry of Health to develop a COVID-19-specific online case management software for control measures and risk communication.²¹³

In response to the COVID-19 pandemic, Viet Nam rolled out several digital health applications, most of which were new, although at least one had long been in existence and was adapted to account for the coronavirus

As in neighboring countries in Southeast Asia, Viet Nam also deployed a Bluetooth-based contact tracing app, with theirs called Bluezone. Unsurprisingly, the app raised [privacy concerns](#) among some, despite the government's assurances of confidentiality, anonymity, and transparency. This apprehension was accentuated by larger misgivings about state surveillance under Viet Nam's model of government. However, a [privacy review](#) of contact tracing apps in Southeast Asia by a local team from the International Association of Privacy Professionals found that Bluezone, together with Singapore's TraceTogether app, actually used the least number of permissions to perform its functions when compared against other apps.²¹⁴ MIT Technology Review's [larger survey](#) of 25 contact tracing apps around the world credited Bluezone for using a voluntary, decentralized, and transparent system, but found that the app nevertheless required access to contacts and other media such as photos on the user's mobile device.²¹⁵

Although there was a low initial uptake of only about [100,000 downloads](#) of Bluezone when it was launched in April 2020, that number shot up to [20 million](#) in a span of only four months as a government campaign [galvanized public support](#) for doing the right thing by protecting the individual, community, and country.²¹⁶ Any unease about the data security and privacy of Bluezone seemed to have been overridden by a stronger sense of community and public confidence in government in the earlier stage of the pandemic.²¹⁷ However, that confidence [dipped dramatically](#) among policy elites as Hanoi's performance rating took a hit in 2022 after the surge of the COVID-19 Delta variant and a slow national vaccination roll-out in 2021.²¹⁸

CASE STUDY

DATA SHEDS LIGHT ON VIOLENCE AGAINST WOMEN

In 2010, a nationwide survey conducted by the General Statistics Office (GSO) of Viet Nam shed light on the prevalence and severity of the violence experienced by women on a nationwide scale. Fifty-eight percent of women reported experiencing physical, sexual, or emotional abuse by their husbands, and 87 percent had not sought any form of help.

Prior to the survey, little was known about the true extent of the violence women faced in Viet Namese society, as it was traditionally viewed as a private family affair which was not to be discussed in public settings. The Vietnamese authorities had no information to guide policymaking and government strategies and it was difficult to improve the legal framework or challenge the cultural stigma surrounding the issue.

The survey collected both qualitative and quantitative data to capture a comprehensive picture of the situation in Viet Nam. The data marked the start of a new era in promoting gender equality in Viet Nam. It “catalyzed a public conversation about the nature of violence against women, raised awareness around coping strategies and available support services, and informed new government strategies and policy responses addressing violence against women.”

3. CHALLENGES AND PROSPECTS

Hanoi’s drive to digitally transform Viet Nam’s governance, economy, and society is palpable from the many decisions, resolutions, and strategies that the country’s leaders have issued over the years. Political will, therefore, is not in short supply.

Rather, Viet Nam will have to overcome several other hurdles as it seeks acceleration on the digital superhighway. These include upskilling and building human resource capacity, enhancing cybersecurity, and improving the country’s digital infrastructure ecosystem sustainably, all of which were raised in our expert consultations and have also been discussed extensively elsewhere.²¹⁹

Consolidation of legal instruments

However, as discussed above, the immediate imperative is for Viet Nam to consolidate and reconcile its array of legal regulations, especially those related to localization. An added complication is the [disjuncture](#) between the language of some of these regulations, on the one hand, and how they are enforced, on the other.²²⁰ The drafts of the cybersecurity and PDPD decrees are cases in point. Further, as informants noted, valid concerns about managing cybersecurity risks and fraudulent online content can lead to the formulation of overly rigid and prescriptive draft regulations that could, in turn, result in unintended negative consequences. Viet Nam’s amendments to Decree 72 on the Management, Provision, and Use of Internet Services and Online Information was cited as an example of regulatory obligations that were extended to cloud service providers without recognizing the shared responsibility model of cloud computing or its restrictive effects on cross-border data flows.²²¹ Moving forward, Hanoi will have to ensure that legal instruments regulating data capture, storage, or transfers are specific and predictable enough for both large and small businesses to operate, but also sufficiently flexible to anticipate, or respond to, changes in the digital landscape.

The requirement of explicit consent for businesses to collect data, such as through pop-up windows on websites or applications, would strengthen data privacy in the country, a particular concern given that the practice of selling phone lists to spammers

or sending bank details via unencrypted chats has run rampant.²²² However, the regulation would also be difficult to implement since [80 percent of Viet Nam's cloud computing](#)²²³ segment comprises foreign companies that have already urged the country to align “with global approaches” to avoid damaging Viet Nam’s plans for digital transformation.

There is also the risk that once Viet Nam’s five-year grace period under the CPTPP ends, these data localization requirements could put the country in breach of its treaty obligations. The CPTPP obliges parties to allow the cross-border transfer of information by electronic means and does not require the use or location of computing facilities in-territory. While the draft PDPD does not appear to accord with either of these provisions, there is a “legitimate public policy objective” under the CPTPP that Hanoi could take advantage of, provided the related policies do not create “disguised barriers to trade or are applied in a discriminatory or arbitrary fashion.” Currently, CPTPP parties have [agreed not to sue](#) Viet Nam if its regulations are deemed inconsistent with the agreement.²²⁴ Groups such as the [Global Data Alliance](#) have urged Viet Nam to account for its CPTPP commitments in its PDPD review process.²²⁵

Inclusion and representation

Relatedly, as Viet Nam seeks to draw foreign investment to grow its digital economy, it will have to pay close attention to its smaller, local businesses. Micro, small, and medium enterprises (MSMEs) make up 95 percent of all firms in Viet Nam, 40 percent of GDP, and employ 50 percent of the country’s workforce.²²⁶ Although an overwhelming [number of SMEs \(96.9 percent\)](#) in Viet Nam think that digital transformation plays an important role, up to 70 percent are still operating outside the digital economy and only around 20 percent are “[tentatively exploring it.](#)”²²⁷ [More than half of them \(57.6 percent\)](#) have insufficient resources to deploy digitalization tools in their business operations because they are either simply too preoccupied with sustaining their businesses, are unfamiliar with digital platforms, or have inadequate support to migrate their enterprise online.²²⁸

With women constituting half of Viet Nam’s population, any successful effort at digitalizing both the country’s economy and society should include a considered gender dimension. After all, women-owned SMEs account for 98.8 percent of MSMEs and 25 percent of SMEs in the country

The impact of data regulations should thus not be a barrier to entry to the digital economy for these MSMEs. Instead, given their outsized participation in the economy, MSMEs could not only be supported in this area through business-to-business-type capacity-building initiatives but also actively courted for consultations in the drafting and promulgation of the relevant rules.

There is a compelling need to support women-owned MSMEs, in particular, and to ensure that data collected on them is accurate in order for them to be adequately represented in Viet Nam’s

digital economy. With women constituting half of Viet Nam's population, any successful effort at digitalizing both the country's economy and society should include a considered gender dimension. After all, [women-owned SMEs](#) account for 98.8 percent of MSMEs and 25 percent of SMEs in the country. Compared to men-owned SMEs, they employ a higher percentage of female workers (43.3 percent versus 36 percent), contribute marginally more to the national budget in taxes per worker per year (VND24.9 million versus VND24.2 million), and contribute slightly more in social insurance payments (36 percent versus 35 percent).²²⁹

In general, Viet Nam's extension of a supportive ecosystem for women in business is [boosted](#) by, for example, preferential measures and training incentives for women-owned SMEs.²³⁰ The government has also long had a National Gender Equality Strategy which mentions support for women-owned SMEs, although it lacks a precise definition of the category. In 2021, the government extended this [strategy](#) for another 10 years to 2030, in furtherance of its [commitment to SDG5](#) on gender equality and women's empowerment. Among other updates, the strategy outlines the development of a national gender statistical database. It also affords flexible online training programs on digital technology for women-owned SMEs. This flexibility will be especially helpful given the [harder impact](#) of COVID-19 on women-led MSME revenues, perhaps a result of differentiated expectations related to home-care responsibilities.²³¹

Inclusion through data is also reflected in the question of where Viet Nam's ethnic minorities place in the country's digital development agenda: a point that is not lost on the government itself. Hanoi has [acknowledged](#) the high poverty rate, difficulty of access to quality and inclusive education, and significant gender gap among the country's ethnic minorities. In 2019, the government passed a [resolution](#) approving the Master Plan on Socio-economic Development of Ethnic Minorities and Mountainous Areas, which includes promoting science and technology transfer and developing a comprehensive database on ethnic minority groups for policy planning and implementation. Partnering with industry and international financial institutions, the government has also [sought to advance](#) digital inclusion for ethnic minorities and rural students.²³² A [pilot project](#) financed by the World Bank, for example, has enabled the Viet Nameese government to pay out social assistance to ethnic minorities in Cao Bang province by way of mobile money instead of requiring them to collect cash in person on one or two fixed days a month.²³³

As nations seek digitalization, representation through data is important even if, but perhaps especially when, digital and traditional ways of life do not neatly intersect. In the past, land development contrary to indigenous practices created frictions between the state and these communities. In response, the [Culture Identity and Resources Use Management \(CIRUM\)](#) non-governmental organization has worked with 19 different ethnic minority groups in upland forested provinces in northern Viet Nam, and even neighboring countries, to collect data on the health and well-being of native communities impacted by these development activities. This data-based advocacy approach resulted in

the passing of [Viet Nam's Law on Forestry in 2017](#), and ethnic minority groups reclaiming their customary rights to the land and its natural resources.

The idea of data collection by, on behalf of, or for, ethnic minority groups restores their agency, authority, and dignity within the context of the state. It also responds in part to [criticisms](#) that government policies inadequately meet the specific needs of different ethnic minority groups and take a top-down, rather than an organic, bottom-up approach. Multi-stakeholder consultations involving policy-makers can also facilitate more effective conflict management or resolution in these areas. CIRUM's use of Google Maps to plot land use rights is a simple yet effective way to mitigate conflict between customary and state laws on land use, and promote transparency on the issue.

Representation through data is but a first step to being “seen” and included in the digital world. That representation must also be protected accordingly, especially among underserved and vulnerable segments of society such as ethnic minority groups, the poor, differently-abled, and children. This is particularly necessary since it may be a while before all minority and marginalized groups are adequately taken into account in the deployment, let alone in the design and development, of digital tools. It explains why, in the meantime, there is a growing body of work calling for privacy rights for vulnerable sections of the population to be reinforced rather than relaxed for the convenience of access to state benefits.²³⁴ In Viet Nam, the right to privacy is constitutionally guaranteed and likely to be preserved in an eventual comprehensive data protection law. The country is therefore already well-placed to expand on protecting the data of its most vulnerable populace — and by extension those communities themselves — should it choose to.

Standards and norms

As Viet Nam navigates its nationwide digitalization efforts, the government's key challenge will be to liberalize its data governance regime, in order to compete more effectively at the international level, without compromising its domestic authority over social and security matters in the digital space. According to one informant, greater awareness of related issues will need to be raised domestically to facilitate wider public deliberation, especially as Viet Nam contemplates adapting different international approaches to data governance to meet its needs. Reflecting on large, external players setting the rules, the informant raised the possibility of Viet Nam working together with other ASEAN nations to craft a middle approach at the regional level that could accommodate the pressures of digital trade liberalization — and correspondingly appropriate data governance frameworks — while preserving state autonomy.²³⁵

The notion of participating more actively in standards setting is key to ensuring agency and, as one informant reminded us, is even more so in the current climate in which great power competition is spilling over into the technology arena. Viet Nam's Directorate for Standards, Metrology and Quality (STAMEQ) under the Ministry of Science and Tech-

nology already [represents](#) the country in 14 international and regional organizations.²³⁶ Viet Nam is also a member of the International Telecommunication Union, although not of the 3GPP initiative, despite its local development of 5G technology.

4. CONCLUSION

Viet Nam's adaptation of different legal regimes, including the EU's GDPR and China's cybersecurity law, into its domestic framework reflects the country's characteristic resolve to continue preserving its policy space and independence in the digital data domain. The government is keenly aware of what needs to be done in all the different areas outlined above in order to drive its vision of national digital transformation. Hanoi's ratification of the CPTPP, domestic challenges notwithstanding, is illustrative of that cognition as are the ambitious reform targets over the next decade it has set out for itself.

As Viet Nam streamlines these internal initiatives, the logical extension to its digital strategic autonomy in the near future would be for the country to increasingly contribute to international rule-making in various forums related to data governance. Hanoi's endorsement and observance of non-binding regional tools such as the ASEAN Data Management Framework would affirm budding collective coherence. More significantly, similar coordination efforts by Viet Nam together with other ASEAN member-states at the regional level could set the stage for greater norms alignment at the international level.

VIET NAM

SELECTED LEGAL INSTRUMENTS RELATED TO DATA PROTECTION

Category	No.	Law
Cybersecurity	1	Law No. 24/2018/QH14 Cybersecurity Law
	2	Law No. 35/2018/QH14 Network Information Security Law
	3	Decree No. 85/2016/ND-CP Security of Information
	4	Decree No. 72/2013/ND-CP on Management, Provision and Use of Internet Services
	5	Law No. 86/2015/QH13 Law on Network Information Security
Data Protection	6	Draft Decree on Personal Data Protection
	7	2013 Constitution of the Socialist Republic of Viet Nam
E-Commerce/ Transactions	8	Law No. 51/2005/QH11 on E-transactions
	9	Law No. 36/2005/QH11 on Commerce
	10	Law No. 61/2020/QH14 on Investment
	11	Decree 52/2013/ND-CP on E-commerce
	12	Decree 09/2018/ND-CP guiding the Law on Commerce and the law on Foreign Trade Management
Information Technology	13	Law No. 67/2006/QH11 Law on Information Technology
	14	Law No. 21/2017/QH14 IT Law

POLICY PLAYBOOK



The overarching principle guiding the use of data and related technologies — artificial intelligence, in this context — should be to preserve, enhance, and advance human dignity.

This policy playbook offers guiding principles and practices on data governance and ethical AI to government and non-government stakeholders in Southeast Asia. It complements, draws from, and builds on the work of others across different fields of study.

Both the principles and practices take a socio-technical approach; that is, that the development and application of data-driven technologies, including AI, must be rooted in the interaction between people — along with their perspectives and knowledge systems — and technology. Consequently, the normative frameworks that govern technological development and application should also reflect this relationship.

>> POLICY PLAYBOOK PRINCIPLES

AGENCY



On data

End user knowledge of how their data is collected, utilized, and stored. Concomitantly, end-user ability to access, store, and even delete their data at discretion.

On AI

End user participation and local context in the research, design, development, deployment, and evaluation of AI applications.

CARE



On data

The handling of datasets and training models adheres to the highest level of integrity. Safeguards are in place from possible data breach or cyberattack.

On AI

Incorporating personal, social, and environmental harm minimization in the life cycle of AI systems and platforms.

EQUITY



A social contract to advance justice and redress structural discrimination by enabling users to reap the greatest benefits from the value creation of data and/or AI.

INCLUSION



Diversification of perspectives, experiences, skills, languages, and demography in norms framing technology development.

RELIABILITY



On data

Transparency, safety, and accountability in process of data generation, collection, storage, protection, and destruction.

On AI

Fairness, safety, clarity, and accountability of AI development and deployment, as well as in algorithmic training to minimize and mitigate bias.



AGENCY

>> **Map international concepts to local languages, create a corpus of interpretations**

Although terms like “data,” “privacy,” and “algorithm” may carry baseline connotations and constitute part of the common policy vocabulary, they often do not translate well into other languages at the community level because there simply might not be a direct equivalent or because the concept itself might be unfamiliar. Multilingual communities in the five countries surveyed — and in many other Southeast Asian nations, for that matter — may also understand the same word differently in the various languages spoken. Language, after all, is contextual.

Explaining what these terms mean in local languages would be a first step. However, it would be more meaningful to take a converse approach by building an understanding of the concept from those languages rather than translating them from English. This way, convergences and divergences in concepts at the local, regional, and international levels could be identified. More importantly, it would contribute local knowledge, nuance, and perspective to concepts that are often assumed to be universally understood.

>> **Collaborate (hyper-)locally on AI systems design**

Although AI developers and local communities challenged by a particular concern may have a shared desire to resolve the problem, their differing motivations and data collection methods may complicate the process of achieving that common goal. Whereas AI engineers may be driven to apply and advance science, local communities may instead want solutions for social change. In such cases, conventional research methods that create a one-way relationship where locals inform scientists through interviews, surveys, or focus-group discussions may not be helpful.

Instead, re-centering the role of locals so that they are part of the design and development of AI solutions could contribute to more effective outcomes. One way of doing this could be to encourage the creation of community datasets, which might be protected through a data trust or co-operative (see below), to enrich the AI research process.

>> **Explore alternative data governance approaches**

Rather than subscribing to the binary model of data flow or data localization, Southeast Asian countries should consider, and where appropriate, adopt or promote alternative data governance approaches.



These include data stewardship arrangements such as data trusts and data co-operatives which pool data into an organization. Whereas in a data trust, trustees would exercise the data rights on behalf of the beneficiaries through a legal fiduciary relationship, a data co-operative would afford participants the opportunity to jointly and meaningfully participate in the value-extraction or monetization of their data.

>> **Create a Data Footprint Registry**

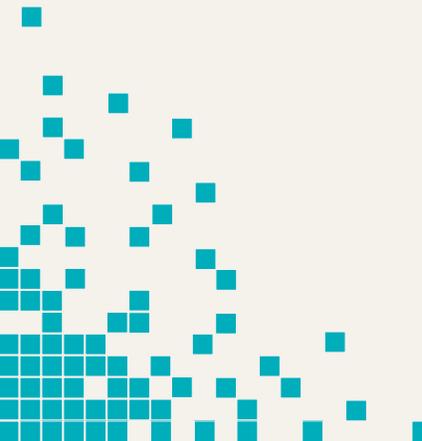
Every exchange and interaction within the digital ecosystem leaves a data footprint. Although individuals are usually informed about their data being collected or processed, often the option to destroy one's data is hardly presented.

Giving users the full visibility of their data through a data footprint registry would allow them to understand the life cycle of their data, from generation, storage, usage, and archival, to deletion. The use of contact tracing apps during the pandemic provides initial lessons on how governments can inform users about the extent of their data footprint and explicitly offer them the choice to opt out or delete their data after a particular transaction.

>> **Advance convergences/consolidation on an ASEAN approach toward inclusive data and ethical AI practices across all three community pillars**

While ASEAN member states have begun aligning positions more closely on data governance with the release of documents such as the ASEAN Data Management Framework and the ASEAN Model Contractual Clauses, similar coordinating efforts should be replicated across the group's two other community pillars: political-security and socio-cultural.

Discussions on data and AI outside the economic realm may require greater sensitivity, but governments should nonetheless begin the process with a view to tabling informed and coherent regional perspectives, particularly in international debates on the role of technology in political and security affairs. Additionally, conversations on the impact of data and ethical AI within the socio-cultural pillar would advance ASEAN's pledges for a more people-oriented and people-centered outlook, especially considering the pervasiveness of data-driven technologies among the region's population.



>> Institutionalize Track Two inter-regional dialogues for regularized exchanges

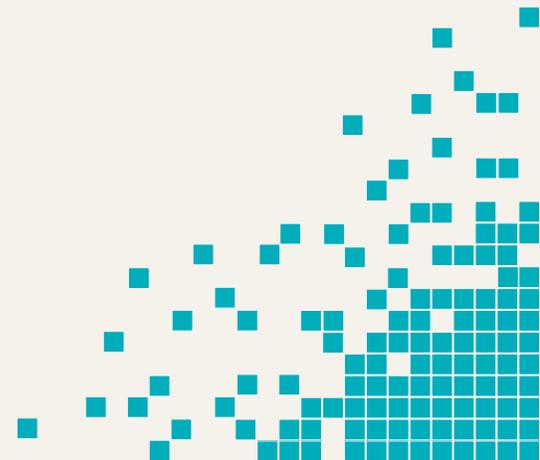
Countries in and of the Global South are impacted by data and AI trends very differently from counterparts in the north. Non-government stakeholders in emerging regions, notably Africa and Latin America, are responding in innovative ways at the community level. There are also rich conceptual, policy, and legal debates that are provoking new and alternative framings of how data-driven technologies could be governed.

Southeast Asian countries could benefit from this diversity of thought. Regular, multilateral dialogues on these developments at the Track Two level, in particular, could facilitate greater exchange of experiences and insights among Global South countries that share developmental and technological commonalities.

>> Prioritize representation at international standards-setting forums

The five countries surveyed are represented at technical standards-setting bodies such as the International Telecommunication Union (ITU) and International Organization for Standardization (ISO). Two are participating or observing members of the ISO Joint Technical Committee on Artificial Intelligence, shaping AI standards, including on bias.

Resource and expertise constraints may make participation in technical bodies difficult, let alone at the highest decision-making levels. However, regular involvement in such meetings even as observers can contribute to technical proficiency over the longer term. In the meantime, identifying specific gaps and needs in these areas can help with negotiating tailored capacity-building programs supported by interested partners. Additionally, where possible, governments should also prioritize active participation in international norms and policy discussions related to data and ethical AI. Without at least representation at the table, there can be no thought partnership, let alone leadership, in these evolving conversations.





CARE

>> Compile impact statements

Understanding the potential and actual harms resulting from weaknesses in data protection regimes or obscure AI processes is key to mitigating and preventing them.

Documenting these harms, from personal to societal and environmental, through impact statements, can provide a clearer record of the gaps that need to be addressed. In this sense, the role of a data protection commissioner might be expanded where appropriate and supported by additional resources. In the field of AI, impact statements collated by experts from different disciplines would offer a more comprehensive picture of potential and actual harms. It would also compel greater accountability by and among AI developers.

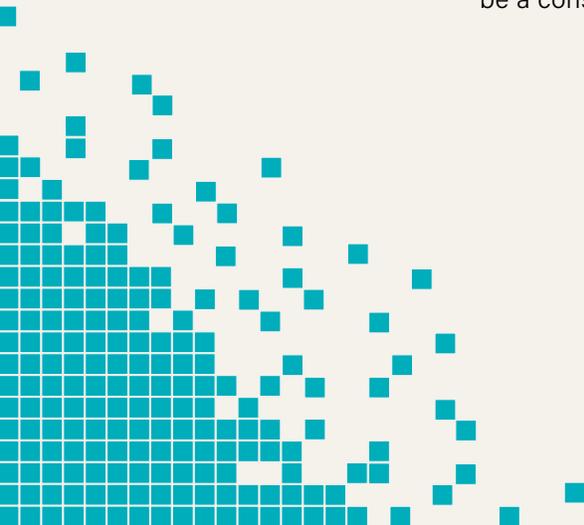
>> Extend accountability obligations to government

Subject to narrow restrictions, governments should also comply with similar standards of care expected of others, particularly in protecting the personal data of its citizens. As a matter of good governance, it could also invite a credible third party to conduct environmental audits of its policy decisions on, for example, migrating to the cloud or setting up data centers.

>> Incentivize business-to-business capacity building

Regulatory compliance can be particularly costly and prohibitive for micro, small, and medium enterprises (MSMEs), which form the backbone of the countries' economies.

Larger corporations might be incentivized by the government or through their corporate social responsibility programs to offer training or capacity assistance to these MSMEs, particularly in the initial stages of business. Existing models in Japan of conglomerates offering cybersecurity assistance to smaller firms might be a constructive point of reference.





EQUITY

>> Evaluate existing normative frameworks

Across the five countries surveyed, there is an urgent sense of forward momentum toward digitizing as much as possible of government, the economy, and society. However, as we assert in our introduction, there seems little appreciation of what the end goal of data-driven optimization actually is.

It might be valuable for government and non-government stakeholders, either separately or in consultation with each other, to pause and assess whether the existing normative frameworks on data and AI in which countries are operating will actually help advance national interest in the broadest sense. This will require a deeper philosophical reflection on the end objectives that countries intend to pursue through the use of data-driven technologies, beyond the achievement of a dynamic digital economy.

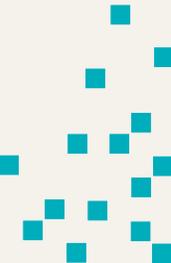
>> Reassess metrics of performance and success

Quantitative indicators can be useful to measure progress in areas such as representation, infrastructure capacity, or available talent for emerging tech sectors. However, they can also mislead and provide a false sense of growth. What are the hidden trade-offs of a rise in the number of MSMEs on e-commerce platforms, for example?

Alternative metrics of success in a data-driven environment plotted against the socio-cultural or biodiverse landscape of Southeast Asian nations could include the number of languages and dialects mapped to preserve the diverse heritage in each country, but also to provide more responsive AI solutions to various accented speech. It could measure the acreage of land reserved for environmental conservation or the tonnage of marine plastic waste cleared from coastal waters. The use of data for social good might reorient the metrics of success, reinterpret development for the better, and redress some structural inequities replicated by data-driven technologies.

>> Mainstream alternative perspectives, including respect for self-governance of data

In light of increasing reports of algorithmic bias and harms, the revival of traditional notions such as *Ubuntu* in Africa or *buen vivir* in Latin America that advocate a relational rather than a purely rational approach to AI is a call to reframe the current discourse on AI ethics. These frameworks are community- rather than state-centric and they center the voices of the marginalized, including indigenous communities, with the aim of utilizing data and AI to achieve social progress in harmony with nature.



There is, in parallel, an indigenous data sovereignty movement which sits awkwardly alongside open data initiatives. While the former drives at the right of indigenous people to own and control data about their communities and land, the latter offers a compromise of sorts, allowing sustainable development of indigenous resources within the parameters of the state.

These different perspectives of data governance and, by extension, AI ethics offer a valuable tapestry of knowledge systems from which Southeast Asian countries could learn. They afford conceptual and policy options to the region in its pursuit of agency. More importantly, they prompt stakeholders to reflect more thoughtfully about how ancestral knowledge might be repurposed for a data-driven present and future.



INCLUSION

>> Expand expert stakeholder engagement

Discussions on data and AI often involve scientists, industry, academics, policymakers, and lawyers. But interpreting data and minimizing related harms require broader lenses. Analyses could be contextually enriched and improved upon by having historians, linguists, community activists, philosophers, and religious leaders at the table.

>> Launch all-female hackathons

Done right, this exercise would not only encourage more girls to code and compete but afford a different, if not safer, space for participants to network and grow the community through mentorship. Of value would be the results from these hackathons that could highlight gendered perspectives in coding solutions for everyday applications. Research has shown that automatic captions are more accurate with male rather than female voices. Having women and girls hack these and other flaws could yield innovative fixes.



RELIABILITY

>> Introduce security- and dignity-by-design in education and training

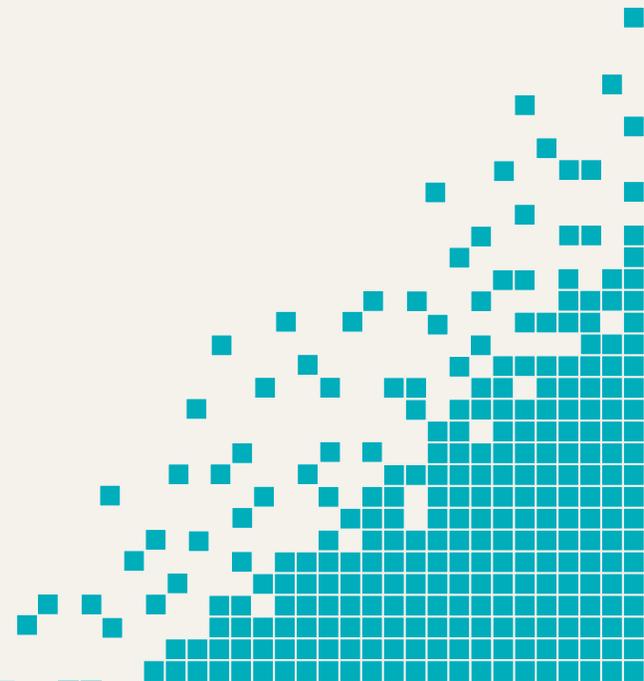
Advancing a socio-technical approach to AI requires the integration of security and dignity at the very start of the AI development cycle. The concept of security-by-design has been widely adopted as a risk-management approach. Adding the consideration of dignity to the equation in engineering and computational science courses trains students to prioritize the user as a human being first, rather than as a disembodied consumer of technology.

Incorporating the dignity angle prompts a closer analysis of requirements, available data, and plans to mitigate the potential occurrence of harms.

>> Establish an AI bias bank

Generally, algorithmic bias is often attributed to computational factors like the quality or quantity of the datasets or the fairness of machine learning algorithms. But bias can also be the outcome of human and systemic factors or the culmination of all these factors. With the availability of off-the-shelf AI solutions, it is becoming easier for individuals and organizations to install applications without fully understanding their risks and harms.

Creating an algorithmic bias bank — a database of use-cases of how bias was produced in the past — can raise public consciousness about the risk, explain more simply how complex codes and algorithms may result in bias, and promote productive exchanges on how to prevent it. By creating space for conversations surrounding AI, the lack of knowledge as well as negative perceptions are mitigated, instilling public trust throughout the process.



SECTION 2



ARTIFICIAL INTELLIGENCE



INDONESIA

1. BACKGROUND

President **Joko Widodo's (Jokowi)** [remarks](#) claiming that whichever country “controls AI can potentially control the world” has galvanized the role of AI for Indonesia’s digital transformation.²³⁷ Capitalizing on its vast geography, market size, and youthful demographics, Indonesia has become a major hotspot for venture capital investments in the region and is [poised](#) to become Southeast Asia’s front-runner in AI development.²³⁸

Jokowi’s observation set in motion a series of initiatives aimed at laying the groundwork for Indonesia’s AI blueprint. The Agency for the Assessment and Application of Technology (BPPT) was [tasked](#) with conducting initial deliberations with government agencies, as well as stakeholders from universities, industry associations, and national telecommunication companies.²³⁹ These consultations culminated in the [National Strategy for Artificial Intelligence](#) (“Strategi Nasional Kecerdasan Artifisial”) released in 2020.²⁴⁰

According to the Ministry of Research and Technology and the National Research and Innovation Agency (BRIN), the document sets forth the national policy for AI development from 2020 to 2045. It outlines five national priorities where AI is anticipated to have the biggest impact: (1) health services to accelerate plans for smart hospitals and health security infrastructure in the aftermath of the pandemic; (2) bureaucratic reform to implement digital services for citizen-centric public service (“pemerintahan digital melayani”); (3) education and research to aid online schooling and bridge the digital divide; (4) food security for smart agriculture, fisheries, and management of natural resources; as well as (5) mobility and services to facilitate the development of 98 smart cities and 416 smart districts under Indonesia’s 100 Smart Cities Movement. In supporting the implementation of these five national priority areas, the National AI Strategy also identifies four key focus areas: (1) ethics and policy; (2) talent development; (3) infrastructure and data; and (4) industrial research and innovation.

The National AI Strategy serves as the umbrella framework to streamline Indonesia’s existing technology-focused plans and projects. It builds on Jokowi’s digital roadmap launched in 2014 called “[Making Indonesia 4.0](#),” which involves 10 cross-sectoral initiatives aimed at boosting Indonesia’s competitive performance in key areas like manufacturing, industry, biology, and hardware automation.

Apart from these initiatives, the overarching governance framework surrounding ethical AI will be critically important to drive the overall strategy. The National AI Strategy’s guidebook recommended the formation of a data ethics board to oversee AI development, as well as create regulations and national standards for AI innovation. There is currently no such agency or institutional structure in place to oversee the governance and ethical use of AI.

With the publication of the National AI Strategy, Indonesia joins other countries in Southeast Asia that are bullish about harnessing AI's transformative impact on both the economy and the wider society. Additionally, Indonesia's role in convening the Regional Comprehensive Economic Partnership (RCEP) and its intention to join the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) demonstrate its interest in helping set regional digital economic standards. Apart from Singapore, which is a participating member, Indonesia is the only other Southeast Asian country that sits as an observing member on the ISO/IEC JTC 1/SC 42 standards committee on artificial intelligence.²⁴¹

2. USAGE AND IMPACT

Even before the release of its National AI Strategy, Indonesia was already primed to seize the opportunities and benefits of AI given its market size and growth potential. A study commissioned by International Data Corporation or IDC Asia-Pacific Enterprise Cognitive/AI Survey in 2018 found that Indonesia had the highest AI adoption rate in Southeast Asia at 24.6 percent, followed by Thailand (17.1 percent), Singapore (9.9 percent), and Malaysia (8.1 percent).²⁴² Having a population of approximately 273 million with a median age of 29 years, and with increasing smartphone usage and internet penetration, Indonesia alone contributed 40 percent to Southeast Asia's total GMV amounting to USD70 billion in 2021.²⁴³ With the rising adoption of AI in the country's financial services, retail, logistics, and supply chains, Indonesia is expected to further add USD366 billion to its GDP in the next decade.²⁴⁴

Indonesia's booming internet economy is fueled by a "digital mindset" that drives the rapid adoption of AI technologies across the archipelago. It is home to native digital tech unicorns such as Bukalapak, Traveloka, and OVO.²⁴⁵ The local success of Indonesia's start-ups in natural language processing and big data analytics has led them to expand further in international markets. Two homegrown digital mammoths, Gojek and Tokopedia, have led Indonesia's mobile-first approach and adoption of AI solutions. Gojek is also one of the most funded start-ups in the Asia Pacific, with operations in other markets like the Philippines, Singapore, Thailand, and Viet Nam. As a one-stop shop multiservice platform, Gojek has developed scalable machine learning (ML) models to create personalized customer preferences. It leverages AI and ML to offer biometric security features such as fingerprint and facial recognition. Tokopedia is an e-commerce giant that leverages AI and ML capabilities for product development. It has also promoted AI research and talent development through its partnership with the University of Indonesia, with the 2019 launch of a deep learning supercomputer technology called NVIDIA DGX-1.²⁴⁶ The partnership also launched AI-based solutions like demand prediction, smart warehouses, and smart logistics.²⁴⁷

Indonesia's booming internet economy is fueled by a "digital mindset" that drives the rapid adoption of AI technologies across the archipelago

In 2021, Gojek and Tokopedia [merged](#) and became the “GoTo Group” with a combined valuation of about USD20 billion.²⁴⁸ The GoTo Group offers a wide-range of services including e-commerce, ride-hailing, food delivery, and financial services, but is also expanding to the fintech arena through financial payments, consumer finance, and merchant lending.²⁴⁹ Although both entities still operate as separate businesses, Tokopedia and Gojek are [accelerating](#) the local integration of AI-enabled technologies in close tandem with initiatives backed by the government.²⁵⁰ However, both entities now face falling market share and profitability due to fierce competition from other regional players like Grab, OVO and ShopeePay.

The continuing success of Indonesia’s unicorns has sparked a vibrant start-up community. With approximately 21,000 start-ups, Indonesia ranked fifth behind the United States, India, the United Kingdom, and Canada in countries with the most start-ups.²⁵¹ Up-and-coming household names are also making a positive impression in the local and international AI scenes. [Kata.ai](#) is a well-known conversational AI platform using natural language processing that automates customer interactions such as customer queries with minimal human intervention. Uniquely for Indonesia’s local market, Katai.ai uses Bahasa Indonesia rather than English.

As an example of Indonesia’s thriving technology sector, Bukit Algoritma (Algorithm Hill) was launched as a mega-tech hub located in Sukabumi, West Java to [emulate](#) the Silicon Valley spirit.²⁵² The sprawling 888 hectares will be transformed into a special economic zone that will host Indonesia’s start-ups specializing in AI, digital technology, biotech, and semiconductors. The ambitious multibillion dollar industrial project hopes to become the country’s center of research in neuroscience, nanotechnology, quantum technology, solar cell technology, and space exploration. With [completion](#) expected by 2030,²⁵³ Bukit Algoritma is the latest addition to other digital hubs across Indonesia — Bumi Serpong Damai or BSD City, Bandung Technopolis, as well as in Yogyakarta and Malang — that will groom the country’s future start-ups and unicorns.²⁵⁴

Indonesia’s growing AI start-up community has received growing traction in key state and city-level projects. Local AI firm Nodeflux was [tapped](#) to partake in the Jakarta Smart City initiative to advance smart governance and smart mobility using data management solutions, computer vision, and real-time video analysis. Furthermore, it also [collaborated](#) with the Indonesian National Police to provide surveillance during the 2018 Asian Games as well as the 2018 International Monetary Fund and World Bank meetings that were held in the country.

The Indonesian government considers AI solutions as vital to achieving administrative effectiveness and efficiency.

The Indonesian government considers AI solutions as vital to achieving administrative effectiveness and efficiency. AI utilization was [included](#) in Indonesia’s five-year digital transformation plan alongside its roll-out of 5G infrastructure.²⁵⁵ BRIN

has [encouraged](#) the use of AI to deliver innovation in agriculture, energy, cybersecurity, and the creative industries.²⁵⁶ The Aeronautics and Space Research Organization of BRIN is also currently [developing](#) an AI-enabled platform for remote sensing to monitor natural resources and the environment.²⁵⁷ Relatedly, other government agencies are [using](#) AI technology to monitor and anticipate forest fires, while some have been promoting AI-tech solutions for edtech in schools and universities, especially during the height of the pandemic.²⁵⁸

Apart from leveraging AI in specific strategic sectors, Jokowi has also [vowed](#) to use AI to reduce bureaucratic red tape.²⁵⁹ If adopted, it will result in the substitution of two ranks of public positions by AI-enabled technologies. Another government-led AI initiative is the employment of AI-based technologies to facilitate an [online single submission system](#) to ease business registration.²⁶⁰ These initiatives will help facilitate the ease of doing business and attract more foreign investment in Indonesia.

The Indonesian government has also [entered](#) into a partnership with the U.N.-led Global Pulse Lab headquartered in Jakarta to further develop AI-based solutions for public policy programs. Together with the U.N. Country Team, Indonesian representatives identified national development priorities for applied research. The collaboration culminated in the AI-powered platform called Haze Gazer, a crisis analysis tool which combines satellite imagery of fire hotspots, census data, and real-time information captured from social media for disaster management efforts.²⁶¹ Through deep learning, it can also identify air quality instantaneously using meteorological data from satellite imagery and images shared via social media.²⁶²

At the height of the COVID-19 outbreak, AI was integrated as part of the e-government response in the public health sector. The Ministry of Health [used](#) an AI-powered app called Telemedicine Indonesia to link patients with hospitals and doctors.²⁶³ In co-ordination with provincial and city health services, the app provided affordable health access in four main telemedicine services: radiology, ultrasound, electrocardiography, and consultation.²⁶⁴

In a move to further centralize the government's approach to AI, Jokowi [reformed](#) the country's science and technology policy, which resulted in the consolidation of BRIN with the technology ministry to establish the Ministry of Education, Culture, Research, and Technology.²⁶⁵ However, it remains to be seen whether the government will enact a digital government transformation body to proactively facilitate resource allocation to priority sectors and help create linkages between international and local tech firms.²⁶⁶ In the meantime, the Artificial Intelligence Research and Innovation Collaboration (Kolaborasi Riset dan Inovasi Industri Kecerdasan Artifisial) or [KORIKA](#) serves as an "orchestrator organization in the form of an association that fosters AI innovation" and advocates for the adoption of AI in various fields to achieve Indonesia's vision as laid out in the National AI Strategy by 2045.²⁶⁷

CASE STUDY

USE OF AI IN HEALTHCARE

As part of Indonesia's G20 presidency, Jakarta has pushed for countries to realize a global AI platform for current and future pandemic surveillance. This is aligned with its endeavors to build a global health architecture, one of the priority issues of Joko Widodo's presidency. Having an integrated system on a single global platform can facilitate collaboration and ease the health sector in identifying, determining, and discovering diseases and new drugs.

The greatest benefit arising from the establishment and implementation of a global platform would be the availability of healthcare data across borders. This would allow for authorities to share knowledge on new viruses and variants, which could aid disease management and mitigation. Researchers and developers would also be able to benefit from this, as the availability of data sets could accelerate research and improve performance for AI applications. Indonesia's National Research and Innovation Agency (BRIN) has prepared the data infrastructure for biological and genetic resources, which could serve as the primary source of data for the entire system. However, data protection laws within and across borders would have to be both tightened and streamlined to balance the public health advantages of such a platform while preserving the privacy and security of personal — even sensitive — data.

3. CHALLENGES AND PROSPECTS

President Jokowi aims to advance Indonesia's AI competitive footing, arguing that “the world today is in a war to gain AI capabilities. The competition to control AI is comparable to the space [race] during the Cold War.”²⁶⁸ To this end, he has instructed the BPPT further advance Indonesia's ongoing indigenization of its tech capabilities through increased collaboration among the Indonesian diaspora, universities, and start-up companies.²⁶⁹

However, Indonesia's ethical AI journey has several urgent challenges. These include concerns surrounding job displacement, inclusion, and equity, as well as surveillance and exploitation.

Job displacement

Through automation, AI could dramatically boost Indonesia's productivity, but it could also cause disruption to the workforce. McKinsey estimates that 23 million jobs could be displaced by automation by 2030. But lost jobs can also be replaced and new ones can be gen-

erated. This depends on a mix of factors like shifting labor demands in key sectors such as construction, manufacturing, and education, as well as government policies to instill technological, social, emotional, and cognitive skills.²⁷⁰

Indonesia's lack of highly-skilled talent has been evident since 2016. The Ministry of Finance has addressed the looming shortage of human resources by reskilling the workforce for high-tech industrial opportunities.²⁷¹ But the Indonesian government needs a comprehensive and a long-term strategy to build and maintain a highly capable workforce. The United Nations Children's Fund (UNICEF) Indonesia recommended that the country must first address the absence or inaccessibility of early childhood development services, especially in rural and remote areas.²⁷²

Through automation, AI could dramatically boost Indonesia's productivity, but it could also cause disruption to the workforce.

A study conducted by the Lowy Institute revealed that the Indonesian government has allocated "low public spending on education" and failed to address "human-resource deficits, perverse incentive structures, and poor management." Such obstacles lay bare Indonesia's challenges in establishing research and development linkages with international institutions in emerging areas like AI.²⁷³ Left unaddressed, Indonesia may find it difficult to tap into its reservoir of young talent to drive the country's innovation and digital economy.

Inclusion and equity

Upon the release of the National AI Strategy, academics and civil society groups warned of the urgency of addressing the country's talent gap, lagging infrastructure, and risk of algorithmic bias. There was a consensus that the National AI Strategy was a positive development, but first Indonesia must address foundational issues like talent development and internet connectivity across the archipelago. The government must also implement reforms in higher education and install regulations to prevent damage from possible AI algorithmic errors. More importantly, there was an emphasis on upholding principles of fairness, accountability, and transparency to guarantee the protection of human rights and prevent the occurrence of racial bias.²⁷⁴

The partnership between Tokopedia and the University of Indonesia is a good starting point to further expand discussion regarding ethical AI guidelines in the context of Indonesia. Under KORIKA's oversight, a multistakeholder AI partnership inspired by multilateral data partnerships can be explored, whereby AI companies are paired with research institutes, universities, and civil society groups to tackle AI's potential risks and harms.²⁷⁵ Lessons learned and insights drawn from these partnerships can be compiled as actual case studies that could strengthen the basis for Indonesia's AI ethics guidelines, in addition to existing initiatives that promote the regulation of information security and the protection of personal data.²⁷⁶

Surveillance and exploitation

The need to uphold and embed principles of fairness, accountability, and transparency has become ever more relevant in light of Indonesia's growing [gig economy](#). According to Gojek's ride-hailing drivers, the app's algorithms have "increasingly squeezed and exploited" their working conditions. Because of intensifying competition and relentless price wars with Grab, Gojek reduced drivers' bonuses and compelled them to work long hours to achieve their daily targets, but at the same pay rate. During the pandemic, allegations were made that Gojek's algorithms were deployed to penalize and demote inactive drivers even if they had contracted COVID-19. As a result, drivers demanded changes to the platform's policies. But despite growing movement within the community to organize, mobilization was hindered by algorithmic configurations that deployed drivers to different locations to disrupt rapport and camaraderie.

To circumvent Gojek's complex algorithms, drivers adopted various strategies like using hacked versions of official accounts coined as ghost accounts or spoofing a phone's global positioning system (GPS). It even led to an app war where developers inserted features to evade Gojek's detection systems. To counter these forms of resistance, Gojek developed more precise trackers to determine driver location and implemented stringent rules of account suspension. However, over time, the drivers' network continued to expand.

Since 2016, Gojek drivers have gone on occasional [strikes](#) under the banner of Gojek Solidarity to push against unfair policies.²⁷⁷ These protests have forced Gojek to incrementally revamp its policies to improve their working conditions.²⁷⁸ Yet there is still a need to push for more regulatory changes in Indonesia to recognize the gig economy and enforce minimum standards for the treatment of ride-hailing drivers.

This particular case highlights the risk of entrenching exploitative labor practices through algorithms. Additionally, charges of "[data colonialism](#)" in other countries where tech companies harvest user data and manipulate algorithms to control users as subjects, offer cautionary lessons for Indonesia about the dangers of surveillance and worker mistreatment in a data-driven ecosystem.²⁷⁹ It also exposes the prevailing [institutional void](#) which characterizes the Indonesian government's shortcomings in providing market regulation policy frameworks fit for the platform economy. This, in turn, undermines formal government rules and regulations under the pretext of economic growth.²⁸⁰

4. CONCLUSION

By reflecting on its leadership role in the region, Indonesia could foster greater dialogue and co-ordination with and among its neighbors in the context of agenda-setting and rulemaking AI. Its G20 chairmanship this year provides the platform for how developing countries can address structural limitations in science, technology, and innovation in collaboration with trusted peers in advanced economies. Indonesia can also explore

effective interventions to prevent or mitigate digital transformation risks that could lead to more serious institutional weaknesses.

In addition to its three G20 digital priority areas — post-COVID-19 recovery, digital literacy, and cross-border data flow — Indonesia should reignite the discussion on harnessing the benefits of AI beyond economic growth. It should [reinforce](#) the tremendous potential of AI-based solutions to accomplish the U.N.'s sustainable development goals, which could lead to positive spill-over effects reaching even those outside the G20 circle.²⁸¹ In doing so, Indonesia can achieve a positive and collective effort, enabled by sound policy incentives to employ AI for good, that will catalyze genuine digital transformation within and beyond Southeast Asia.

MALAYSIA

1. BACKGROUND

Malaysia's recognition of the need for an ethical approach to artificial intelligence (AI) is embedded within the country's National AI Roadmap (AI-Rmap). The AI-Rmap, drafted from December 2020 to March 2021, outlines the establishment of an AI Code of Ethics as one of four strategic initiatives that would contribute toward a broader AI governance framework.

The development of an AI Code of Ethics is projected to take place over a period of four years (2021–2025), with progressive yardsticks and measurable key performance indicators (KPIs) along the way.

ESTABLISHING AN AI CODE OF ETHICS

	Horizon 1 (2021–2022)	Horizon 2 (2023–2024)
Monitoring and analyzing ethical initiatives and impacts	<ul style="list-style-type: none"> >> Benchmarking activities to develop a Code >> Observing trending codes in international organizations and major countries >> Drafting an AI Code of Ethics and Guidelines >> Formulating AI ethical standards consistent with evolving global norms >> Setting up a Center for Data Ethics 	<ul style="list-style-type: none"> >> Launching a national discussion on AI ethics >> Finalizing the AI Code of Ethics and Guidelines >> Disseminating the AI Code of Ethics and Guidelines to all stakeholders
Key Performance Indicators		
1	Number of benchmarks conducted	
2	Number of studies executed	
3	Preparation of an AI Code of Ethics/Guidelines	
4	Number of AI ethical standards framed	
5	Creation of a data ethics center	

Source: Aini Suzana Arifin, "Strategy 1: Establishing AI Governance," *Malaysia Artificial Intelligence (AI) Roadmap*, National AI Roadmap Townhall, March 15, 2021, <https://airmap.my/st1>

Implicit in the AI-Rmap's logic for a broader AI governance framework for Malaysia is that AI will be ubiquitous in the country's development trajectory. The AI-Rmap impresses the [need for "continual oversight"](#) over AI technologies that will permeate all aspects of human activity and productivity through the Internet of Things, Fourth Industrial Revolution, big data analytics, and security and surveillance. AI governance is therefore needed to set the "parameters and agencies of Artificial Intelligence in public service delivery as well as its proper role, execution, and regulation across the environment, digital commons, society, and technology." Somewhat confusingly, the AI-Rmap [defines](#) AI governance as encompassing the "vehicular, structural, and actionable aspects" of AI in "quadruple helix society," built upon four axes of human-centricity, explainability, transparency, and ethics.²⁸² While the latter terms are commonly used in AI guidelines around the world, unfortunately, there appears to be no accompanying clarification in the AI-Rmap of how they might translate in the Malaysian context.

The AI-Rmap is an extension of the Malaysia Digital Economy Corporation's (MDEC) still unreleased National AI Framework (NAIF), which is said to set out 20 initiatives within six key building blocks and five goals related to the economy, government, and industry, as well as people and society. NAIF aside, the AI-Rmap also takes into account seven other AI-related documents, including national policies that incorporate the development and implementation of AI. These are the Shared Prosperity Vision (SPV) 2030 (which replaces the earlier Vision 2020); the Ministry of Science, Technology and Innovation's (MOSTI) National Science, Technology and Innovation Policy (NSTIP) 2021–2030 and 10–10 MySTIE Framework; the Ministry of International Trade and Industry's (MITI) Industry-4WRD: National Policy on Industry 4.0; the Academy of Sciences Malaysia's Envisioning Malaysia 2050 Foresight Narrative; Malaysia Digital Economy Blueprint; and Malaysia AI Blueprint 2019.

It is worth noting that most of these documents either at least cursorily refer to, or discuss, ethics in specific connection to AI or, more generally, to technology. The Blueprint, in particular — as the Malaysia chapter on data elaborates — identifies ethics in the use of data and digital tools as one of its three guiding principles.

2. USAGE AND IMPACT

A common thread running through Malaysia's boggling number of technology-related policies is the prioritization of national economic development and the modernization of the public service in order to facilitate that. Tellingly, the NSTIP itself states that its rationale is to strengthen the position of science, technology, and innovation "in the development and growth of an innovation-based economy." Accordingly, the [NSTIP](#) introduced the acronym, "STIE" — science, technology, innovation, and economy — that is used throughout the document "to support economic growth" and to become a "high-tech nation."²⁸³

There is, however, an appreciation reflected in these many policies that achieving high-tech status and improving the quality of life through AI and big data analytics will have to be moored to principles of inclusiveness, economic justice, social equity, and sustainability.

Malaysia's [National Fourth Industrial Revolution \(4IR\) Policy](#), which addresses digital, physical, and biological advancement, as well as the overlaps between them, aims to facilitate socio-economic transformation through the “ethical use of 4IR technologies.” These technologies include artificial intelligence and big data in the digital domain, autonomous vehicles and 3D printing in the physical realm, and bioprinting and genetics in the biological sphere.²⁸⁴

The Envisioning Malaysia 2050 document acknowledges that sustainability “must also extend to the notions of harmony and prosperity through smart management of its resources and leveraging on opportunities enabled by the knowledge of its people.”

At the government level, the foray by Putrajaya (Malaysia's administrative capital) into big data analytics as a foundation for AI applications started over a decade ago, with projects such as the Ministry of Health's (MOH) Malaysian Health Data Warehouse (MyHDW) in 2010. Utilizing big data analytics, AI, and geographic information system (GIS), MyHDW is meant to process huge volumes of structured and unstructured data for health data management, publication, and dissemination, as well as for the development of health informatics standards. Over 90 percent of the technology is [homegrown](#) and built by the Malaysian Institute of Microelectronic Systems (MIMOS), the country's national applied research and development agency under MOSTI.²⁸⁵

To preserve the privacy and security of information collected, stored, and analyzed through MyHDW, MIMOS assures the system complies with all relevant provisions under Malaysia's Personal Data Protection Act (PDPA) 2010. There is also data pseudonymization

Privacy-enhancing technologies like pseudonymization and anonymization are seen to offer a balance between preserving individual privacy, on the one hand, and optimizing information system functionality, on the other

(the practice of replacing clear identifiers such as names with pseudonyms) to conceal patient information, as well as multi-factor user authentication, in accordance with the Malaysian Administrative Modernisation and Management Planning Unit's (MAMPU) guidelines. Additionally, a [Data and Information Governance Committee](#) manages data ownership, usage, and quality.²⁸⁶

To be sure, these are progressive measures. Privacy-enhancing technologies like pseudonymization and anonymization, in particular, are seen to offer a balance between preserving individual privacy, on the one hand, and optimizing information system functionality, on the other.²⁸⁷ They are also in line with international standards such as [ISO 25237:2017](#) for the privacy and protection of personal health information.²⁸⁸

However, as discussed in the Malaysia chapter on data, the government is presently excluded from the PDPA's ambit, which is a particular omission given the involvement of MOH, MIMOS, and government hospitals. There is also [ambiguity](#) about whether pharmaceutical or insurance companies have access to the database, whether access is granted by a fee, or whether the information accessed will be used for purposes other than research.²⁸⁹

A few years after the rollout of MyHDW, the government announced a broader [Public Sector Big Data Analytics Pilot Project](#). This initiative, announced in 2013, began in 2015 as a collaboration among three agencies — the Ministry of Communications and Multimedia, MAMPU, and MDEC — with proof-of-concept implementation in sentiment analysis, price monitoring, public health, and crime prevention.²⁹⁰

With the launch of SPV 2030, Malaysia's big data initiatives have become even more ambitious. A planned [National Big Data Analytics Center \(NBDAC\)](#) will enable public decision-making to be based on data analytics, in line with Malaysia's digital government and Fourth Industrial Revolution (4IR) strategies.²⁹¹ The NBDAC will encompass projects such as the Department of Statistics Malaysia's (DOSM) estimation of land area and productivity in rubber plantation through satellite imagery, machine learning, and mobile positioning data. The utility of an NBDAC was also underlined during COVID-19, as it would have enabled a clearer picture of labor disruptions and the actual size of the informal work sector as Malaysia grappled with waves of movement control orders.

The AI-Rmap document sketches five national AI projects in healthcare, agriculture, education, smart city transportation, and public service. Catalyzed by the pandemic, the [project on healthcare](#) would rely on machine and deep reinforcement learning to establish an autonomous vaccine distribution and management system.²⁹² Using similar AI technologies, the [project on agriculture](#) envisions an AI-driven supply chain management system for Malaysia's important palm oil industry.²⁹³

The [project on education](#) would utilize AI technologies such as machine learning, neural networks, and natural language processing to develop a personalized learning system equipped with automated assessment to be deployed at scale. The hope for this particular project is to match industry demand with suitable graduates and job seekers for a "future-driven workforce."²⁹⁴

For [smart city transportation](#), machine learning, big data, optimization, IoT, and blockchain would drive autonomous maintenance, repair, and operation processes for a more effective and reliable public commuter service.²⁹⁵

In the [public service](#), intelligent automation through chatbots could improve process efficiency and service delivery at the federal and state government levels.²⁹⁶ Additionally, MAMPU is studying the use of [AI-based facial recognition](#) to monitor employee attendance.²⁹⁷

With the exception of the AI-in-education project, the other nationwide initiatives will center on reducing operational friction and increasing productivity. Policies and guidelines for the public sector's use of AI and blockchain will set the parameters for ethical and effective implementation of these technologies. However, there are potential minefields even with seemingly mundane processes in innocuous sectors such as agriculture, to be discussed in the next section. Guidelines will have to be scrutinized by more than the AI-Rmap's quadruple-helix structure of stakeholders to check for bias and to ensure ethical concepts and practices are upheld, from system design to deployment.

CASE STUDY

USE OF AI IN THE JUDICIARY

Malaysia has begun piloting AI sentencing tools in two states, Sabah and Sarawak. The impetus behind the push to utilize AI in the judicial system is to achieve greater consistency in sentencing, and to allow the courts to clear case backlogs efficiently, preventing stressful and lengthy legal proceedings. The AI tool is currently being trialed in two types of offences: drug possession under Section 12(2) of the Dangerous Drug Act and rape under Section 376(1) of the Penal Code.

The AI algorithm analyzes cases under both offences in Sabah and Sarawak between 2014 and 2019. A model is created from past case patterns, then applied to present-day cases before producing sentencing recommendations that judges can choose to adopt or deviate from.

Critics, however, warn of the risks involved when utilizing AI to make such decisions. These include the amplification of bias against minorities and marginalized groups as well as the lack of ability to consider mitigating factors and circumstances. Malaysia's Bar Council has also questioned the validity and transparency of the algorithm, given that the training dataset used was limited to only a five-year period. In response, the Sabah and Sarawak courts, along with the software developer Sarawak Information Systems Sdn. Bhd., attempted to mitigate the risk of bias by removing the "race" variable for future sentencing guidance.

The government is also partnering with the private sector to implement large-scale projects such as urban planning and development. Alibaba's [City Brain program](#), which started out in the Chinese city of Hangzhou, was rolled out in Malaysia's capital, Kuala Lumpur, as a partnership involving the tech giant, MDEC, and City Hall. In the

first phase, inputs from 382 cameras and 281 traffic light junctions around central Kuala Lumpur fed data for real-time analysis and improved traffic forecasting. The project is intended to support Malaysia's digital transformation with Alibaba's cloud and AI software, although the [data will be owned by the city](#).²⁹⁸

However, as [others have pointed out](#), the fact that City Brain will also be offered as an open innovation platform to enterprises, startups, and research organizations raises privacy and surveillance concerns, since data that is initially gathered and algorithmically processed for public use may end up being utilized for profiling and commercial purposes in the future.²⁹⁹

3. CHALLENGES AND PROSPECTS

A 2021 [study](#) on Malaysia's progress in big data analytics and AI proposed a national AI ethical framework to guide industry in developing and deploying AI that would be "transparent, unbiased, and beneficial to as many people as possible." The idea, of course, is not new, given Putrajaya's own cognizance of the imperative to integrate ethics into AI use through documents such as the AI-Rmap and the Blueprint. However, the study makes it clear that such a framework should go beyond the normative instruments that regional and international organizations, as well as multinational tech companies, have already tabled. Rather, an AI ethical framework for Malaysia should include additional principles "unique to its national values and aspirations."³⁰⁰

An AI ethical framework for Malaysia should include additional principles "unique to its national values and aspirations"

This approach makes sense since even basal, global standards may need to be adapted to, or supplemented by, those that are more contextually applicable to a particular nation. In Malaysia's case, these should address the additional challenges of government data classification, labor disruption, and inclusivity, in particular.

Government data classification

Open government data is a good practice in the digital age of making data produced or collected by governments available for free public use. It promotes good governance principles of transparency and accountability, especially if, as in Malaysia's case, government is currently excluded from data protection legislation. Although tensions between open government data and classified government data exist everywhere, they can be complicated by a vague classification policy that might inadvertently result in an overly cautious bureaucracy being hesitant to publish information. This, in turn, could negatively impact the quality of AI data or datasets and produce automated decisions based on incomplete information that would likely not even be verifiable.

In 2021, Putrajaya took a step closer to adopting a [Cloud First Policy](#) with a collaboration between the government's cloud service provider, MyGovCloud@PDSA, and four commercial providers: Microsoft Azure, Google Cloud, TM Cloud Alpha, and Amazon Web Services.³⁰¹ The decision was meant to leverage the potential of data analytics, AI, and other emerging technologies.

Yet efforts have been slow to get underway. In 2019, an [MDEC engagement session](#) with 29 government agencies revealed several concerns over cloud adoption, primarily related to security. This was notwithstanding a mandate by MAMPU dating back to 2003 directing the observance of a comprehensive set of minimum technical standards covering data integration, information access, and metadata, among others.³⁰²

The lack of clarity on government data classification in a cloud environment was also listed as a significant concern during that session. The Chief Government Security Office (CGSO) released [data classification guidance](#) for public agencies in 2021 so that data can be tagged, categorized, and organized for more efficient, automated processing.³⁰³ Yet informants pointed out that the data classification initiative has so far been driven more by the private rather than the public sector. Additionally, the lack of an integrated database in many government agencies, as well as varying administrative procedures, such as the imposition of a fee in exchange for data even between agencies, hamper data-sharing and classification efforts.³⁰⁴

Determining the parameters of what data should or should not be shared goes beyond improving bureaucratic functionality. It has substantial implications for how automated decisions are made and how the results affect people's lives.

Labor disruption

A 2017 [study](#) calculated that 54 percent of jobs across all major economic sectors in Malaysia could be at high risk of being technologically displaced over the next 20 years. Of that figure, more than 70 percent would be semi-skilled and 80 percent would be low-skilled jobs. Women in clerical positions would be disproportionately affected, but men in more labor-intensive industries such as agriculture, mining, and construction would be overwhelmingly at risk from automation.³⁰⁵ These projections accord with other studies, with [one estimate](#) showing about 50 percent of work time in Malaysia being spent on highly automatable activities.³⁰⁶

Pre-emptive and mitigation strategies through [technical vocational education and training \(TVET\)](#), as well as reskilling programs, are already underway.³⁰⁷ There is also the anticipation that there will be new demand for labor, notwithstanding the expected increase of automation and use of AI in both the public and private sectors. Factors such as the surprising [growth](#) of Malaysia's digital economy, despite the economic shocks of the pandemic, as well as greater investment in renewables, could create more jobs in different areas.³⁰⁸

Effectively future-proofing Malaysia's workforce should go beyond worker retraining or reskilling in digital technologies. Jobs requiring a high level of social, emotional, linguistic, and cognitive skills will help diversify workers' options. Some allowance has already been made for this in the [Blueprint](#). The document outlines the need to develop creative thinking among students for a "competent and agile workforce." It also spells out a specific initiative to nurture talent in the arts, entertainment, and recreation industries to enhance the nation's innovation and export of digital content.³⁰⁹

Yet, as the [Malaysia Education Blueprint 2013–2025](#) itself implicitly acknowledges in its rationale, the country's education system has long been plagued by the rigidity of rote-learning; an exam-oriented approach; and the fragmentation of school types, from the national and vernacular to the international and religious.³¹⁰ This last challenge has deepened divisions among Malaysia's next generation along socio-economic and rural/urban lines, even as it has provided the curricular flexibility reflective of the nation's diversity. This could have lasting effects on the country's AI-powered future in two ways — by under-preparing Malaysians for a disrupted labor market, and undermining the desired transformative and inclusive impact of technology for the whole nation.

There is, however, a grimmer aspect to labor disruption that should be considered, particularly if Malaysia's national AI project in agriculture is to focus on palm oil. The country is the world's second largest exporter of the commodity. Automating harvesting, extraction, and supply chain management to "sustain the productivity and revenue of the plantation companies despite shortage of labor" would, on the surface, be a sound use of machine learning, deep learning, and computer vision.³¹¹

Given the controversy surrounding allegations of forced, undocumented labor in Malaysia's palm oil plantations, the integration of AI in these production processes could well alleviate some of the industry's problems in this regard. Yet, as [examples elsewhere](#) have shown, the use of AI technologies can also strengthen power and control in the hands of corporations to the detriment of mainly low-wage workers. This, in turn, can exacerbate [income inequality](#) or worse, exploitation.³¹² Any code of ethics guiding the use of AI in this and, indeed, other industries with a stark power imbalance would have to make allowances for both the foreseeable and unintended consequences of reproducing pre-existing inequities through automation.

Inclusivity

One of the most discomfiting risks of AI in a multi-ethnic and multi-religious society is its proven ability to propagate bias and discrimination through opaque algorithms. In the context of Malaysia, two related and sensitive questions arise. First, how will the nation's delicate balance of communal relations play into and affect algorithmic datasets without worsening real-world biases? Second, big data initiatives notwithstanding, with gaps in the availability and quality of data, can Malaysia credibly train AI systems, and can these technologies redress or reverse latent policy biases?³¹³

The ethnic, religious, and linguistic cleavages that post-colonial Malaysia inherited at independence continue to underpin public and private debates on education, the legal and justice systems, and economic policies

Data, after all, is a reflection of historical, political, and social realities. The ethnic, religious, and linguistic cleavages that post-colonial Malaysia inherited at independence continue to underpin public and private debates on education, the legal and justice

systems, and economic policies. If anything, these frictions have only been amplified with greater political space and the advent of social media since the early 2000s. Not addressing these communal fractures in real life and delegating decisions to algorithms, instead, will only embed prejudice under the guise of technological neutrality.

One way to assess whether AI-powered systems will serve Malaysia's diverse population equitably is to examine the ethnic or national-origin composition of the scientific research community in the country.

This shines a light into how welcoming it is to different perspectives, which could in turn stimulate higher-quality research.

A [study](#) in 2016 concluded that Malays greatly increased their research participation and publication in Malaysia over three decades, from 20 percent in 1982–1984 to 65 percent in 2012–2014. There was a corresponding decline among Malaysian Chinese and Indian authors (although their absolute numbers increased because of a rise in Malaysian scientific output in total). Malay researchers demonstrated particular strength in engineering and technology, as well as in physics, and doubled their representation in clinical medicine, which is a field traditionally dominated by Indians.

Unsurprisingly, research and writing collaborations with foreign scientists strongly reflected the ethnic divisions in Malaysia; that is, Malays (who are also Muslim, as defined by Malaysia's constitution) favored working with counterparts from Muslim-majority countries, Indians with colleagues from India, and Chinese with those from China. The expansion in scientific output among Malays is remarkable when compared against the steadier population growth of Malays, as a collective group, in the same time period.³¹⁴

These figures on science are testament to the country's affirmative action agenda dating back to the New Economic Policy of 1970 to correct for ethnic-wealth disparities. However, this approach, which started out with good intentions to uplift Malaysia's bumiputera (sons of the soil) population, has proven polarizing over the years.³¹⁵

The country's *orang asal* or *orang asli* (indigenous community) are categorized as bumiputera, yet they continue to be hardest hit by poverty. [Official data from 2010](#) showed that over 50 percent of the community in peninsular Malaysia was categorized as poor and 33 percent as hard-core poor. By comparison, the national average of hard-core poor was 0.7 percent.³¹⁶

The *orang asli* in peninsular Malaysia were not actually included in DOSM's 2016 household income survey, even though they numbered around 178,000 people. By contrast, 80,000 households were surveyed. DOSM [explained](#) that the Department of *Orang Asli* Development (JAKOA) had those detailed statistics, but did not provide a reason why they had been left out of the survey itself.³¹⁷ As it is, observers point to the challenge of data exclusion in countries such as Malaysia as a larger concern than data protection and privacy.³¹⁸ The lack of quality data, as well as decentralized access to datasets, could degrade the algorithmic training process and consequently the value of decisions derived from that.

Like most indigenous communities elsewhere, Malaysia's *orang asal/orang asli* provided for themselves by foraging, hunting, and subsistence farming on native customary land. However, repeated infringements of their land rights through logging, mining, and cash crop plantations have left them marginalized, and plagued by malnutrition and lack of access to basic services. Although the government established JAKOA as a dedicated agency for indigenous affairs, scholars and non-governmental organizations argue that its approach has been to assimilate and resettle the population in the name of sustainable development.

In the past, the government attributed the continued impoverishment of the *orang asal/orang asli* to their failure to view development through the same national lens.³¹⁹ This perspective questions the meaning of references to harmony, prosperity, sustainability, and progressiveness in the Envisioning Malaysia 2050 document, which also talks about "endogenous STI" and knowledge of the country's people. Presumably, this would also encompass indigenous knowledge among Malaysia's native communities in peninsular and east Malaysia with their deep connections to nature and biodiversity.

Another indication of inclusivity in advancing an ethical AI ecosystem is female participation in STEM subjects. In Malaysia, women fall behind men at both the tertiary and professional levels. Of the number of [STEM tertiary graduates](#) in 2018, 34.2 percent constituted women compared to 65.8 percent for men.³²⁰

Interestingly, in the early 2000s, as the number of women in higher computer science education decreased in many Western countries due to perceptions of the field as "masculine," Malaysia presented a [different picture](#). At the time, women constituted about half of all students and the majority of the faculty in computer science and information technology (IT).³²¹ One [study](#) in 2006 concluded there was no gender bias with regard to how those subjects were viewed by female students. In fact, when compared to their male counterparts, female students were more certain that they would go on to pursue a career in computing or IT.³²²

Yet the overall picture is a little more complex. Malaysia has had a [national policy on women](#) since 1989 to achieve gender equality, yet has the [third lowest](#) female labor force participation rate in the ASEAN region.³²³ At the same time, the country has a reverse

gender gap in school enrollment at all levels, with males being significantly underrepresented in public university enrollment in every field of study except engineering, manufacturing, and construction. There is also a trend of male underperformance at the secondary education level.³²⁴ So, as Malaysia works toward bringing on board more women into STEM for more ethical AI systems, society should also ensure that it doubles down on engaging males in education so as not to create a cohort of “[lost boys](#),” or educationally marginalized young men.³²⁵

4. CONCLUSION

Malaysia’s AI-Rmap document, with its proposal for an AI Code of Ethics, and pending National AI Framework are encouraging steps to integrate ethical principles and standards into the country’s transition to AI technologies. A suite of other complementary digital strategies, policies, and blueprints will help institutionalize this approach for the long term.

However, it is still a huge leap from this point to what was initially envisioned with the birth of the Multimedia Super Corridor (MSC), which set the stage for nearly all of Malaysia’s digital ambitions and policies — a networked ecosystem of ICT- and IT-enabled industries that would “develop new codes of ethics in a shrunken world,” “set global standards in flagship applications,” and facilitate a “world-leading” and “harmonized global framework of cyberlaws.”³²⁶

While Malaysia has been a member of the International Telecommunication Union (ITU) since 1958 and the Department of Standards Malaysia is a member of both the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC), it does not currently participate in the ISO and IEC Joint Technical Committee (JTC) on Artificial Intelligence. The JTC serves as the focal point for the Committee’s standardization program on AI, including on ethics, and provides guidance on developing AI applications. Drawing up new codes of ethics and international standards requires consistent presence and participation in these sorts of forums.

But it would have to start with multi-stakeholder discussions at the national level. This would require delicate conversations about the types of values and principles underpinning the multiculturalism of Malaysia, which could then be translated into an AI Code of Ethics to govern technology. It would also warrant a recap of the nine challenges first laid out in Vision 2020 and recalled by the Envisioning Malaysia 2050 document as a recurring theme of “a united, democratic, moral and ethical, liberal and tolerant, just and equitable, prosperous, scientific and progressive society.”³²⁷ To paraphrase an informant, ethical AI in a nation of diversity can only be realized if there is first an embrace of that diversity. The proof will be in the coding.

SINGAPORE

1. BACKGROUND

As Southeast Asia's tech front runner, it comes as no surprise that Singapore is ahead of the pack among its ASEAN peers in the AI landscape. The city-state's rapid advancements and agile approach to AI technical development and policymaking have been noted across the Asia Pacific. Singapore's geographic size, multicultural mix, and reputation as the melting pot of technological innovation in the region makes it the ideal AI laboratory, capturing the imagination and even the admiration of other countries like Australia, Japan, and South Korea. As Singapore rides the momentum of its technological advancements in AI, it has also started to install guardrails to maximize the benefits and mitigate any unintended harms.

In June 2018, Singapore announced that it would embark on [three AI Governance and Ethics Initiatives](#):³²⁸ (1) an Advisory Council on the Ethical Use of AI and Data, established in August 2018 and comprising of government and private sector representatives; (2) a discussion paper released by the Personal Data Protection Commission (PDPC) on responsible development and adoption of AI, which will be used by the Council to frame its deliberations; and (3) a research program on the governance of AI and data use to advance and inform scholarly research on AI governance issues.

In 2019, Singapore launched the [National AI Strategy \(NAIS\)](#), under the Smart Nation and Digital Government Office's National AI Office. As part of a three-point vision to use AI to transform the country's economy and the lives of its people, NAIS will deploy AI at a national scale for Singapore to become a global hub for AI solutions; generate new business models and deliver innovative services to local populations; and train the Singaporean workforce to adapt in the evolving knowledge-based economy.³²⁹ To build a viable AI ecosystem, NAIS [outlined](#) seven national AI projects, namely, healthcare, smart estates, education, border security, logistics, finance, and government,³³⁰ which will be [supported](#) by key enablers — multi-stakeholder partnerships, data architecture, talents and education, trusted environment, and international collaboration.³³¹

Singapore's Smart Nation initiative is a culmination of [previous efforts](#) to digitize public service delivery or e-government.³³² But unlike previous attempts, this Smart Nation initiative aims for a [complete digital transformation](#) across different aspects of urban life.³³³ The impetus for the Smart Nation initiative to employ smart technologies is rooted in the confluence of internal and external events. Globally, there is an [emerging trend](#) to capitalize on the value creation offered by big data. At the same time, domestically, the political debate on urban development has been intensifying.³³⁴ High population density and immigration were two factors that led to growing public discontent, which [resulted](#) in a decline in support for the ruling People's Action Party in the 2011 general elections.³³⁵

The juxtaposition of the economic opportunities from the global explosion of data, combined with growing public pressure from the Singaporean electorate to address the challenges of overcrowding in the city-state, [compelled](#) the government to lay the early foundations of the Smart Nation initiative.³³⁶

2. USAGE AND IMPACT

Investments in research and development and human resources were integral to achieving Singapore's Smart Nation ambition. Deputy Prime Minister and Coordinating Minister for Economic Policies **Heng Swee Keat** [announced](#) in November 2019 that the government was investing SGD500 million (around USD364 million) to fund AI projects

AI has the potential to boost Singapore's annual economic growth from 3.2 percent to 5.4 percent and its labor productivity by 41 percent by 2025

under the Research, Innovation and Enterprise 2020 plan.³³⁷ In affirming Singapore's vision of becoming a global AI hub by 2030, Heng said that the island republic would strive to be at the forefront of developing and deploying scalable and impactful AI solutions.³³⁸ Singapore's ambition to lead in AI innovation is warranted. McKinsey has [found](#) Singapore to be the frontrunner in AI experimentation in financial services, high-tech telecom-

munications, manufacturing, and mobility in Southeast Asia.³³⁹ Accenture [estimates](#) that AI has the potential to boost Singapore's annual economic growth from 3.2 percent to 5.4 percent and its labor productivity by 41 percent by 2025.³⁴⁰

Over time, the number of key enablers of Singapore's digitization efforts under its Smart Nation program has [expanded](#), underpinned by a strong collaboration between government, industry, and academia.³⁴¹ For instance, the Monetary Authority of Singapore (MAS) established a regulatory sandbox in collaboration with PayPal to incubate start-ups in financial technology. The [collaboration](#) produced PolicyPal, an AI-powered app which facilitates registration of insurance policies.³⁴² Since then, the [regulatory sandbox](#) has been adopted as a useful policy tool in Singapore's smart city initiatives to co-create solutions among relevant government agencies, the private sector, and policymakers.³⁴³

NAIS also introduced the idea of building data lakes to manage Smart Estates in Singapore. Smart Estates refer to the deployment of smart technologies to collect, analyze, and optimize the use of data to pre-empt problems or predict trends in housing estates. Through [Smart Estates](#), the Singaporean government can tap data to identify the use of electricity for lighting and cooling systems.³⁴⁴ The Infocomm Media Development Authority (IMDA) and the Singapore University of Technology and Design will pilot data lakes to improve data access and serve as a repository for common data standards and governance frameworks. With the malleable nature and emergent effects of AI, NAIS remains a living document, open to constant review to reflect the evolving technical, ethical, and socio-economic dimensions of AI.

CASE STUDY

USE OF AI IN URBAN PLANNING

In the Singaporean government's efforts to construct a Smart City, smart lamp posts have been planned for installation throughout the city. The lamp posts are to house a host of interconnected sensors and cameras belonging to different government agencies for detecting everything from unruly crowds and speeding e-scooters, to hazy weather. AI technologies such as big data analytics and deep learning would analyze the integrated pool of data collected to facilitate better-informed and co-ordinated public sector decision-making in urban planning.

Concerns were raised about the surveillance cameras and facial recognition technologies that would be incorporated into the smart lamp posts, but Prime Minister **Lee Hsien Loong** stated that the project was aimed at improving the lives of citizens, and that it was not intended to be unethical or intrusive. A spokesman for GovTech said: "The need to protect personal data and preserve privacy are key considerations in the technical implementation of the project." In order to ensure that data collected remain secure, the government has engaged commercial security stakeholders such as LogRhythm's NextGen SIEM platform to monitor and detect potential cybersecurity threats.³⁴⁵ The platform allows for all data sources, including cameras, sensors, cloud network, servers, and security operations centers' workstations, to be integrated onto a single platform, enabling the security team to identify high-risk activities in the network and corroborate threat indicators.

To address the governance conundrum in AI development, Singapore prides itself on being the first country in Asia to put forward an AI framework.³⁴⁶ The Model AI Governance Framework aims to address the complex relationship between innovation and regulation. Oriented around internal and external governance measures, risk-management, and operation management, the Model AI Governance Framework provides policymakers and industry practitioners with practical tools to address and overcome future AI challenges, given the disruptive nature of technology.^{347,348}

In building trust toward AI, the Framework is grounded on two high-level principles. First, AI solutions' decision-making process should be explainable, transparent, and fair. Second, they should be "human-centric."³⁴⁹ Organizations must help people understand how machine learning and deep learning make their predictions. They must also oversee the overall process as to how AI models use data to make predictions and arrive at fair assessments or outcomes. Human-centric refers to the requirement that AI should benefit the well-being and safety of society.³⁵⁰

To further guide industry in adopting a self-regulatory approach to the development, deployment, and usage of AI, the Singaporean government produced the Compendium of Use Cases and the [Implementation and Self-Assessment Guide for Organisations \(ISAGO\)](#) companion document.³⁵¹ Both documents provide practical examples to help organizations align their AI governance practices to the Model Framework.

As part of its industry outreach, the [MAS](#) entered a multi-phase collaborative project with the financial industry to evaluate their Artificial Intelligence and Data Analytics (AIDA), and to co-produce principles of fairness, ethics, accountability, and transparency which can be applied to banking (credit risk scoring and customer marketing) and insurance (predictive underwriting and fraud detection).³⁵²

Singapore is also making its mark in the emerging AI [international standards](#) setting arena, participating in the ISO/IEC JTC 1/SC 42 standards committee on Artificial Intelligence.³⁵³ As of the time of writing, in Southeast Asia only Singapore and Indonesia were involved in the committee, with Singapore participating as a full member with voting rights and Indonesia as an observer member. With its high technical capacity and heavy investments in AI research and development, Singapore can utilize its expertise to contribute productively to the ongoing global discussions on standards.³⁵⁴

3. CHALLENGES AND PROSPECTS

Singapore has secured the first mover advantage in AI development in the region, but a few challenges remain. These obstacles include a shortage of talent; repeated incidents of data breaches; the government's highly centralized approach; and problems with upholding transparency, inclusion, and equity.

AI workforce

To elevate its competitive position in the AI landscape, Singapore must [contend](#) first with the lack of a capable workforce. It is projected that Singapore's talent deficit will amount to 600,000 in the next few years.³⁵⁵ Although the government has launched apprenticeships, graduate scholarships, and conversion programs with the private sector, Singapore will have to [find](#) creative ways to attract international talent.³⁵⁶ If not, the city-state risks losing approximately USD107 billion by 2030 due to [manpower shortages](#).³⁵⁷ While off-the-shelf AI solutions remain a viable option, AI is an artisanal endeavor that requires a "human-in-the-loop" to ensure the explainability and reliability of its models. Humans in the loop can inspect, verify, and alter algorithms at different stages of the cycle to make high quality AI models which embody fairness and transparency. Highly skilled and capable talent is fundamental to harnessing the power of AI to mitigate any potential harm or bias.

Cyberattacks

High profile incidents of [data breaches](#) involving Singapore's digital native companies deploying AI solutions like Grab can dampen public confidence in AI.³⁵⁸ The repeated occurrence of data privacy breaches can have a chilling effect on public-private partnerships involving data usage in pilot testing, regulatory sandbox, and the establishment of infrastructures like data lakes. Cyberattacks through adversarial AI are an emerging threat that further challenge the efficacy of current data protection laws. Defense Minister **Ng Eng Hen** has [called](#) for the need to revisit cybersecurity standards and frameworks to guide the public and the private sectors with the increasing integration of AI and big data.³⁵⁹ Singapore's private sector has echoed similar sentiments, noting that increasing reliance on technology will result in more cyberattacks.³⁶⁰ The recent public backlash over the TraceTogether app and other high-profile data breaches adds to the growing [reluctance](#) among Singaporeans to share personal information with the government.³⁶¹

Surveillance, accountability, and public trust

Recognizing the public's growing skepticism about the reach and impact of AI and big data, combined with deteriorating confidence in data protection, it could be hard for the Singaporean government to solicit more solid public buy-in in further rollouts of Smart Nation initiatives as the public starts to focus more on deeper issues of surveillance, accountability, public trust, and inclusion.

Singapore's use of facial recognition and smart city solutions predates its smart city initiatives. With the deployment of facial verification and smart lamps as components of crowd analytics, there is growing [criticism](#) of how facial recognition technologies can inadvertently facilitate discrimination based on gender and ethnic bias.³⁶² The intrusive nature of such technologies extending to human emotions is also problematic, particularly in the absence of user consent.³⁶³

Relatedly, there is also the issue of accountability and public trust. Despite [claims](#) that the Model AI Governance Framework is sector-, technology-, and algorithmic-agnostic — meaning it has a general focus on AI data analytics, systems, and software and applies as a standard baseline for organizations across all sectors³⁶⁴ — it is still considered weak. As adoption remains voluntary in the private sector, there is no [clear-cut understanding](#) of the extent to which it will be applied.³⁶⁵ With its non-binding nature, the framework can be applied during the initial stages of tech deployment, but AI developers can eventually [depart](#) from it in the process. Thus, more concrete oversight must be adopted to address safety considerations, given the rapid integration of AI-based features in commonly available applications.³⁶⁶

With these concerns simmering, there is a clear need for concrete legislation to ameliorate the unintended effects of AI. The Law Reform Committee of the Singapore Academy of Law has called for a more proactive approach to tackle developing, deploying, and scaling

AI applications. It published a series of reports that called for the passage of “[soft laws](#)” to develop AI technologies “that foster socially and economically beneficial development and use of robotic and AI-driven technologies.”³⁶⁷ Specifically, the reports [highlight](#) the potential risks of autonomous robotics and AI (RAI) on humans and property, and issues over how existing criminal laws and liability can be applied. In conclusion, the Committee recognized that RAI could give rise to new forms of harm, thus inevitably challenging existing laws and regulations. This will, in turn, require all regulators and legislators to be agile in addressing new and emerging risks.³⁶⁸

Underlying issues of weak regulatory and legislative frameworks lead to legitimate concerns over surveillance and discrimination, and this will have far-reaching implications in terms of Singaporeans’ perception of AI. A [Pew survey](#) confirms that, overall, 72 percent of Singaporeans perceive AI as beneficial to their society, but the use of robots to automate jobs solicited mixed views, with 48 percent saying it would be a good thing and 42 percent averse to the idea.³⁶⁹ The mixed results [show](#) that it remains to be seen how the actual implementation of AI technologies can live up to its promise.³⁷⁰

Inclusion and equity

As mentioned, the IMDA [established](#) an Advisory Council on the Ethical Use of AI and Data to support the establishment of a trusted AI ecosystem.³⁷¹ This is a positive step toward potentially bridging any gaps in inclusion and trust among its diverse members.³⁷² But experts argue that the government’s heavy hand in guiding the council’s direction still casts a shadow of doubt over its capacity to genuinely dive into the root cause of AI’s potential and unintended risks without being influenced by issues of politics and profit.³⁷³ In various stakeholder consultations conducted for this report, informants cautioned that the government’s tendency toward heavy technological determinism should be balanced by a deeper sense of critical reflection to promote inclusion and equity.

The government’s top-down digitization efforts have [crowded out](#) private-sector opportunities, which disproportionately impacts small players, entrepreneurs, and start-ups.³⁷⁴ The consequences of the government’s centralized approach are already manifest — the Smart Nation initiative is struggling to capture Singaporeans’ imagination due to the [lack](#) of other success stories besides its local fintech industry.³⁷⁵ Setting up adequate digital infrastructure and providing funding resources are essential, but the government should allow start-ups to “play” and exercise a relative degree of creative freedom to spur out-of-the-box innovation.³⁷⁶

Small and Medium Enterprises (SMEs) continue to face digitalization barriers in Singapore. For context, Micro, Small and Medium Enterprises (MSMEs) comprise 99 percent of all firms, employ 72 percent of the workforce, and contribute approximately 50 percent to the total GDP. Although SMEs in the city-state are [optimistic](#) about their digital transformation,³⁷⁷ it was [found](#) that they continue to experience higher costs in

tech adoption, an urgent requirement to upskill employees, and the need to raise cybersecurity spending against potential risks.³⁷⁸ Singapore could also pay more attention to the role of women-led businesses. Despite the government's campaigns for [digital inclusiveness](#), such as Digital for Life,³⁷⁹ and women-focused initiatives such as SG Women in Tech,³⁸⁰ more could be done to close the gender imbalance. A [study](#) conducted by Accenture revealed that women-owned businesses account for only 27 percent of all businesses and 13 percent of sales.³⁸¹ Addressing gender parity through more opportunities for women-owned businesses could [yield](#) an additional 20 percent to Singapore's GDP.³⁸²

Another dimension of exclusion that pervades AI development in Singapore is the notion of data dominance.³⁸³ Most often, Singapore is perceived as a highly interconnected city-state capable of capturing huge streams of data. But a major concern among experts is the overrepresentation and the underrepresentation of specific groups or profiles of individuals and communities in Singapore that can lead to some being marginalized or excluded. The term data dominance has a sharper edge when discussing data inclusion or exclusion, because it shows how stereotypes and binaries can be reinforced in the digital realm with overrepresentation or underrepresentation in data sets.

Singapore is comprised of diverse communities imbued with an array of different ethnicities and faiths. In addition, it is also home to thousands of foreign talents engaged in both high-skilled and labor-intensive industries. With a unique cultural mix and manageable geographic size, Singapore is a living AI laboratory capable of testing, developing, deploying, and scaling AI solutions. However, if not managed carefully, data dominance can favor one community over the other and disproportionately impact those who are already in precarious positions.³⁸⁴

The TraceTogether controversy demonstrated how AI-backed platforms can impact vulnerable migrant workers in cosmopolitan cities like Singapore in the age of globalization. Although Singapore has had one of the world's most efficient coronavirus responses, its [preferential programs](#) aimed specifically at monitoring the mobility of migrant workers showed how foreign workers were considered a risk, rather than being at risk.³⁸⁵ More importantly, it illustrated how technology can reinforce or amplify racism and xenophobia, [resulting](#) in "multiple and intersecting forms of discrimination and inequality, gender-specific restrictions in migration policies, precarious and informal labor [conditions]."³⁸⁶

Challenges on inclusion and equity are not unique to Singapore. The problems of digital technologies perpetuating current structural power imbalances and social injustices have gained wider attention, alongside a wave of renewed optimism on AI.³⁸⁷ With AI's unprecedented integration and the dawn of an emerging digitally-centric society, redefining what it means to be a citizen in this new era is paramount. As one informant argued, being a digital citizen requires knowing how to be human and humane in today's

digital societies and understanding one's digital rights. Having such knowledge will allow human beings to live and thrive with machines that possess human-like abilities. Reflecting on what it means to be a digital citizen will demand more than just a checklist or guidelines but more space for dialogue and deliberation.³⁸⁸

Informants suggested establishing a “social material assembly” — informed by the socio-technical approach — to fully harness the dynamics of human-machine interaction and to alleviate concerns about surveillance and discrimination.³⁸⁹ In practical terms, the social material assembly could be implemented by convening community forums to facilitate better interaction and understanding between the creators and innovators of AI technologies, as well as direct users and the general population more broadly.³⁹⁰ Community dialogues or forums would open more direct communication channels between technical experts, like AI engineers and data scientists, as well those who come from non-technical backgrounds.³⁹¹ These forums could help technical experts better grasp the implications of their codes or models in real-world settings, while the non-technical individuals could provide feedback.³⁹²

The assembly would also incorporate the philosophical approaches of mindfulness and clarity with high technical capacity. Clarity includes knowing what kind of information an individual needs to guide his or her behavior, while mindfulness involves leading AI and not being led by it.³⁹³ Dialogues or deliberations are key in translating clarity and mindfulness into concrete terms and in realizing digital equity.³⁹⁴ Achieving digital equity will help transcend not only the gap between the haves and have-nots in tech access, but also the generational divide between Singapore's ageing population and younger digital natives.³⁹⁵

It is not sufficient for the private sector to drive the conversation on the future of AI. Instead, proactively involving citizens in such deliberations in an organic fashion could facilitate more buy-in and ownership.³⁹⁶ Combined with ongoing digital literacy and education, internalizing what it means to be a digital citizen could be the key to a more ethical and sustainable AI in the future.³⁹⁷

4. CONCLUSION

After a careful examination of Singapore's approach to data privacy and security and AI standards, it is apparent that there is a fundamental connection between the two. As the building blocks of AI, Singapore ensures that the foundational elements of confidentiality, integrity, and accessibility of data are intact and, more importantly, that the individual's rights to privacy and security are protected. Although the Model AI Governance Framework is non-binding, the stringent regulatory measures offered by the PDPA lay the foundation to ensuring that organizations comply with their data protection obligations in processing personal data. From a practical standpoint, the PDPA serves as a guiding

framework to help companies set up accountability-based practices in data management and protection. If companies do not align their policies, structures, and processes around the core tenets of PDPA, they risk legal, ethical, and governance issues which may erode public confidence in AI. The enforcement of the PDPA thus provides concrete assurances that AI technologies built or utilized in Singapore are held to high-level standards.

A cursory glance at the current data landscape in the region shows a rising trend of adopting the EU's GDPR as the gold standard for data privacy and protection. While this signals a positive step, a major concern on the horizon is how to reconcile such international frameworks with developments in Southeast Asia; in particular, whether a regional and interoperable AI ecosystem can be cultivated in the region amid tensions between data localization, on the one hand, and cross-border data flows, on the other. Between the two camps, Singapore leans more toward the free and open flow of data, based on its various bilateral digital economic agreements and membership of regional trade frameworks.

The recent launch of the [Global Cross-Border Privacy Rules \(CBPR\)](#), building on the existing APEC CBPR and Privacy Recognition for Processors, could provide ASEAN with a middle pathway.³⁹⁸ The membership of Singapore and the Philippines in the Global CBPR could provide the opportunity for dialogue among other ASEAN members that are also members of APEC and subscribe to the existing APEC CBPR. Finding a nimble and win-win arrangement to facilitate equivalency measures or reciprocity on data flow could help the region lay the groundwork for an interoperable AI ecosystem.

As Singapore continues to journey in the uncharted territory of AI, and in the wider context of the data-driven economy, its ambition to become a global hub could be enhanced by inclusive and flexible public engagements and education. Existing efforts on digital literacy and information and communication campaigns could be supplemented by deep and meaningful conversations that ask the more practical yet pertinent questions of its citizens: “Why should I care?” and “How should my understanding drive my decisions?” As Singapore aims to become the hub of AI innovation in the region — whether through exporting advanced AI technologies, or leading rule-making strategies on AI governance in international standards setting or policymaking — it will have to contend with increasing tension between innovation and regulation. But ultimately, according to our informants, Singapore will need to wrestle with the more uncomfortable issues and challenges of digital equity, digital citizenship, and AI sustainability, which its top-down approach has not yet adequately addressed.

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THAILAND

1. BACKGROUND

Thailand's foray into AI started in the 1970s, marked by a gradual and sustained engagement and collaboration between the government, academia, and research institutes. Despite limited funding allocation and resources, Thailand's [AI development](#) has undergone a steady transformation, with some scholars suggesting the following timescale: Pioneering Period (1988–1999), Research Roadmap Creation (2000–2005), Synergy and Alignment (2006–2010), to the Practical Applications of AI Research (2011–onwards).³⁹⁹

In recent years, Bangkok has released policy frameworks and initiatives to bolster its AI competitiveness. The National Higher Education, Science, Research, and Innovation Policy Council (Policy Council) approved the draft version of the [National AI Master Plan 2021–2027](#), which outlines two development phases.⁴⁰⁰ Under Phase 1 (2021–2022), Thailand will establish key aspects of AI development from data governance guidelines, data analytics and AI infrastructure, to human resources, entrepreneurs, agriculture, and government services. During Phase 2 (2023–2027), there will be an expansion on research and development and applications of AI across target industrial sectors.⁴⁰¹

In early 2022, the National AI Strategy (NAIS) was finally [published](#), outlining a framework to strengthen Thailand's competitive position in AI development, as well as its readiness for the evolving social, ethical, legal, and other regulatory dimensions of AI application.⁴⁰² To implement the strategy, the National AI committee, and its sub-committees — (1) Regulation and Social; (2) Data and Infrastructure; (3) Human resources and Research, Development, and Innovation; (4) Industry promotion and Investments — were established to facilitate collaborative participation among different government ministries.⁴⁰³ At the time of writing, [NAIS](#)⁴⁰⁴ is currently waiting for cabinet approval.

AI is an integral component for the development of science, technology, and innovation, as indicated in the Twelfth National Economic and Social Development Plan

The Draft National AI Master Plan and subsequently, the NAIS build on core documents such as the [20-Year National Strategic Plan](#) released in 2017, which aims to boost Thailand's digital economic development in the long term.⁴⁰⁵ Under Thailand's [National Strategy \(2018–2037\)](#), AI was identified as one of the key drivers to advance the country's economy, alongside the Internet of Things, big data

analytics, robotics, and drone technology.⁴⁰⁶ Given the drastic shift in Thailand's ageing demographics, AI is expected to improve the country's healthcare sector for greater efficiency, not only in the metropolis but also in far-flung areas.⁴⁰⁷ Additionally, AI is an integral component for the development of science, technology, and innovation, as [indicated](#) in the Twelfth National Economic and Social Development Plan (2017–2021).⁴⁰⁸

Although Thailand had an early head start with its AI research and development, discussions on AI ethics are only a recent phenomenon. In 2019, the country's AI ethics guidelines were drafted through a joint effort by the government, academia, and the private sector. Thailand's National Digital Economy and Society (DES) Committee led the drafting of the first [AI ethics guidelines](#) in partnership with Mahidol University and Microsoft Thailand.⁴⁰⁹ The AI ethics draft emphasizes sustainable development, equality, and fairness in conjunction with national laws and international standards.⁴¹⁰ The guidelines will serve researchers, developers, and service providers engaging in tech development in Thailand.⁴¹¹ Like NAIS, the AI ethics is also [awaiting](#) approval from Cabinet.⁴¹²

2. USAGE AND IMPACT

Under the 20-year plan of Thailand 4.0, AI is expected to help the country [leap ahead](#) in key strategic sectors, particularly industry, service, and agriculture.⁴¹³ With Thailand's increasing adoption of 5G and IoT devices, a large segment of the business sector has begun to [engage](#) customers via online platforms, while the growing availability of off-the-shelf AI technologies makes a strong case for automation.⁴¹⁴

To meet the demands of the global supply chain, Thailand's manufacturing industry started early on digitalization. In the last two decades, there has been a high integration of advanced ICT capabilities such as IoT, machinery, and electronics. These advantages have put Thailand ahead of its ASEAN peers in AI and its related application, robotics. According to the International Federation of Robotics in 2019, Thailand [had](#) the highest number of industrial robots in ASEAN, totaling 3,000 units. Globally, Thailand accounts for almost one percent of the total 373,000 industrial robots in operation.⁴¹⁵

As the manufacturing sector increasingly embraces digital transformation, it is projected that AI-infused technologies and robotics in industrial automation will help [streamline](#) supply chains across Thailand's key industries, like automotives, food and food processing, and electronics.⁴¹⁶ The International Federation of Robotics expects that Thailand will soon adopt self-driving vehicles to ease the movement of goods from ports to factories and warehouses and vice versa. This will raise the adoption of automated guide vehicles up to 60 percent per year to over 700,000 units by 2022.⁴¹⁷

Digital transformation backed by AI technologies is also in full swing in Thailand's commercial sector. Since 2018, Thailand's banking, telecom, and retail conglomerates have been [leveraging](#) AI not only to optimize operations, sales, and marketing, but also to offer a new value proposition of convenience and efficiency to customers.⁴¹⁸ In the banking sector, facial recognition is employed for electronic know-your-customer regulations, while machine learning and blockchain are useful for fraud detections. AI technologies help the oil and gas industry ensure road safety through detection of driver's dangerous, while retail enterprises employ advanced AI algorithms for loyalty programs and e-commerce.

With growing enthusiasm about the integration of smart technologies and data analytics, a Bangkok Smart City plan is also [underway](#) to achieve more sustainable urban planning and development.⁴¹⁹ Under Thailand 4.0, six more cities have [committed](#) to smart city development, namely Phuket, Chiang Mai, Khon Kaen, Chonburi, Rayong, and Chachoengsao, which all will be included in ASEAN's Smart Cities Network.⁴²⁰

Given growing AI adoption, large companies are either building internal AI teams or contracting third party AI providers. Others, like Bangkok Bank, are tapping new modes of partnerships with fintech startups, [launching](#) an accelerator program called “InnoHub” to explore technology-driven solutions in wealth management.⁴²¹ To encourage [wide participation](#) across business sectors in Thailand, especially among SMEs, the Digital Economy Promotion Agency (DEPA) signed a partnership with VISAI to establish the Thailand AI Research Institute.⁴²²

Under the concept of “AI for Everyone,” the institute seeks to make AI-enabled solutions available for SMEs by lessening dependency on advanced AI experts and providing off-the-shelf AI models which can be easily integrated into their business models and operations.⁴²³ Some ICT companies like IBM Thailand have also [extended](#) their multi-cloud services and AI software to support new avenues for customer engagement, product development, and automation of tasks.⁴²⁴

At present, Thailand is witnessing a mixture of public and private sector efforts, involving major companies like Microsoft and IBM, to mainstream AI adoption and the formulation of AI ethical standards. Prior to the entry of such multinational firms, the government in tandem with key universities and research centers were the main driving forces of AI development in the country. The outcomes of such collaboration formed the bedrock of Thailand's early successes in producing AI applications to deliver public goods and serve as a springboard for its domestic AI industry.

During the early 1990s, initial attempts at AI development focused on Thai national language processing. These efforts [led](#) to Thailand's first book on natural language processing as well as the first national-level research project focused on machine translation.⁴²⁵ In the early 2000s the direct involvement of the National Electronics and Computer Technology Center (NECTEC) served as an impetus to finally produce research development plans. Acting as roadmaps, the development plans [activated](#) increased participation among Thai universities, which led to more in-depth AI research.⁴²⁶

By 2010, AI development had [expanded](#) to include intelligence image processing, speech processing, machine learning, robotics, intelligence computer-aided instruction, and forecasting systems.⁴²⁷ With such advancements in AI's applied research, Thailand's AI industry finally took off particularly in health care and agricultural technologies.

Two pioneering AI applications were Vaja and CyberBrain. [Vaja](#), a bilingual Thai/English text-to-speech application, has been used in more than 70 state hospitals for patient registration, information, and consultation services. Persons with visual disabilities use its interface to access information in online newspapers. Moreover, Vaja's multilingual speech translation opened doors for local Thais to engage with international audiences.⁴²⁸ Given the uniqueness of the Thai language, Vaja's breakthrough marked the growing maturity of Thailand's homegrown AI technologies.

Even with its recent technological leaps, agriculture remains a central pillar of Thailand's economy. [CyberBrain](#), an AI-powered platform, is a pioneering agri-tech initiative in Thailand. The platform facilitates community knowledge sharing and delivery of services through IT infrastructure consolidation, information sharing, and collaboration across government agencies and its partners. Through CyberBrain, federal, state, and local governments avoid duplication and achieve proper integration of IT resources.⁴²⁹ For agricultural cooperatives, CyberBrain provides the organizing framework for best practices to conduct rice diagnosis and treatment services, customized fertilizing services, and soil analysis.⁴³⁰

Throughout AI development in Thailand over the last three decades, government policies and frameworks have played an important role in driving the country's AI ecosystem forward. In the early 2000s, Thailand's SchoolNet Initiative [fast-tracked](#) internet connection in schools throughout the country.⁴³¹ In that same year, the government also launched the National ICT Master Plan, a roadmap that laid the foundation for the Village Broadband Internet initiative.⁴³² Under Thailand 4.0, the highly anticipated roll-out of the 5G roadmap will further accelerate innovative solutions across the country.

Building on these accomplishments in ICT research and development over the past 25 years, the Ministry of Information and Communication Technology (MICT) which later on became MDES has been leading efforts to help the country to transition towards integrated service innovation to [achieve](#) a Smart Thailand driven by various Smart applications from health, education, and energy, to tourism and agriculture.⁴³³

In 2020, the Bangkok-based Bank for Agriculture and Agricultural Cooperatives introduced plans to implement smart farming to 4,500 Thai communities. AI and ML-infused sensors [provide](#) insights from data collected to identify anomalies or deficiencies and devise interventions to improve crop yields with respect to soil, temperature, rainfall, and humidity.⁴³⁴

Throughout AI development in Thailand over the last three decades, government policies and frameworks have played an important role in driving the country's AI ecosystem forward

CASE STUDY

USE OF AI IN AGRICULTURE

Agriculture plays a crucial role in Thailand's economy. Thailand's 20-year national strategy for agriculture, known as the Agriculture and Cooperative Strategy (2017 to 2036) by the Ministry of Agriculture and Cooperatives, aims to transform Thailand's agriculture sector by incorporating technology and focusing on smart agriculture. Some areas in which AI and technology can be harnessed include weather forecasting, pest monitoring, and the analysis of plant growth. In 2019, the National Science and Technology Development Agency (NSTDA), a government research agency, developed a smart agricultural system for greenhouses that was capable of monitoring key environmental variables and controlling irrigation accordingly. This increased the efficiency of farmers and allowed for labor and other resources to be more efficiently deployed.

In the private sector, companies have also created technological solutions that have facilitated smart farming. Ricult, a Thai start-up, utilizes AI and ML to analyze weather patterns and advise farmers on how to increase crop yield.⁴³⁵ As of 2021, there were more than 400,000 farmers on the application. The company is also careful about protecting the personal data of farmers, and has sought the consent of farmers before allowing such information to be released to banks, insurance companies, and crop buyers. ListenField is another similar agritech start-up which uses AI and ML to provide precision farming solutions to Thai farmers that allow them to cut operational costs and predict crop yield.⁴³⁶

Neural networks, an advanced type of ML algorithm, were also deployed to classify satellite images to improve Thailand's statistical information to map poverty. The use of [neural networks](#) improved the granularity of government-published poverty statistics, which traditional data sourcing techniques like survey responses cannot fully capture.⁴³⁷ The availability of granular data helped inform more localized policies and strategies to improve poverty alleviation programs.⁴³⁸

As part of Khon Kaen's Smart City agenda, smart devices are used to [expedite](#) the dispatch of ambulances, diagnose patients before they arrive at the hospital, and even monitor patients in intensive-care units.⁴³⁹ On preventive health, the city administration also plans to distribute smart wristbands to monitor and collect health data from citizens and to provide medical options or advice.

At the height of the COVID-19 pandemic, the Thai government relied on AI-backed technologies provided by [Thai mobile operators](#) Advanced Info Service and True

Corp.⁴⁴⁰ Thailand's two large telcos installed 5G networks in over 158 hospitals based all over Thailand, providing critical support for medical personnel. The 5G coverage allowed medical facilities to conduct telemedicine, while the use of 5G-powered robots meant doctors and patients did not have to come into direct contact.⁴⁴¹

As in Malaysia and Singapore, AI is also helping Thailand's courts go digital. During the pandemic, the increase of remote court hearings for civil and criminal cases prompted the judiciary to explore the use of AI to support in-court or out-of-court settlements.⁴⁴² Supreme Court President **Slaikate Wattanapan** is considering the use of ML algorithms to perform probabilistic analysis, based on hundreds of laws and previous court cases, in order to hand down court rulings.⁴⁴³

AI is also expected to aid the work of judges, providing administrative support, collecting statistics, and monitoring the progress of cases due to possible backlogs.⁴⁴⁴ However, the integration of AI software as part of a growing wave of predictive justice in Southeast Asia is problematic, given existing concerns over its ability to fairly and transparently adjudicate.

3. CHALLENGES AND PROSPECTS

With its Smart Thailand vision, the country's dependence on AI technologies will only continue to accelerate. But as AI gains more traction, its disruptive effects will inevitably become more visible. Key challenges relating to job displacement and digital capacity already are on the horizon, but equally concerning are the governance issues that have long-term and systemic implications for justice, equity, and surveillance. These disruptions will challenge the Thai government to ensure the realization of its promises of inclusion, equality, and sustainability in its economic agenda.⁴⁴⁵

Job disruption

The Thailand Development Research Institute (TDRI) estimates that 8.3 million Thais or approximately 70 percent in high-risk occupations will be replaced by AI. Thailand's unskilled workers will be the first casualties of widespread automation and adoption of robotics. The National Labor Development Advisory Council estimates that 16.9 million unskilled workers or 45 percent of the total workforce could lose their jobs to digitalized machines.⁴⁴⁶

Although a study from the International Labor Organization (ILO) predicts that the probability of automation is still lowest in Thailand (44 percent) compared to its ASEAN neighbors, the gradual adoption of AI-powered robots and automation is in fact likely to skyrocket in the next five to 10 years.⁴⁴⁷ Early signs of digitalization in Thailand have already begun, including the use of robotic process automation or bot software to auto-

mate simpler routine tasks in human resources and accounting, as well as intelligent process automation that assists humans in performing repetitive and manual tasks.⁴⁴⁸ With the increasing availability of off-the-shelf AI technologies, combined with the rapid integration of robots and automation, the [transformation](#) of the country's major industrial assembly-line is almost certain looking ahead into the next decade.⁴⁴⁹

More positively, AI disruption in Thailand could lead to the creation of new jobs fit for the digital era. In a [study](#) commissioned by Microsoft-IDC, it was found that 30 percent of jobs will be outsourced, automated, or made obsolete, but an equal number of new roles in the workforce will also be created.⁴⁵⁰ If upskilling or reskilling programs are properly implemented under job transformation programs, an additional 35 percent of new jobs will also be retained.⁴⁵¹ But whether AI adoption in Thailand will result in job turbulence or job transformation will [depend](#) on the overall readiness and AI-preparedness of both its younger and older population.⁴⁵² Findings [suggest](#) that the younger segment of the population is more open to accepting automation, while the older generation is less inclined to embrace technological change.⁴⁵³ Reconciling such differences will be critical given Thailand's ageing demographic.

More alarming in the job displacement trend is the [insecurity](#) of women involved in low-skilled jobs. The [ILO](#) asserts that women will feel the pinch more compared to their male counterparts.⁴⁵⁴ The current lack of women's access to STEM education and training opportunities already puts them at a disadvantage when it comes to higher-skilled positions. With the dawn of automation, [employment prospects](#) for women in new growth areas will only continue to deteriorate if not addressed urgently.⁴⁵⁵

Inclusion and inequity

The disruptive effects of AI have also raised a wide range of ethical and governance considerations, especially with the risks of surveillance and discrimination. The propensity to embed smart technologies in the mundane routines of the Thai population has been viewed with skepticism because of the intense digital scrutiny of Malay-Muslim minorities located in Pattani, Yala, Narathiwat provinces, and the four districts of Songkhla province in [southern Thailand](#).⁴⁵⁶

Human rights activists and academics argue that [advanced technologies](#) like AI are expected to aid the government in amplifying its counter-insurgency strategies.⁴⁵⁷ It was reported that 8,200 AI-powered surveillance cameras were [installed](#) to help authorities monitor risk and safety in southern Thailand. This follows the government's many documented initiatives of state surveillance. For instance, facial recognition systems were used in the mandatory SIM card registration of Malay-Muslim communities in Pattani.⁴⁵⁸ In the aftermath of the insurgency in 2012, [Thai security forces](#) also established a DNA databank collecting DNA samples of suspects, a practice tantamount to ethnic profiling,

exacerbating alienation and complicating efforts at consolidating national unity for the long term.⁴⁵⁹

The effects of surveillance could, in turn, [lead](#) to the fragmentation of the social contract and weaken trust between the state and its public.⁴⁶⁰ Critics warn of a new “[digital panopticon](#)” in Thailand characterized by a “geography of fear based on systemic inclusion and exclusion of particular groups of population.”⁴⁶¹

Additionally, as Thailand continues on a trajectory of increasing adoption of smart applications — from wearable health wristbands to smart sensors — there is also the risk that the government could extend its surveillance reach to protesters in other parts of the country, if [ongoing political trends](#) persist.⁴⁶²

Gaps in the AI ethical guidelines

On the surface, Thailand’s AI ethical guidelines manage to address looming governance issues relating to surveillance, monitoring, inclusivity, fairness, transparency, and accountability. But upon closer examination, the guidelines reveal a subordination of ethics to improving the country’s economic competitiveness. [Soraj Hongladarom](#)’s critical assessment of the AI ethical guidelines uncovers a glaring bias towards the private sector. This means that the top priority of the guidelines is to ensure industry’s compliance to international standards at the expense of public safety and protection.⁴⁶³

Hongladarom argues that the formulation of the national ethical guidelines is deeply rooted in policymakers attempting to project an image of Thailand being in lockstep with the international community, given recent releases of AI ethical guidelines across the globe. Such a move [favors](#) industrialization, premised upon the “import of technological innovation” through “less-skilled local manpower resources,” over protecting against the long-term risks of AI to the public. Even more worrying, according to Hongladarom, is that not only do the guidelines fail to clarify how the government can provide concrete support to Thais in understanding the risks associated with AI, but it also even puts the onus on the populace to find out the full ramifications of AI adoption.⁴⁶⁴

The lack of genuine public involvement in [drafting](#) the guidelines should not come as a surprise, as consultation sessions and hearings only involved selected representatives from academia, government officials, and the private sector. As a result, much of the document sought to benefit developers and manufacturers, which consequently sidelined critical discussions on privacy. For instance, although Principle Four in the guidelines states that “AI systems should be designed with the principle that seeks to protect personal data in mind,” Hongladarom contends that the emphasis in the clause is directed towards developers rather than the public, whose privacy is a guaranteed right under Thailand’s constitution. In prioritizing industry and not the public interest, the

guidelines only act as a façade rather than a strong foundation for Thailand's homegrown technological capabilities and the protection of the public interest.⁴⁶⁵

A silver lining to these caveats about Thailand's AI ethical guidelines is that it is considered a living document, subject to further revision. There is still an opportunity to check the influence of the private sector, mostly comprising established large ICT companies,

Reviewing the ethical guidelines may help course correct Bangkok's current direction to become more inclusive and responsive to public concerns about privacy and security. A critical starting point would be raising awareness and literacy and building trust among Thais

over the framework. Reviewing the ethical guidelines may help course correct Bangkok's current direction to become more inclusive and responsive to public concerns about privacy and security. A critical starting point would be raising awareness and literacy and building trust among Thais.

During stakeholder consultations, an informant suggested that many local start-ups still lack awareness of how to implement the ethical guidelines. Despite the early successes of the Thai AI ecosystem, the notion of incorporating ethics is only a recent phenomenon. The local start-up commu-

nity needs more persuasion to consider ethics as fundamental to the very onset of the AI development cycle, rather than an element to be tacked on later. Established tech companies could be potential sources of guidance on ethical frameworks, but the tools they provide may require modifications to suit Thailand's unique context.⁴⁶⁶

Erosion of public trust

Informants also cautioned about limited public understanding of AI bias.⁴⁶⁷ Deep distrust among the public toward law enforcement and government officials borne of perceptions of corruption has led to a ready embrace of technology as a solution to arbitrary decision-making.⁴⁶⁸ One informant shared that the majority of the Thai population supports the idea of using AI applications in their judicial system because of an existing distrust of judges. As a result, there is a misconception among Thais that AI-based judicial decisions are more predictable and consistent compared to those of actual human judges, without fully recognizing that AI can potentially perpetuate the same biases in existing datasets.⁴⁶⁹

Migrating to AI platforms will not allay the public's distrust if the data to be fed to AI/ML models are still far from complete or impartial.⁴⁷⁰ As pointed out in the data governance chapter on Thailand, the digitization of documents in local and state government agencies remains a challenge because of complications with machine readability and documentation formatting. These technical hurdles end up affecting the quality of data relied on to develop AI/ML models and software applications, whether to adjudicate court cases or contribute to data analytics that will drive public policies.

Fundamentally, there is a growing dissonance between the public's expectations surrounding AI and its limitations. This, in part, can be attributed to the siloed and technocratic approach taken by the government and the private sector. Additionally, rising state surveillance could impinge upon privacy concerns as well as the public's (mis)perception of the possibilities and constraints of AI tools.

Restoring trust between the government, private sector, and the public will be critical for Thailand's smooth voyage in the AI sphere. To do so, it could draw lessons from the early years of its AI development when the country championed deep collaboration between the government and universities, as well as community-driven initiatives like CyberBrain.

These bottom-up initiatives should be complementary to the existing high-level, government-led projects under Thailand 4.0. Digital literacy and job reskilling are being addressed through various [public-private partnerships](#).⁴⁷¹ But beyond just discovering the next unicorn or raising capital, programs that promote AI ethics during the [incubation process](#) of establishing start-ups should be encouraged, especially among younger tech founders and enthusiasts.⁴⁷²

Bangkok remains an attractive venue to host [multistakeholder and multilateral engagements](#) on the ethical, legal, and social implications of emerging technologies like AI, big data, and robotics. In 2019, Thailand hosted the Conference on the Ethics of Science and Technology and Sustainable Development, which included several UNESCO-led events such as the public meetings of the International Bioethics Committee and the World Commission on the Ethics of Science Knowledge and Technology.⁴⁷³

Supported by academia and the private sector, these international events could serve as a conduit for the government and civil society to re-engage and to discuss sensitive issues on surveillance, privacy, and security. As much as possible, the general outcomes of these discussions should be made public to cultivate an atmosphere of trust and transparency. If executed properly, this could pave the way for more productive dialogue between the government and civil society.

4. CONCLUSION

Thailand's AI narrative can no longer just rely on its digital economic success. The focus on AI's transformative power is shifting to its real-world causes and effects as well as how those will, in turn, impact the social fabric of Thailand's emerging digital society. With increasing awareness among Thais about their digital rights, plus growing concerns about state surveillance and discrimination, a trust deficit is looming over the government's plans for a Smart Thailand. Mustering public support will be crucial to the continuing viability of Thailand 4.0.

Although imperfect, the anticipated enforcement of the PDPA is a significant step toward safeguarding the protection of personal data. With AI's rising prevalence in citizens' day-to-day activities, full enforcement of the PDPA could mitigate anxieties about the collection of DNA samples or biometric data under broad and often vague justifications of national security. It could also preserve user trust when transacting online or using e-government platforms. However, it remains to be seen whether the implementation of the PDPA in June 2022 will narrow this widening trust deficit.

As digital economies become highly interconnected, Thailand's promulgation of the PDPA and AI ethical guidelines signals its interest and willingness to join the ranks of highly advanced countries aiming to become fair and equitable data-driven economies. Yet details on the ground appear to undermine or contradict Bangkok's ambition. Without the political will to implement robust governance frameworks, Thailand 4.0 will remain an aspiration that benefits only a few while marginalizing others. Thailand should find a viable middle path of adhering to international standards while embracing a fit-for-purpose AI ethical standards and data protection regime that will best serve its local context.

VIET NAM

1. BACKGROUND

Consultations with experts and other studies indicate that AI adoption in Viet Nam is still nascent. In 2021, a Southeast Asia-focused [report](#) on AI found about 49 percent of respondents in Viet Nam were still piloting AI initiatives rather than scaling or having achieved full-scale end-to-end implementation in different activities across sectors.⁴⁷⁴

In January 2021, Viet Nam's [National Strategy for Artificial Intelligence Research, Development and Application through 2030](#) was issued to realize specific, measurable, and incremental targets by 2025 and 2030.⁴⁷⁵

NATIONAL STRATEGY ON RESEARCH, DEVELOPMENT, AND APPLICATION OF AI THROUGH 2030

Target areas	2025	2025
R&D and training	>> Top five in ASEAN region	>> Top four in ASEAN with 10 prestigious AI brands in the region >> Top 60 in the world >> At least one representative in one of ASEAN region's top 20 AI research and training institutions >> 50 sets of open, linked data in various socio-economic sectors
Institutions and personnel	>> Two national innovation centers	>> Three national innovation centers + "contingent of high-quality human resources"
Application/deployment	>> Widespread application in public administration, social services, and urban management	>> Universalization of basic AI skills among greater public >> Application in defense, security, as well as humanitarian assistance and disaster response

The country foresees a holistic application of AI, from "building a creative society" and facilitating effective governance, to protecting national security, maintaining social order, and advancing sustainable economic development. The language of the Strategy is one of growth and efficiency, with "a system of legal documents and legal corridors related to AI" supplemented by "complete policies and laws." While the 14-page document does not make any explicit mention of ethics, there are nonetheless references to "avoiding technology abuse and infringing upon legitimate rights and interests of organizations and individuals."

In recognizing the value of data as foundational to the efficacy of AI, the Strategy outlines a balance to be struck between two seemingly contradictory imperatives: shared, open, even decentralized databases for the research and development of AI applications, on the one hand, and maintaining the data privacy of individuals and organizations, on the other. The latter aligns with Viet Nam’s constitutionally guaranteed right to privacy and (at the time of writing) ongoing efforts to draft a comprehensive data protection regime.

2. USAGE AND IMPACT

There is in Viet Nam an acute cognizance of a gap in the market for locally- or even regionally-tailored solutions and that innovation must be contextualized and applied for domestic use, in the first instance. In 2019, the Ministry of Information and Communications (MIC) launched “Make in Viet Nam,” an initiative to spur the development of the domestic ICT industry for local solutions which would ultimately boost the country’s global presence. The slogan’s active tense — “make” rather than “made” — was a [deliberate choice](#) to promote the spirit of “Vietnamese people proactively, creatively designing, and producing products that contribute to the technology community.”⁴⁷⁶ Tellingly, the minister, **Nguyễn Mạnh Hùng**, [explained](#): “We heard and told far more about international stories to Vietnamese people. It is time to tell Vietnamese stories. Every Vietnamese person and each Vietnamese business should join the Make in Vietnam program and tell their own stories to encourage others to do so.”⁴⁷⁷

CASE STUDY

USE OF AI IN BIOMEDICAL RESEARCH

The 1000 Vietnamese Genome Project (1KVG), which began in 2018, is Viet Nam’s first large-scale human genome project by Vingroup Bigdata Institute (VinBigData). Over the past three years, the research team has analyzed the genomes of over 1,000 healthy, biologically unrelated individuals between 35 and 55 years of age, with sufficient phenotypic and demographic information. The individual data was processed through Google, Illumina, and NVIDIA. The genomes of more than 4,000 individuals were also analyzed in relation to common diseases and drug reactions. As a result, “more than 40 million genetic variants, including nearly 2 million common and unique genetic variants of the Vietnamese population were detected.” The project is invaluable for biomedical and genomic research in Viet Nam as it is the first and only dataset characterizing genetic variation for the Vietnamese population. It would also promote medical advancements in precision medicine in Viet Nam.

There exists substantive literature on the ethical considerations that should be considered when conducting whole-genome research. These include the return of research results to participants and their relatives, as well as the maintenance of anonymity throughout the testing and analyzing process. Biomedical research marks a significant step towards AI implementation for public health advances at the national level.

A year earlier, the “Digital Knowledge System of Viet Nam” project was launched on January 1 with a website (<https://itrithuc.vn>) serving as an open database for all, especially Vietnamese youth, to contribute to. In addition to government agencies providing information, the site is also meant to archive Vietnamese translations of knowledge resources from around the world to feed into a repository of Big Data that can then facilitate AI technologies and IoT platforms.

Domestic conglomerates such as Viettel and VinGroup have begun to forge ahead in the spirit of “Make in Viet Nam,” spinning off AI research-based institutes and working on machine learning, computer vision, and natural language processing for local use. Viettel’s AI open platform features speech synthesis applications that take into account the regional variances in spoken Vietnamese — northern, central, and southern — for use in announcements, customer service systems, and e-readers for the visually impaired or people on the go. Similarly, its voice-to-note product is supposed to be able to recognize these different regional dialects and convert speech to Vietnamese text directly.⁴⁷⁸

VNG Corporation’s Zalo Group, Viet Nam’s first technology unicorn, introduced “Kiki” in 2021. Kiki is a Vietnamese virtual personal assistant built in the image of Amazon’s Alexa, Apple’s Siri, Microsoft’s Cortana, or Google Assistant, but specifically adapted to local needs and customs. It is trained to recognize the three Vietnamese regional dialects, and [can check the lunar calendar and announce winning lottery numbers](#).⁴⁷⁹ Zalo Group’s president, **Vương Quang Khải**, [noted](#) that with Kiki Vietnamese people would no longer be left out of AI’s benefits; an apt reflection of the frustration any non-native English speaker has had to contend with when relying on voice assistants designed and developed by U.S. technology companies. Interestingly, although Google Assistant launched Vietnamese language support in May 2019 for the domestic market, the service appears to have been [suspended](#) across its Google Home and Google Nest products after struggling to perform reliably in the country.⁴⁸⁰

The pandemic was an impetus for local, more effective, and cost-efficient AI-based solutions for many businesses hit hard by the global economic disruption.⁴⁸¹ G-Group, the parent company of Gapo, a local social network with about six million users, initially adopted Meta’s online collaboration software, Workplace, to consolidate and streamline

G-Group's internal communication platforms. However, at USD8 per person per month, the cost of using Workplace became too expensive, prompting G-Group to develop GapoWork. **Hà Trung Kiên**, chief executive officer of Gapo, [attributed](#) the advantages of home-grown platforms to a deeper understanding of Vietnamese culture and business needs as well as lower costs.⁴⁸²

As Viet Nam's domestic champions work toward fulfilling local needs, they may eventually scale up to meet underserved regional demands. VinGroup's VinAI, which already claims to rank among the world's top 25 AI research companies, alludes to this in [describing its work](#): "Due to our unique location we are also naturally drawn toward problems for developing countries, which might otherwise be overlooked in the research community."⁴⁸³

3. CHALLENGES AND PROSPECTS

Viet Nam's deployment of AI technologies across public administration, the economy, and daily social life is not without its challenges. As in other countries, these include competition for funding and skilled personnel — issues that are discussed [in great detail elsewhere](#), and are beyond the focus on ethics in this report.⁴⁸⁴

Level of awareness

If the state of AI adoption in Viet Nam is still only in its early stages, the topic of ethics in relation to AI has barely begun to percolate in the country, despite the fervor surrounding its digitalization drive. As outlined above, there is some recognition in the

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National Strategy that there should be ethical or legal parameters to its execution. The Ministry of Public Security, for example, has been tasked to "develop and complete additional legal documents on privacy protection and human rights, on security and social order issues related to AI development and application activities."

Otherwise, there appears to be little emphasis on delving deeper into the concept, let alone the practical application, of AI ethics in the national context. In mandating the Ministry of Defense to develop and deploy AI applications as part of its military modernization and combat plans, the National Strategy makes no related mention of ethics or international law. However, one informant offered that there is, in fact, awareness in Viet Nam about the risks of lethal autonomous weapons that are currently being debated in the UN and around the world.⁴⁸⁵

Likewise, the Ministry of Public Security's charge to use AI applications in policing and immigration "to proactively prevent crimes" begs further discussion about the implications of surveillance technologies, algorithmic processing, and quality of datasets for predictive policing purposes. Their potential for efficiency notwithstanding, reports about bias and discrimination resulting in miscarriages of justice in the United States and the United Kingdom provide cautionary lessons for Viet Nam and Southeast Asia at large.⁴⁸⁶

Similarly, although the Ministry of Natural Resources and Environment is to promote the adoption of AI applications for data-gathering on land and environmental resources in response to pollution and climate change, the Strategy is silent on the principles or regulatory oversight needed to ensure that these AI-based technologies support, rather than obstruct, Viet Nam's SDG commitments.

AI, therefore, is seen by the Vietnamese government and public as a generally positive and catalytic force for practicality, convenience, and development. The impact and trade-offs of AI algorithms, however, do not yet appear to be widely considered. For example, AI-powered "[rice ATMs](#)," or automatic rice dispensing machines, provided free rice to those in need during the pandemic-induced citywide lockdowns.⁴⁸⁷ These rice ATMs appeared in Ho Chi Minh City, Da Nang, and other cities as part of community efforts led by universities and local Red Cross societies. The Ho Chi Minh City-based inventor of the rice ATMs went on to replicate [face mask dispensing machines](#) a few months later as COVID-19 cases surged in a second wave. The machines provided each recipient with three face masks, which could be washed and reused at least 30 times.⁴⁸⁸

To prevent overcrowding, minimize surface contact, and verify identity, these dispensers relied on facial recognition technology linked to personal information, based on prior registration. Despite the risks to privacy, confidentiality, and other use of personal data, this technology did not prompt much public or government concern at all. This could be explained by the more pressing considerations of a public health crisis, compounded by food security uncertainties. With increased public awareness, there may be more questions posed about the longer-term implications of facial or other biometric recognition technologies, as well as the need for much more transparency, explainability, and accountability.

Labor displacement

Interestingly, labor displacement as a result of an increased deployment of AI was identified as an ethical concern during stakeholder consultations. Survey data from Viet Nam's [2019 population and housing census](#) indicates that 80.8 percent of Vietnamese aged 15 years and above possess no technical or professional qualifications. Only 23.1 percent of the labor force does.⁴⁸⁹ [Studies](#) have found that given the country's prevailing labor structure, the impact of AI on individual workers could be challenging for a comprehensive,

nationwide digital transformation without accompanying initiatives to reskill, upskill, or build a higher-quality labor market in line with at least regional, if not international, standards.⁴⁹⁰

There will also need to be special attention paid to the gender dimension of labor-displacing AI technologies. A gender-disaggregated [analysis](#) in 2021 showed that female workers tend to be slightly more affected than their male counterparts, in line with other research findings on the general impact of digital technologies on women, especially in developing economies.⁴⁹¹

One informant pointed out that apart from the risks of unemployment and a consequently widening inequality gap, AI-supported innovations such as self-driving cars could disrupt the country's budding gig economy — characterized by short-term, flexible, or freelance jobs such as ride-sharing or food delivery drivers — particularly in the aftermath of the COVID-19 pandemic.⁴⁹² A [2021 survey](#) of more than 60,000 workers in Viet Nam found that up to 53 percent of knowledge workers participated in the gig economy and only 40 percent of respondents wanted to return to the office.⁴⁹³

Inclusivity

In order for Viet Nam's AI-driven digital transformation to be as competitive and inclusive as possible, it will need to overcome language and gender barriers. The realities of an English-dominated global science and technology field mean that if Viet Nam's foray into the Fourth Industrial Revolution is to attract greater foreign investment, promote international cooperation, and effectively project the country's own potential onto the regional and world stages in line with the Strategy, the nation will have to speak the common language of technology and business.

In 2008, the government launched Project 2020 with an approved budget of VND9.4 trillion (approximately USD443 million). The project's vision was for most Vietnamese school, college and university graduates to be able “to use a foreign language confidently... in an integrated, multi-cultural, and multi-lingual environment, making foreign languages a comparative advantage of development for Vietnamese people.” However, in 2016, four years shy of its target date, the Minister of Education and Training, **Phùng Xuân Nhạ**, [declared](#) the project a failure before the country's National Assembly.

Since AI material is primarily taught in English, language-learning support will be crucial not only for general communication purposes but also for a more technically-focused immersion into AI subjects. It would also help facilitate translation or interpretation of English technical terms such as “algorithmic bias” into everyday Vietnamese for widespread comprehension and more meaningful domestic conversations about the potential benefits and harms of AI.

Part of reducing the harms — particularly the risks of exclusion, bias, and discrimination — of AI technologies is to ensure that different segments of the country’s population are adequately and securely accounted for in building the datasets that train AI algorithms. Although female representation in Viet Nam’s National Assembly reached 26.7 percent in the course of its 2016–2021 term and women held 12 of 30 ministerial and deputy ministerial positions in 2017,⁴⁹⁴ Vietnamese women still fall short of adequate representation at the C-suite level in the business world. In 2020, one [survey](#) found that women comprised only 17 percent of board members, 12 percent of chairs, and nine percent of chief executive officers in all Vietnamese listed entities.⁴⁹⁵ At the university level, women [account for](#) only 36.5 percent of science, technology, engineering, and mathematics (STEM) tertiary graduates compared to 63.5 percent of men.⁴⁹⁶ The good news is that the [margin of difference](#) between women and men researchers currently in STEM is slightly lower at 44 percent compared to 56 percent.⁴⁹⁷

The gender imbalance in STEM fields and in corporate boardrooms translates into the very real exclusion of half the country’s population, along with their perspectives and realities in the design and development of AI technologies as well as the decision-making processes of society’s digital transformation. It also sits awkwardly with the fact that most of Viet Nam’s enterprise landscape is dominated by women-owned SMEs and female [consumers](#).⁴⁹⁸

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4. CONCLUSION

Rather than an afterthought, ethics should be baked into the design of AI algorithms and systems from the very outset. This means identifying the principles, values, and objectives of AI use in Viet Nam; being familiar with the terminologies of ethics in the global discourse; adapting that language to the domestic context, as appropriate; teaching AI ethics in engineering and other related courses at universities; and incorporating a cross-disciplinary approach to AI technology. Indeed, the Strategy tasks the Ministry of Science and Technology with promoting the formation of “open professional groups for multi-, inter-, and trans-disciplinary use and exchange of AI data technologies.”

Additionally, the Ministry of Information and Communications will develop legal and policy frameworks to ease data sharing and AI testing in sandboxes. Importantly, it will “develop standards, technical regulations, and formats for AI technologies and products.” Yet, Viet Nam is currently neither a participating nor observing member of the ISO and IEC Joint Technical Committee on Artificial Intelligence, which has published 11 ISO standards and is developing 26 more in the area of AI, including in the treatment of bias as well as related ethical and societal concerns.

Rather than adopt an existing model wholesale, it appears that Viet Nam may well chart its own AI and ethics path to suit its local setting. Although the [OECD Principles on Artificial Intelligence](#) and accompanying recommendations were forwarded to the Vietnamese prime minister's office for consideration,⁴⁹⁹ a government release in 2019 soberly noted that, "if Viet Nam follows the trend of AI development like developed countries with solid AI resources, it will be difficult for Viet Nam to keep up with them.... Therefore, Viet Nam must have its own direction for the AI industry."⁵⁰⁰

Our informants summarized it best: Viet Nam will have to take a step-by-step approach to integrating ethics in AI application. That process begins with an increased awareness of the topic and a greater exchange of perspectives domestically and regionally. The country's ambition of being a developed economy warrants reflection on the standards already proposed and embraced by more technologically mature states. Nevertheless, Viet Nam will also study alternative models, and look to cooperate with its ASEAN neighbors to adapt the existing suite of AI principles for an optimal domestic and regional fit. For now, while there is some degree of recognition in Viet Nam of the importance of AI ethics, their formulation and application remains underexplored.

>> CONCLUSION

There is little doubt that Southeast Asia as a region, and the five countries that we covered in this project, are embracing the transformative promise of data and AI. Most of that anticipation is focused on the utility of technology to extend the trajectory of economic development into the digital space. This is evident in the many national policies and strategies of Southeast Asian countries, as well as in the forward-leaning masterplans and blueprints of the Association of Southeast Asian Nations (ASEAN) as a group.

It is not just governments that are excited about digitalizing the region; the upbeat sentiment is also shared by the private sector and the people of Southeast Asia. The technology industry's vote of confidence is reflected in large, long-term capital investments in and around the region, from submarine cables for faster data transfers, to data centers for even greater cloud storage capacity. Among the public, Southeast Asia's strong e-commerce performance, even during the pandemic, is testament to how bullish consumers are about the future of the digital economy.

This project sought to push the envelope in thinking about the data-driven environment in Southeast Asia. In mapping the aspirations of five regional countries, we question what the end goal of data-driven optimization is and what it might be instead. We urge a reframing of the utility of data and artificial intelligence (AI) so that there is deeper consideration of the values underpinning buzzwords like an “inclusive digital economy” or “ethical AI.” We also invite deliberation on whether there are uniquely Southeast Asian values and viewpoints that countries can bring to the table in international discussions on technological rule-setting.

A relational rather than rational approach to technology, reflected in concepts like *ubuntu* among African scholars and scientists as well as *buen vivir* in Latin America, are already beginning to make their mark in conversations about inclusive data and the ethics of AI. We encourage Southeast Asian stakeholders to reflect similarly on their digital paths ahead and to look harder beyond conventional metrics of success.

We urge a reframing of the utility of data and artificial intelligence (AI) so that there is deeper consideration of the values underpinning buzzwords like an “inclusive digital economy” or “ethical AI”

Widening the aperture to include different knowledge systems and perspectives has profound policy implications. At the domestic level, it can enable Southeast Asian countries to ground their digital ambitions in their own, unique contexts, correcting structural inequities for a fairer and more accountable national vision. At the ASEAN level, it can help align a region-wide approach toward data and AI. At the same time, it can afford Southeast Asian nations the opportunity to carve agency and strategic autonomy as major power rivalry intensifies in the technological arena. Finally, at the international level, it can empower a distinctly Southeast Asian voice as standards, norms, and rules are being developed to govern the data-driven technologies that will shape the world.

CONSOLIDATED RESEARCH & STATISTICS



MSME Statistics

Breakdown of STEM Professionals by Gender

Disability Statistics

Participation in International Standards-Setting Bodies

Government AI Readiness Index 2021

Data Centers in Southeast Asia

Data Protection Laws and National AI Policies

>> MSME STATISTICS

Micro, Small, and Medium Enterprises (MSME) make up an overwhelming majority of businesses in each of the five countries studied in this report. As a result, they are often a key constituency of governments' digitalization efforts. In this section, we delve deeper into the key facts and figures of MSMEs in Southeast Asia.

INDONESIA



Representation of MSMEs in the digital landscape (2015)*



MALAYSIA



Representation of MSMEs in the digital landscape*

>> "Only about **one in three** businesses in Malaysia has implemented digital transformation strategies, while **less than one in four** businesses has a dedicated digital strategy team. Malaysia also has "fewer businesses with websites, and fewer secure servers than per capita income would predict" compared to other countries. As of 2017, only **37.8%** of business establishments in Malaysia have a web presence."

* Lacking data on intersection of ownership by gender and digital presence of MSMEs

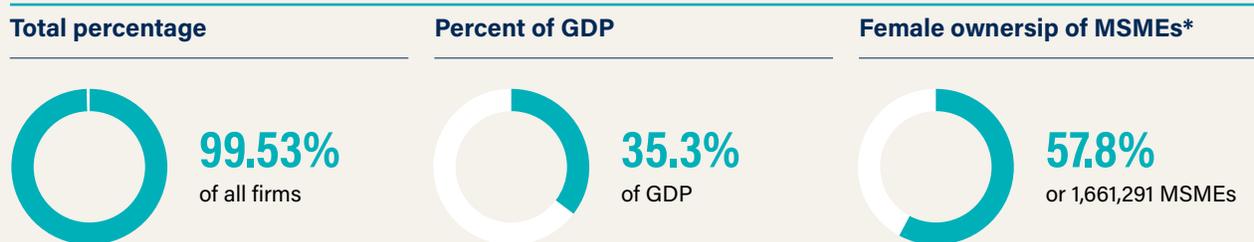
SINGAPORE



Representation of MSMEs in the digital landscape (2015)*



THAILAND



Representation of MSMEs in the digital landscape (2014)*



* Lacking data on intersection of ownership by gender and digital presence of MSMEs.

** Lacking information on MSMEs specifically.

VIET NAM



Representation of MSMEs in the digital landscape*



Up to **96.9%** of SMEs in Viet Nam think that digital transformation plays an important role.



However, **57.6%** of SMEs do not possess sufficient resources to deploy.

* Lacking data on intersection of ownership by gender and digital presence of MSMEs.

Sources

Indonesia

- Female ownership of MSMEs available at: www.smefinanceforum.org/data-sites/msme-finance-gap; and www.ifc.org/wps/wcm/connect/260f2097-e440-4599-91ec-e42d45cf3913/SME+Indonesia+Final_Eng.pdf?MOD=AJPERES&CVID=1j8qhPY.
- Representation of MSMEs in the digital landscape in Table "Core indicators on ICT use in business by enterprise size class, annual, 2003–2016", Indicator "Proportion of businesses with a web presence" available at: <https://unctadstat.unctad.org/wds/ReportFolders/reportFolders.aspx>.

Malaysia

- Female ownership of MSMEs available at: www.smefinanceforum.org/data-sites/msme-finance-gap.
- Representation of MSMEs in the digital landscape available at: <https://techwireasia.com/2021/06/smes-in-malaysia-still-lag-in-digital-adoption-world-bank>.

Singapore

- Female ownership of MSMEs available at: www.accenture.com/_acnmedia/PDF-135/Accenture-Businesseswomen-Grow-Economies-Singapore-Next.pdf.
- Representation of MSMEs in the digital landscape in Table "Core indicators on ICT use in business by enterprise size class, annual, 2003–2016", Indicator "Proportion of businesses with a web presence" available at: <https://unctadstat.unctad.org/wds/ReportFolders/reportFolders.aspx>.

Thailand

- Female ownership of MSMEs available at: www.smefinanceforum.org/data-sites/msme-finance-gap.
- Representation of MSMEs in the digital landscape in Table "Core indicators on ICT use in business by enterprise size class, annual, 2003–2016", Indicator "Proportion of businesses with a web presence" available at: <https://unctadstat.unctad.org/wds/ReportFolders/reportFolders.aspx>.

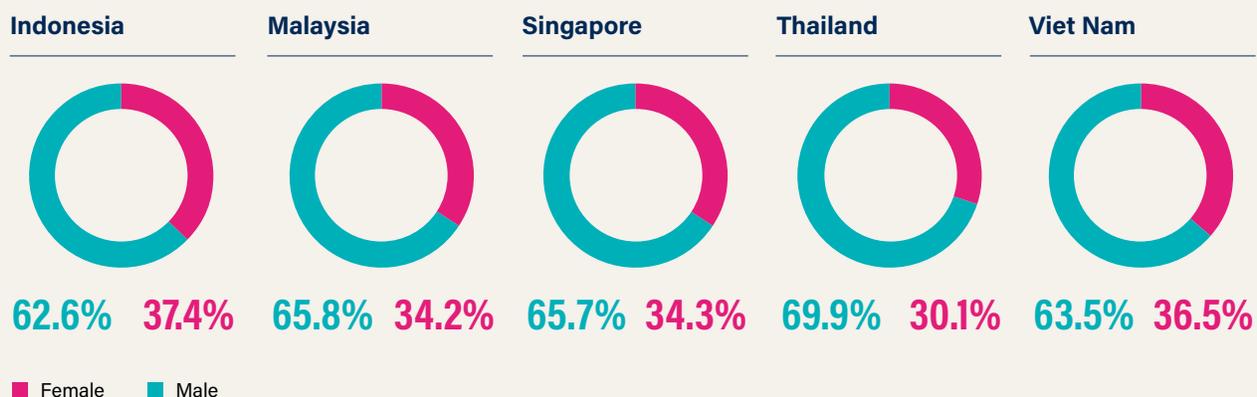
Viet Nam

- Female ownership of MSMEs available at: www.smefinanceforum.org/data-sites/msme-finance-gap.
- Representation of MSMEs in the digital landscape available at: https://mekongbiz.org/wp-content/uploads/2017/07/WOB-Position-Paper_English-1.pdf; and <https://vir.com.vn/over-575-per-cent-of-vietnamese-smes-struggle-with-digital-transformation-how-can-they-cope-with-the-challenge-83754.html>.
- ICT index and average % of internet and website adoption by enterprises in each province can be found at: <https://m.mic.gov.vn/Pages/TinTuc/143252/Bao-cao-Vietnam-ICT-Index.html> (reports are in Vietnamese, will require translation.) 2015 figures from the same index can be found in English at: www.tandfonline.com/doi/full/10.1080/02681102.2021.1935201 (table 2).

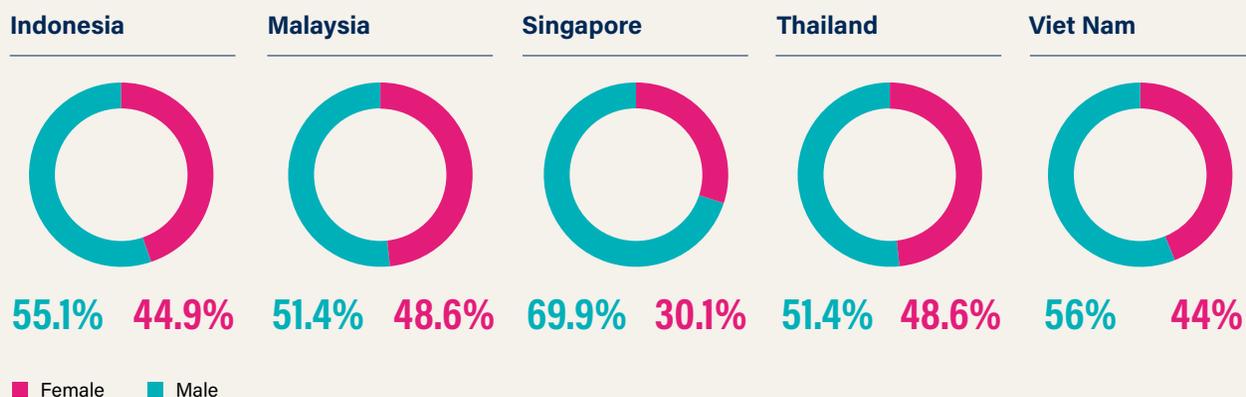
>> BREAKDOWN OF STEM PROFESSIONALS BY GENDER

The presence of science, technology, engineering, and mathematics (STEM) professionals is critical for an economy invested in data-driven technologies like AI. It is also important to understand the gender breakdown of STEM professionals to ensure that the conceptualization, design, and deployment of those technologies adequately reflect the unique needs, priorities, and perspectives of both women and men.

FEMALE SHARE OF STEM TERTIARY GRADUATES | 2018-2020



PROPORTION OF RESEARCHERS IN STEM BY GENDER | 2015-2019



Sources

- Female share of STEM tertiary graduates, available at: https://databank.worldbank.org/id/2ddc971b?Code=SE.TER.GRAD.FE.SI.ZS&report_name=Gender_Indicators_Report&populartype=series.
- Proportion of researchers in STEM by gender, available at: <https://bangkok.unesco.org/content/complex-formula-girls-and-women-science-technology-engineering-and-mathematics-asia>.
- Science, technology and innovation: Researchers by sex, per million inhabitants, per thousand labor force, per thousand total employment (FTE and HC), available at: data.uis.unesco.org.

>> DISABILITY STATISTICS

Technology should enable and empower persons with disabilities (PWDs) to realize their full potential and live a life of dignity. Although many countries have dedicated policies for PWDs, like many other minority groups, PWDs do not always receive mainstream consideration in data-driven national policies. This can result in practical shortcomings or worse, bias and discrimination, when technological innovations for public services are rolled out.

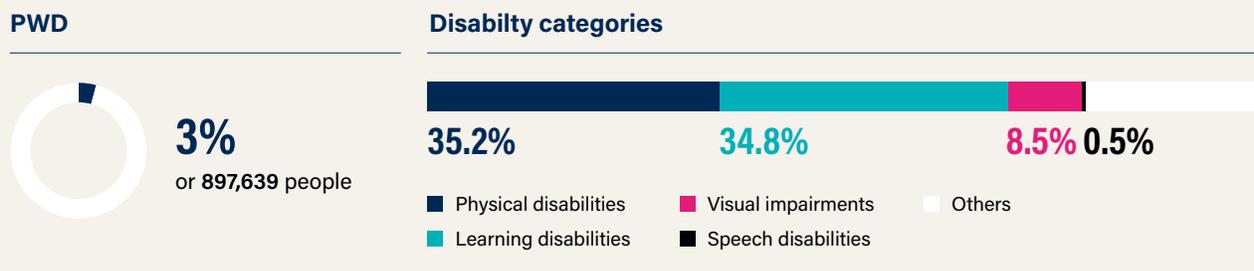
In the Asia-Pacific region, PWD are two to six times less likely to be employed as compared to persons without disabilities.

INDONESIA*

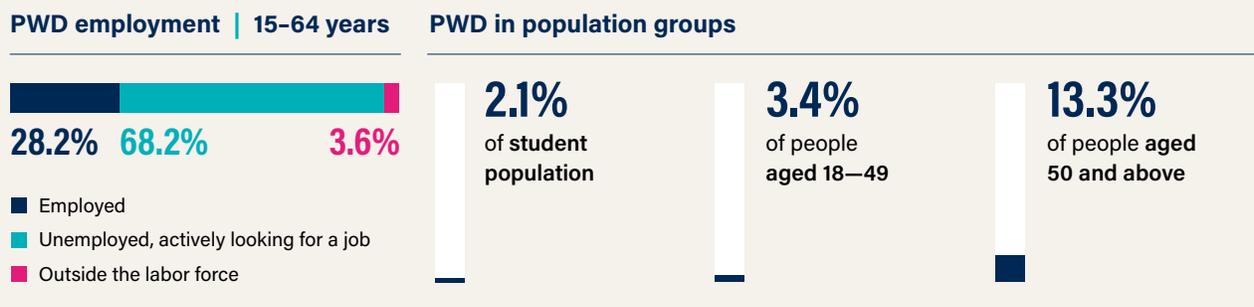


* Concerns have been raised about the lack of data Indonesia has on PWD, see: www.asiasentinel.com/p/indonesia-disability-issues-lack-data?s=r.

MALAYSIA



SINGAPORE



THAILAND

PWD



Age groups



Disability categories

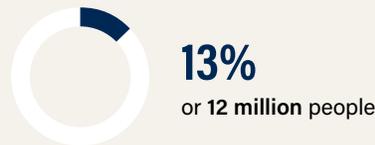


VIET NAM

PWD | aged 2 years and older



People living with a PWD



>> These percentages are expected to rise with an aging population

All five countries are signatories of the UN Convention on the Rights of Persons with Disabilities (UNCRPD). The timeline below shows when each country ratified the UNCRPD.



>> PARTICIPATION IN INTERNATIONAL STANDARDS-SETTING BODIES

Participation in the international standards arena affords not only familiarization with developments being discussed (a capacity-building measure, in itself) but also the opportunity to contribute to deliberations about the longer-term rules of the road for a particular field. Simply being present in these forums can nurture agency and prepare countries' for more involved discussions later on.

Technical standards-setting bodies on data and AI include the International Organization for Standardization (ISO) and the International Telecommunication Union (ITU).

COUNTRY PARTICIPATION

Country	Participation in ISO	Participation in ISO/IEC JTC 1/SC 42: The international standards committee responsible for standardization in AI	Participation in ITU
Indonesia	Full member	Yes (Observing member)	Member state
Malaysia	Full member	No	Member state
Singapore	Full member	Yes (Participating member)	Member state
Thailand	Full member	No	Member state
Viet Nam	Full member	No	Member state

>> GOVERNMENT AI READINESS INDEX 2021

This table is drawn from the Oxford Insights' Government AI Readiness Index, which is now in its fourth edition. The index draws on 42 indicators across 10 dimensions in the areas of Government, Technology Sector, and Data and Infrastructure, in order to answer the question: "How ready is a given government to implement AI in the delivery of public services to their citizens?" The scores are calculated out of a total of 100.

GOVERNMENT AI READINESS

Global Rank	Country	Overall score	Government	Technology Sector	Data and Infrastructure
2	Singapore	82.46	94.88	66.69	85.80
36	Malaysia	62.46	68.37	52.67	66.34
47	Indonesia	58.14	73.05	40.96	60.40
59	Thailand	52.63	45.45	41.22	71.21
62	Viet Nam	51.82	70.81	32.78	51.87

>> DATA CENTERS IN SOUTHEAST ASIA

The increasing number of data centers in Southeast Asia points to an expected growth of the data industry, supported by long-term capital investment to facilitate that expansion. However, the amount of energy needed to power the operation of these data centers can have potentially detrimental effects on the environment — including community displacement — without proper planning.

NUMBER OF DATA CENTERS BY COUNTRY



>> The Southeast Asia data center market by investment is expected to **grow at a compound annual growth rate (CAGR) of over 8%** during the period 2021–2026.

>> According to a study by Arizton, the ASEAN data center market size is the fastest growing data center market in the world. The Southeast Asia data center market was **valued at \$8.71 billion** in 2021 and is expected to **reach \$12.34 billion** by 2027.

Sources

- www.businesswire.com/news/home/20210427005613/en/Southeast-Asia-Data-Center-Market-Outlook-and-Forecast-2021-2026-Featuring-Key-IT-Infrastructure-Providers-Support-Infrastructure-Providers-Contractors-Investors---ResearchAndMarkets.com.
- <https://www.globenewswire.com/news-release/2022/03/09/2400274/0/en/Southeast-Asia-Data-Center-Market-Size-to-Reach-12-34-Billion-by-2027-Around-2-3-Million-Sq-Ft-of-Data-Center-White-Space-to-be-Added-Arizton.html>.

>> DATA PROTECTION LAWS AND NATIONAL AI POLICIES

This table is a comparative and shorthand depiction of data protection-specific laws and their status in each of the five countries, as of June 2022.

DATA PROTECTION LAWS AND NATIONAL ARTIFICIAL INTELLIGENCE POLICIES

Country	Data Protection Law	National Artificial Intelligence Policies
Indonesia	Personal Data Protection Bill	>> National Strategy for Artificial Intelligence (2020–2045)
Malaysia	Personal Data Protection Act 2010	>> Malaysia AI Blueprint (2019) >> National AI Roadmap (drafted December 2020–March 2021) >> National AI Framework for Malaysia (yet to be released)
Singapore	Personal Data Protection Act 2012	>> National AI Strategy (launched 2019) >> The Model AI Governance Framework (released 2019)
Thailand	Personal Data Protection Act 2019	>> AI Ethics Guidelines (drafted 2019) >> National AI Master Plan (2021–2027) >> National AI Strategy (draft released 2022)
Viet Nam	Draft Personal Data Protection Decree	>> National Strategy for Artificial Intelligence Research, Development and Application through 2030 (2021)

>> ENDNOTES

- 1 Stakeholder consultation.
- 2 Kristie Neo, "Southeast Asia: Digital Life Intensified" We Are Social, March 8, 2021, <https://wearesocial.com/sg/blog/2021/03/southeast-asia-digital-life-intensified>.
- 3 "Principal Officers," International Organization for Standardization, accessed May 30, 2022, www.iso.org/principal-officers.html.
- 4 Areas for Future Action in the Responsible AI Ecosystem (Boston: The Future Society, 2020), <https://thefuturesociety.org/wp-content/uploads/2021/02/Areas-for-Future-Action-in-the-Responsible-AI-Ecosystem.pdf>.
- 5 Ministry of Communications and Informatics, *Connected Indonesia: More Digital, More Advanced*, Annual Report 2020, Jakarta: Kementerian Komunikasi dan Informatika, 2020, 61.
- 6 *Undang-undang Dasar Negara Republik Indonesia 1945* (State Constitution of the Republic of Indonesia 1945), Dewan Perwakilan Rakyat Indonesia (House of Representatives Indonesia), www.dpr.go.id/jdih/uu1945, accessed June 3, 2022; Wahyudi Djafar, "Hukum Perlindungan Data Pribadi di Indonesia: Lanskap, Urgensi dan Kebutuhan Pembaruan," (Personal Data Protection Law in Indonesia: Landscape, Urgency and Need for Reform) (presentation, "Tantangan Hukum dalam Era Analisis Big Data" [Legal Challenges in the Era of Big Data Analysis], Gadjah Mada University Law Faculty Post-Graduate Program, Yogyakarta, Indonesia, August 26, 2019).
- 7 Sinta Dewi Rosadi, "Privacy vs. Democracy in the Digital Age: Indonesia's Challenge," in *Issues on the Frontlines of Technology and Politics*, ed. Steven Feldstein (Washington, DC: Carnegie Endowment for International Peace, 2021), <https://carnegieendowment.org/2021/10/19/privacy-vs.-democracy-in-digital-age-indonesia-s-challenge-pub-85517>; <https://law.ugm.ac.id/wp-content/uploads/sites/1043/2019/08/Hukum-Perlindungan-Data-Pribadi-di-Indonesia-Wahyudi-Djafar.pdf>.
- 8 Ministry of Communications and Informatics, *Connected Indonesia: More Digital, More Advanced*, 39.
- 9 *Ibid.*
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