THE NEXT GREAT DIVERGENCE
WHY AI MAY WIDEN INEQUALITY BETWEEN COUNTRIES

Seeing the Unseen: Avoiding Data Deserts and Algorithmic Exclusion

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AI can make predictions that help promote human development and social inclusion, but it can also widen inequalities. Lack of local infrastructure and data gaps can lead to 'algorithmic exclusion' of vulnerable communities such as women, informal workers, displaced persons, and rural communities. As each country's economic and social system becomes more AI-driven, people who find themselves isolated in `data deserts' risk exclusion from public services such as health or disaster assistance as well as from employment opportunities or financial services. There can also be widening gaps between countries when lower-income nations lack the financial or technical resources to take full advantage of AI systems.

For many years, economists tended to see the goal of AI research as being to create useful and somewhat sentient robots. Now however, many see AI as a technology for something that was previously difficult and costly to do: making accurate, and customized predictions. AI is already being deployed to reduce the costs of predictions in many areas including:

- *Radiology* – AI can examine unstructured data in a radiology image and suggest whether someone is likely to be healthy or have a disease that needs to be treated.
- *Writing and predictive text* – AI now tracks text messages typed into cell phones and predicts what might come next. If the user agrees, the prediction becomes the message.
- *Self-driving cars* – AI examines real-time camera images to assess the immediate environment. If it predicts a hazard ahead, for example, it can steer the car to avoid the hazard or come to a stop.
- *Fraud detection* – AI can monitor bank and other transactions and predict whether they are likely to be fraudulent.
- *Customer-service chatbots* – Faced with a customer service query, AI can make a prediction about what information will best resolve the issue.
- *Agriculture* – AI can predict what crops will produce the best yield for a particular piece of land.

Short and long-term impacts

In general, when economists consider the impact of cost-saving technology that can be deployed across the economy, they know two things. First, that as a 'general-purpose technology,' it is likely to have profound effects on how the economy works. Second, that for the new technology to be deployed effectively, there will need to be large changes in how the economy works, so full deployment will take a long time.

The canonical example is electricity. This cost-saving technology revolutionized economic and social life in the modern era. However, this transformation took many decades. Initially, electricity was mainly used for illumination, and particularly for enabling houses to be lit after dark. Its use in factories that had been built for steam power was tentative and piecemeal. It was only after factories had been rebuilt for electrification that economies gained the full benefits.

Policy-makers in the Asia-Pacific region could therefore consider these two timescales. First, in the short term, countries can use AI to reduce the cost of prediction and improve human welfare. Second, over a longer period, countries can reorganize industrial production around

AI. However, both transformations require stronger and more extensive digital infrastructure.

Relying on equitable data

AI can be thought of as a production function where one input is algorithmic technology and the other input is data. Science is widely available and often open, at least to those with the necessary knowledge and capacity, and the technology is in principle widely accessible. However, for AI to work well for each person, or each type of person, there needs to be enough data about them. Even in countries or areas well served by physical infrastructure, some groups are regularly excluded, including women, informal workers, displaced persons, and other marginalized groups.

AI systems trained on datasets that omit these groups are likely to perpetuate and even amplify existing economic disparities. For instance, digital health datasets that do not fully represent rural populations will make AI-powered diagnostic tools less effective, potentially widening disparities in healthcare. Such citizens are likely to suffer from 'algorithmic exclusion.'

If AI technologies are to fulfil their promise of helping to create more inclusive and equitable societies, there should be full data representation. This chapter examines what this would mean for access to credit and health services, but similar concerns about digital deserts or invisibility extend across the whole human development landscape. This chapter discusses in depth some of the challenges for the Asia-Pacific region posed by missing data, using two motivating examples – inclusive finance and healthcare.

The use of national ID systems to resolve data fragmentation and promote financial inclusion via AI

Traditional models of financial inclusion have been hindered by the high marginal cost of serving low-income and remote populations, especially when identity documentation is fragmentary or non-existent.

AI can be used to promote inclusion and is particularly helpful for people without formal credit records. In general, access to credit requires some form of security, which is a challenge for those without wealth, or at least a financial record which gives the lender comfort that the person is a good credit risk. In countries without a single, universally accepted identifier, such as the United States or the UK, data brokers must piece data together about an individual using names, addresses, telephone numbers and email addresses. However, this is fraught with challenges, because the stability and accuracy of these digital identifiers are affected by underlying inequality. Lower-income households are more likely to move frequently and change telephone numbers, and are less likely to use an email address consistently. And if they are members of minority groups their names are more likely to be misspelled. Records of prior businesses owned or prior education or training obtained may not exist at all, or may not exist digitally, making it hard for lenders to assess risk before providing a loan.[1]

AI tools offer the ability to sift through and integrate multiple alternative, non-conventional data points relating to the borrower, such as online purchasing behavior or satellite data on crop production on a small farm, and combine many different records – and predict future behavior. This improves the accuracy of lenders' credit risk scoring systems. However, such data still needs to be accurately matched to an individual.

Financial providers are already highlighting the usefulness of AI in the credit allocation process: a mid-2024 McKinsey survey of 24 senior credit risk executives found that 19 of them expected to have implemented AI within the next 12 months.[2]

National ID systems can serve as identifiers around which government services, such as disaster relief, can be delivered. But they can also be used as the core of digital profiles that companies or other organizations can use, for example, to allocate credit. In data science, such an identifier is referred to as a 'key.' For a key to be effective, it is ideally an immutable alphanumeric string

which is attached to multiple different types of data on an individual. Then, these different data sources can be effortlessly merged to form a single data profile.

Fully digital national ID systems may provide benefits ultimately to citizens if they allow a complete digital profile that can then be used by an AI algorithm to make accurate predictions about the needs and behaviors of similarly situated people. The government of India, for example, with Aadhaar in place, will be straightforwardly able to build AI tools on top of the infrastructure layer, such as by using non-financial activities to improve predictions for credit-scoring systems, complemented by human review.[3] [4] For financial inclusion, it also in the interests of the citizen to have successful and accurate predictions made about them.

Most countries in the Asia-Pacific region have mandatory national ID cards, generally digital with biometric chips (Table 11). These ID cards have typically been created for national security purposes or for controlling access to government benefits.

Table 1 – National ID systems in selected Asia-Pacific countries

Country	National ID System Name	Mandatory?	Digital/Biometric Component
Brunei	*Kad Pengenalan (Smart Identity Card)*	*Yes*	*Yes – chip with photo & fingerprints*
Cambodia	*Khmer Identity Card*	*Yes*	*Yes – biometric (photo & fingerprints)*
Indonesia	*e-KTP (Kartu Tanda Penduduk)*	*Yes*	*Yes – biometric chip card*
Lao PDR	*National ID Card*	*Yes*	*Yes – photo and fingerprint biometrics*
Malaysia	*MyKad*	*Yes*	*Yes – smart card with photo & fingerprints*
Myanmar	*National Registration Card (NRC)*	*Yes*	*Transitioning to biometric smart card*
Philippines	*PhilSys ID (PhilID)*	*Yes*	*Yes – biometric (photo, fingerprints, iris)*
Singapore	*NRIC (National Registration ID Card)*	*Yes*	*Partially – biometric data held, not on chip*
Thailand	*National ID Card*	*Yes*	*Yes – biometric smart card*
Viet Nam	*Citizen Identification Card*	*Yes*	*Yes – biometric chip card*
Japan	*My Number Card*	*No*	*Yes – chip card with photo and digital cert*
China	*Resident Identity Card*	*Yes*	*Yes – biometric smart card (photo, fingerprints)*
Tonga	*TongaPass*	*Yes*	*Transitioning to biometric smart card*

This table suggests significant commonalities across countries, probably because most are using the same suppliers such as the Thales Group, a French multinational, or the Modular Open-Source Identification Platform (MOSIP). MOSIP, established in 2018, was inspired by the scale and success of India's Aadhaar project. Launched in 2009, MOSIP was conceived and initiated by the International Institute of Information Technology Bangalore (IIIT-B), with initial funding from the Bill & Melinda Gates Foundation. MOSIP is an open-source platform upon which identity systems are built using modules, such as national registration or personal authentication. In Asia and the Pacific, the largest implementation is in the Philippines, though Sri Lanka and Indonesia are also thought to be interested.

Universal Trusted Credentials

While these single identifiers attach to individuals, there have also been initiatives to support access to credit for medium and small enterprises, notably the Universal Trusted Credentials initiative launched by UNDP in partnership with the Monetary Authority of Singapore.[5] Traditional credit scoring models systematically disadvantage businesses operating in informal economies or those with limited banking histories. The UTC system validates alternative data points, such as consistent utility payments, supplier relationships, and mobile money transaction patterns, to create financial identities for businesses previously excluded from conventional lending processes – with the potential to increase loan approval rates for women-owned businesses and rural enterprises.[6]

At a digital disadvantage

AI for financial inclusion would typically link with government digital national ID systems. However, allocating credit on this basis is likely to further exclude some groups who do not have ready access to digital services. Lao PDR, using World Bank funds, has invested heavily in trying to ensure that the national ID system can reach remote communities.[7] Broader constraints on internet affordability and connectivity continue to shape how effectively these systems can be linked with digital service delivery.[8] As a result, rural rates of adoption of broadband are less than 1 percent in some communities.[9]

For example: In many countries, people facing gendered, livelihood or displacement related barriers may be under-represented in available datasets, creating 'data deserts' in which some populations become less visible to algorithmic decision-making systems.

This algorithmic exclusion is concerning in the Asia-Pacific region, where both within and between countries there are often large disparities in digital data readiness.[10]

Even in a developed economy, for infirmed or disabled people an existing physical disadvantage may translate into a data disadvantage if the AI used for predictions depends on how that individual has used the physical My Number Card.

The risks of bias and digital exclusion.

While some Asia-Pacific countries have extensive national ID systems, they are nevertheless not universal, and each has its own weaknesses and gaps.

India – Launched in 2009 by the Unique Identification Authority of India (UIDAI), Aadhaar assigned a 12-digit number to residents, linked to biometric and demographic data. As of 2024, over 1.3 billion residents had been enrolled, making it the largest biometric ID system globally. Given the complexity, its roll-out has seen different iterations and challenges. Earlier data shows that marginalized populations were at times unable to verify biometrics in the system, leading to possible risk of exclusion. Later evidence suggest that gaps in connectivity access and literacy remain obstacles hindering full access to benefits in certain cases, such as rural communities.[11]

Japan – Japan has well-established digital infrastructure. The My Number Card is deployed broadly for access, for example, to national pensions and to government services. Although the card is digital, to renew it people

must visit a physical office.[12] Such physical verification may reduce fraud, but it may also pose a challenge to infirmed or disabled people, or anyone for whom leaving their house is difficult.

Philippines – The rollout of the PhilSys national ID system, built on MOSIP, was accelerated during the COVID-19 pandemic. Communities without formal identity documents—including some indigenous groups—faced difficulties enrolling. Efforts were subsequently made to expand registration outreach and improve accessibility.[13] The Government explicitly tried to tackle this by, for example, organizing registration efforts of citizens living in geographically isolated and disadvantaged areas. For example, on 30 November 2021, more than 100 individuals residing in remote areas of Nueva Ecija were registered.[14] Universal registration could imply more effort by governments to involuntarily register people who live remotely or in indigenous communities.

Myanmar – Myanmar's national ID system has uneven coverage, and some population groups — including long-standing communities in Rakhine State — face barriers to obtaining official identity documents. These documentation gaps predate the development of digital ID systems, but they shape who can access digital services and who may be excluded when identification is required.[15]

China – The national ID is required for most interactions of daily life. Now China has proposed expanding this national ID system to include all aspects of internet life by complementing it with a national internet ID system.[16] Such expansive data collection and infrastructure owned by the Government, is useful for AI development, but increases the risks of government surveillance. This raises broader concerns about balancing data-driven innovation with rights and privacy protections.[17]

Although national ID cards are on balance helpful, it is important to note different views. Many people are unhappy with the notion of mandatory, national, digital IDs. The principal objection concerns privacy. A dataset that includes a national ID number and a photo is one thing; a dataset that links these to the person's medical record, voter registration, driving record, phone number and record of purchases, all of which are possible with digital IDs, is quite another. Such a profile poses a far greater threat to individual privacy, while a more valuable tools for hackers.

As the 2022 OHCHR report Privacy in the Digital Age notes, "States should [when adopting new biometric systems,] consider risks of abuse, function creep and repurposing, including risks as a result of future political changes." [19]

AI for financial inclusion

If countries do decide to enable national IDs and attached profiles as the basis for financial inclusion, they will need to incorporate detailed data on vulnerable and excluded populations, while doing so in ways that do not expose every aspect of residents' lives to exploitation by data holders.

Without consultation, governments risk deploying AI in harmful ways, for example by unfairly denying access to benefits or services. AI systems could be used to automatically flag people for negative governmental actions, such as shutting down individuals' or communities' access to banking, train systems, or the internet.

Decisions around what AI to deploy should not simply happen top-down. Instead, mechanisms of consent and consultation should permit thorough discussion of both the possible benefits and the potential adverse consequences. Not every community or individual will weigh up the risks and decide that they wish to participate in AI-driven government processes that fail to offer a net benefit.

AI-driven predictions for healthcare

A second example where AI can significantly benefit residents of the Asia-Pacific region is AI-driven healthcare. In this section, we use the very specific illustration of a device for diagnosing diabetic retinopathy

– a serious complication of diabetes which damages blood vessels in the retina, which in turn leads to partial vision loss or blindness. The Asia-Pacific region is predicted to become the largest contributor to the economic burden of diabetes by the 2030s, with a total cost of approximately $800 billion annually, due to a combination of diet, genetics and a lack of diagnosis.[20]

Traditionally, to diagnose diabetic retinopathy, a doctor would take images of the eye that would be then examined by specialist for a variety of markers – a long, complex and potentially expensive process. By contrast, AI-enabled devices can detect the markers within minutes, and can be deployed at scale even in areas and regions without trained specialists. The new device takes an image, and submits it to an online algorithm, receiving results within 60 seconds.[21] Initial evidence suggests that such systems are better than humans at detecting diabetic retinopathy.[22] They are also low-cost and easy to deploy at scale.

Unlike the use of AI to make financial predictions, these AI-embedded devices do not require the person to have a pre-existing data profile. Instead, the data for the AI prediction is created in real time and should not be distorted by that person's economic status. The clinical features used in retinal screening do not differ inherently by socioeconomic status. This means that, if these features are well represented in the training data, AI models can perform accurately across diverse populations even when screening access varies.. Furthermore, the AI device requires only electricity and the internet, and a link to a data center somewhere in the world.

This is less demanding than the infrastructure needed for UTC, for example, or for Aadhaar. There are nevertheless, potential sources of inequality. First, the technology only makes a prediction about who should be referred to a specialist, or who is at risk for vision loss and blindness from diabetes. This is less useful in countries or regions that lack access to specialists. Second, the technology is intended for those who are already known to have diabetes. In South-East Asia, for example, more than half of diabetes cases are undiagnosed.[23] So while AI can make some forms of diagnosis cheaper and more scalable, it will have limited applicability unless complemented by basic forms of healthcare.

Moreover, as with any AI-enabled device there are potential inequalities in training data. One such device, EyeArt has been developed using data from the United Kingdom and the United States. Another device, SELENA, originally developed in Singapore, was trained on a Singaporean population.Such training misses out large populations,[24] for whom predictions will be inaccurate. If devices do not get properly deployed in such groups because of uncertainty over their efficacy, more inclusive data for fine-tuning will never be created. Though some of the risks of algorithmic exclusion can be mitigated using standalone devices, there is thus nevertheless the potential for indirect algorithmic exclusion via an absence of relevant training data.

Different approaches to data governance

To help counter algorithmic exclusion and other data concerns, some Asia-Pacific economies are implementing risk-based data frameworks, based on a recent European Union methodology which applies progressively more stringent requirements for higher-risk systems. Others are taking a more development-oriented approach to AI data governance seeing it as a means of reaching economic objectives, but often without robust safeguards against algorithmic exclusion or bias in AI outputs (Table 2).

- *Bangladesh* – The draft National Artificial Intelligence Policy incorporates principles of social equity and fairness, and also emphasizes the potential for AI to increase welfare, and establishes a National AI Council to drive innovation and industry development.
- *China* – The New Generation Artificial Intelligence Development Plan takes a development-oriented approach.

- *Fiji* – The National Digital Strategy framework primarily addresses the cybersecurity aspects of AI.
- *India* – The Digital Personal Data Protection Act strengthens the privacy framework around the use of personal data in digital and algorithmic systems, though broader AI governance mechanisms continue to evolve through complementary policies and initiatives.
- *Japan* – Japan has a distinctive hybrid model, combining innovation priorities with its AI Strategy 2022 while actively participating in international governance initiatives through the G7 and OECD.
- *Republic of Korea* – The Basic Act on Artificial Intelligence adopts a risk-stratified approach, distinguishing between high-impact AI systems requiring human oversight and generative AI applications subject to transparency requirements and content labelling.
- *Thailand* – The draft Royal Decree on AI-Based Service Businesses establishes a tiered regulatory system with distinct requirements for different risk categories of AI systems.

As these examples suggest, AI regulatory frameworks in the Asia-Pacific region do not specifically consider the problem of algorithmic exclusion. Though policies cover AI as a technology, they do not address directly the issues of data readiness or disparities in inclusion or exclusion of particular groups of populations, or how those issues might affect AI outcomes.

Table 2 – AI governance in selected Asia-Pacific countries

Country	Policy Name	Status	Key Focus Areas	Regulatory Approach	Features
Bangladesh	National Artificial Intelligence Policy[26]	Draft 2024	AI research, education, industry development, governance	Establish National AI Council with emphasis on innovation	Six principles: social equity, equality, and fairness; transparency and accountability; safety, security, and robustness; sustainability
China	New Generation Artificial Intelligence Development Plan[27] Opinions on Deepening the Implementation of Artificial Intelligence Plus Action, for implementation starting from the 15th Five Year Plan (2026-2030)	Implemented 2017	AI development, industry applications, talent cultivation, ethics and security	Government-led development with industrial policy focus; Comprehensive legal and ethical framework including Cybersecurity Law, Data Security Law, Personal Information Protection Law, Anti-Monopoly Law, and various AI-specific regulations	The Plan: Three-step strategic objectives with milestones for 2020, 2025, and 2030, including on ethical frameworks. The AI+ Initiative includes penetration targets; defines six action areas; establishes foundational support capabilities.

Country	Policy Name	Status	Key Focus Areas	Regulatory Approach	Features
Fiji	A framework to safeguard internet users against AI threats as part of National Digital Strategy[28]	Implemented 2024	Safeguarding internet users from AI-related threats		
India	IndiaAI Mission[29]	Implemented 2024	AI research, innovation, healthcare, education, agriculture, smart cities, infrastructure, and mobility	Pro-innovation governance with ethical guidelines; voluntary principles for responsible AI	Three distinct pillars: economic opportunity, social development/ inclusive growth, and "AI garage for 40 percent of the world"
Japan	AI Strategy 2022[30]	Implemented 2022	Digital transformation, industrial competitiveness, ethical AI usage	Co-regulatory approach balancing innovation and risk management	Emphasis on human-centered AI; social implementation focus; ELSI (Ethical, Legal and Social Issues) considerations
Lao PDR	National Digital Economy Development Strategy[31]	Implemented 2021	20-Year National Digital Economy Development Vision (2021–2040) and the 10-Year National Digital Economy Development Strategy (2021–2030)		Part of broader digitization efforts; early-stage focus on AI education and infrastructure
Papua New Guinea	No AI Policy	N/A	N/A	N/A	No official AI-related policies as of 2025
Thailand	Royal Decree on the Operation of AI-Based Service Businesses[32]	Implemented 2023	Risk-based	Tiered regulatory approach based on risk levels of AI systems	Classification of AI systems by risk; registration requirements for high-risk AI

Country	Policy Name	Status	Key Focus Areas	Regulatory Approach	Features
Republic of Korea	Basic Act on Artificial Intelligence[33]	Implemented 2024	Ethical AI usage, innovation promotion, and user protection	Risk-based framework differentiating high-impact and generative AI systems	Transparency requirements; human oversight for high-impact systems; labelling for generative AI outputs; enforcement begins January 2026

Other issues hindering algorithmic inclusion

There are many other potential causes of data deserts and algorithmic exclusion. One is multiple languages. Asia and the Pacific is the most linguistically diverse area in the world. Papua New Guinea alone has more than 800 languages; Indonesia has more than 700. There are likely to be more digital records in the national lingua franca, offering larger training sets. Those who know the lingua franca will therefore be more algorithmically included than those who only know a minority language, because there will be more digital records on them.

In societies affected by conflict or marked by long-standing social divisions, data collection has at times been misused, contributing to understandable mistrust among marginalized communities. It is therefore important that these communities are meaningfully informed and engaged in decisions about how data and AI systems are used, with transparent communication and safeguards that reflect their rights, perspectives, and priorities.

A further issue is the lack of complementary digital infrastructure. If the country itself is to take responsibility for the process of designing and training for AI rather than leaving it to other countries it will need sophisticated computational resources, data storage architectures, and high-bandwidth networks. Countries or regions lacking these digital resources cannot participate in the self-reinforcing needed for ongoing fine-tuning.

Policy implications and recommendations

Policymakers in the Asia-Pacific region may consider how AI can improve welfare in the short term by reducing prediction costs, accompanied by measures to assist workers and companies in the transition. In the longer term, they can think about ways AI can improve welfare through efficiency gains in industry. They should therefore identify sectors where reducing the costs of prediction can generate welfare improvements.

As a core principle, AI policies should mitigate algorithmic exclusion. Policymakers can pro-actively consider what groups within their country may be excluded from the benefits of AI, as a result of being less present or visible within pre-existing commercial and governmental data systems and social structures.

Ensuring that everyone can access services, benefit from AI-enabled systems, and be appropriately represented in data should not depend on the volume of data collected about them. At the same time, policymakers may wish to recognize that some individuals and groups—including privacy-conscious communities or certain minorities—may prefer to limit their visibility in official data systems. Approaches to digital inclusion should therefore balance the need for effective service delivery with respect for diverse preferences, rights, and expectations around data use.AI has already proven its use in specific areas like diabetic retinopathy scans.

Strategies to promote AI in healthcare need to be grounded in strong health systems that ensure people can access timely diagnosis and treatment. ; AI tools still depend on a robust healthcare system that routes people to the right diagnosis and treatment of conditions. AI systems demand vast computational resources, data storage architectures, and high-bandwidth networks. Policymakers can help make sure these resources are available, reliable and affordable.

In settings affected by linguistic diversity, past conflict or low levels of institutional trust, deploying AI enabled services may require additional time and engagement to ensure they are inclusive and responsive to local needs. Clear communication and participatory design processes can support equitable adoption.

END NOTES

1. (Tucker, 2023)
2. (McKinsey, 2024)
3. (Berg et al., 2020)
4. (Carriere-Swallow, Haksar and Patnam, 2021)
5. (Puricelli, 2024)
6. (UNDP, 2024c)
7. (World Bank, 2025)
8. (Redmond, 2021)
9. (DataReportal, 2025)
10. (UNDP, 2025b, 2025a)
11. (Vaid, 2021)
12. (Japan Today, 2023)
13. (Senate of the Philippines, 2021)
14. (PSA, 2021)
15. (Stateless Journeys, 2019)
16. (Tobin and Liu, 2024)
17. (Mozur, 2019)
18. (Tobin and Liu, 2024)
19. (UNHRC, 2022)
20. (Bommer et al., 2018)
21. (Eyenuk, 2020)
22. (Lim et al., 2022)
23. (Ogurtsova et al., 2022)
24. (Ting et al., 2017)
25. (European Parliament, 2023)
26. (Government of Bangladesh, 2024)

27. (Webster et al., 2017)
28. (Chand, 2024)
29. (Deepankshi Agnihotry, 2025)
30. (Government of Japan, 2022)
31. (Sengpaseuth, 2025)
32. (Trisadikoon and Umponkitviwat, 2025)
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