Feasibility Study on AI adoption in Small Island Developing States (SIDS), Landlocked Developing Countries (LLDCs), and Least Developed Countries (LDCs) in Asia-Pacific Region

Preliminary findings

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Executive Summary

This feasibility study assessed the existing Artificial Intelligence (AI) infrastructure, capacities, and capabilities across 21 Asia-Pacific countries classified as Small Island Developing States (SIDS), Landlocked Developing Countries (LLDCs), and Least Developed Countries (LDCs). The primary objectives were to identify the infrastructure, data, human resources, institutional capacities, and governance mechanisms essential for harnessing emerging technologies to accelerate digital transformation; recognize key barriers to AI adoption; illustrate sector-specific AI use cases that can promote socio-economic development; and offer recommendations to support national AI strategies.

To support this analysis, an extensive online search was conducted using academic, governmental, and regional digital libraries and platforms. A standardized set of search terms was used to identify publicly available policy documents, strategies, regulatory guidelines, and development reports related to AI adoption. The document review was limited to publications from 2015 to 2025 to ensure relevance and manageability.

The study found wide disparities in Internet access among the countries, with usage rates ranging from 18.4 percent in Afghanistan to 77.4 percent in Mongolia. Countries such as the Solomon Islands (24.6%) and Tuvalu (25.3%) exhibited low Internet penetration. Similarly, mobile broadband subscriptions varied significantly, with the Maldives (128.7), Cambodia (122.2), and Mongolia (115.3) leading, while Pacific Island countries such as Kiribati (25.4), Micronesia (25.9), and Tuvalu (29.1) trailing behind. Internet speeds also showed stark differences, from 25.1 Mbps in Mongolia to just 3.2 Mbps in the Solomon Islands, revealing critical gaps in digital connectivity. Additionally, variations in submarine cable infrastructure further highlight uneven digital integration across island nations.

In terms of policy readiness, countries in the region displayed varied levels of progress. Some have developed AI-specific frameworks, while others rely on broader digital strategies to support AI development. Notably, Bangladesh, Myanmar, Mongolia, and Nepal have formalized or recently drafted national AI policies (2024–2025), reflecting growing political commitment and international collaboration. In contrast, countries such as Afghanistan, Kiribati, Solomon Islands, and Vanuatu lack publicly available AI-related frameworks, suggesting limitations in national capacity, resources, or political stability.

Data from the Oxford Insights AI Readiness Index 2024 further confirmed that most LDCs, LLDCs, and SIDS fall below the global median in governance, technological sector maturity, and data infrastructure and lag far behind the global leaders and their regional peers in AI Readiness. Capacity development emerges as a critical priority for fostering local AI talent and strengthening national ecosystems.

The study also identified various sector-specific AI initiatives within the region, offering scalable examples that can be adapted by LDCs, LLDCs, and SIDS. It concludes with

preliminary recommendations and actionable steps to accelerate AI adoption in support of national development agendas and the Sustainable Development Goals (SDGs).

Acronyms

AI	Artificial Intelligence
AGI	Artificial General Intelligence
ASI	Artificial Super Intelligence
ADB	Asian Development Bank
a2i	Aspire to Innovate
DL	Deep Learning
FAIR	Fairness, Accountability, Interpretability, and Robustness
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
GPU	Graphics Processing Unit
HAI	Human-centered Artificial Intelligence
HPC	High Performance Computing
ICT	Information and Communication Technology
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IMDA	Info-communications Media Development Authority (Singapore)
IoT	Internet of Things
ISO	International Organization for Standardization
ITU	International Telecommunication Union
ITU-T	ITU Telecommunication Standardization Sector
LDC	Least Developed Country
LLDC	Landlocked Developing Country
LLM	Large Language Model
ML	Machine Learning
NLP	Natural Language Processing
OECD	Organisation for Economic Co-operation and Development
OHRLLS	Office of the High Representative for the LDCs, LLDCs and SIDS
R&D	Research and Development
RL	Reinforcement Learning
SDG	Sustainable Development Goal
SIDS	Small Island Developing States
SME	Small and Medium Enterprise
SPC	Pacific Community
STEM	Science, Technology, Engineering, and Mathematics
TPU	Tensor Processing Unit
UN	United Nations
UNCDF	United Nations Capital Development Fund
UNDP	United Nations Development Programme

UNDRR	United Nations Office for Disaster Risk Reduction
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNWTO	UN World Tourism Organization
WHO	World Health Organization

1. Overview

Artificial Intelligence (AI) presents a transformative opportunity for Small Island Developing States (SIDS), Landlocked Developing Countries (LLDCs), and Least Developed Countries (LDCs) in the Asia-Pacific region. This feasibility study examines these countries' readiness, their challenges, and viable strategies for adopting AI to enhance sustainable development.

It is widely recognized that rapid advancements in AI have significantly reshaped global socioeconomic dynamics. These technological advances have created disparities among nations, with some countries pioneering innovations while others lag far behind. AI adoption has notably transformed economies in numerous countries, spanning various sectors, from social impact initiatives and environmental conservation efforts to banking, music, art, and sports (Asian Development Bank, 2023a; UNIDO, 2024; World Bank, 2024).

By the end of 2025, AI-driven technologies and applications are expected to dominate approximately 95% of customer interactions within the business environment, and the AI market is projected to expand at an annual rate of 54% (UNIDO, 2024). However, the uneven pace of AI development and deployment between advanced and developing countries threatens to widen existing technological divides. Developing countries frequently occupy consumer positions, effectively functioning as "technological colonies," rather than becoming active innovators or producers in the rapidly evolving AI landscape (UNIDO, 2024).

To better understand the extent of AI adoption in the Asia-Pacific region, it is essential to briefly discuss the emerging technologies driving AI, the ways in which AI can assist in achieving the Sustainable Development Goals (SDGs), the specific challenges faced by countries in the region in implementing AI, and the role of international organizations like the ITU in supporting these efforts.

AI and the emergence of new technologies

The emergence of AI can be traced back to the early 1950s when researchers began experimenting with creating machines capable of performing tasks beyond human abilities. By the end of that decade, the academic discipline of machine learning emerged, combining computer science, mathematics, and programming to predict trends and behaviors without direct human oversight (Figure 1).

By 2017, deep learning became prominent, enabling machine learning algorithms to explore unstructured datasets without supervision. In the 2020s, various advanced algorithmic models were developed to manage massive datasets of multiple formats, such as texts, videos, images, and more, and countries began adapting them into their workflow processes (Government of Malaysia, 2024).

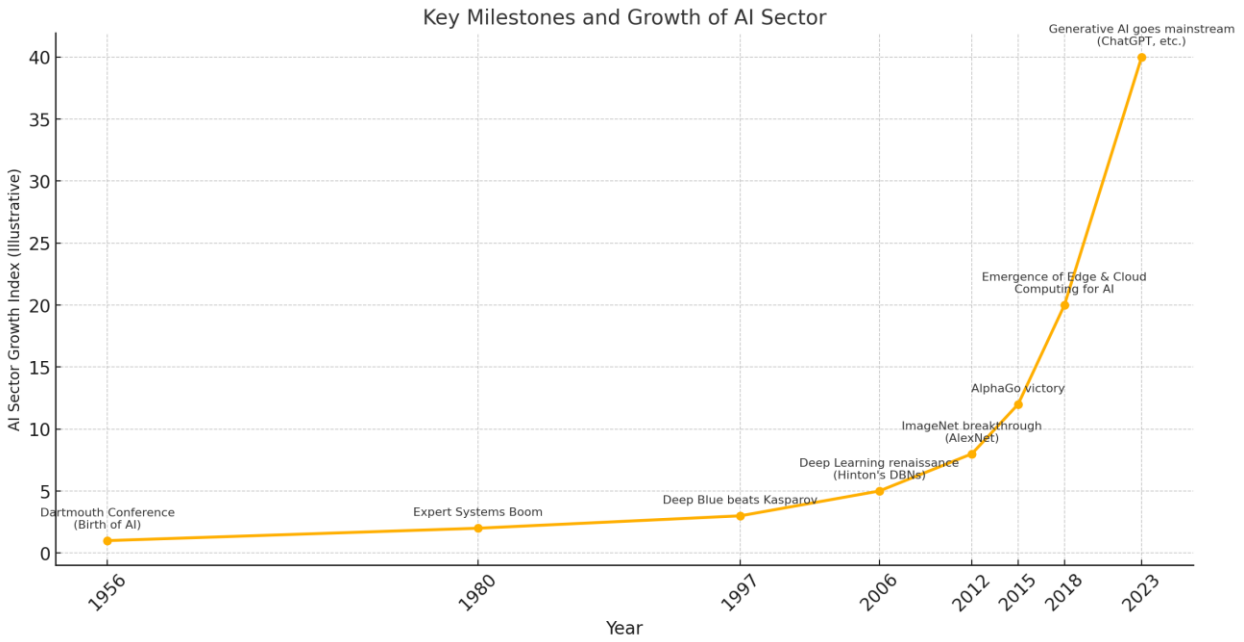

Figure 1. Key technical milestones in the advancement and application of Artificial Intelligence. Source: Barton, D. et al., (2017); Hinton, G., Osindero, S., & Teh, Y. W. (2006); IBM. (2020); Jobin, A. et al., (2019); Krizhevsky, A. et al., (2012); Russell, S., & Norvig, P. (2021); Silver, D., Huang, A. et al., (2016); Vincent, J. (2022); and OpenAI. (2023).

The technologies that emerged during the last half of the 20th century and the first part of the 21st century continue to shape the Fifth Industrial Revolution[1]. These include applications of AI, the Internet of Things (IoT), 5G and 6G cellular network technology, blockchain and distributed ledgers, big data analytics, robotics and autonomous systems, and quantum computing. IoT's network of devices and sensors provides real-time insights into supply chains and urban planning. 5G cellular technology offers high-speed, low-latency connectivity that supports large-scale AI and IoT applications—from autonomous vehicles to remote healthcare. Blockchain ensures secure, transparent record-keeping; big data analytics refines massive data sets for real-time decision-making; robotics and autonomous systems automate repetitive or hazardous tasks; and quantum computing, while still in development, promises revolutionary advances in cryptography, climate modeling, and more.

As the pace of AI application development has increased, its use in various chatbots has also grown. While some chatbots are sector-specific, others serve general-purpose functions (Table 1). The table presents AI chatbots into ten distinct sectors based on their functionalities and primary uses. In general conversational AI, popular platforms include

[1] The Fifth Industrial Revolution is defined by human-centric innovation, seamless human-AI collaboration, personalized technology-driven products and services, and the use of technology to advance social good by reducing inequality, improving healthcare, and fostering inclusive growth.

ChatGPT, Google Bard, DeepSeek, and Microsoft Bing Chat, designed for versatile interactions. Customer support and service feature tools like IBM Watson Assistant, Zendesk Answer Bot, and Drift, which help businesses manage customer inquiries and streamline communication effectively. Voice-based assistants comprise widely known systems such as Amazon Alexa, Google Assistant, and Apple Siri, primarily facilitating hands-free interactions and smart-home controls.

Social media and marketing chatbots, including ManyChat, Chatfuel, and MobileMonkey, assist in managing digital marketing campaigns, lead generation, and customer engagement on social platforms. Educational chatbots such as Duolingo Bot, Socratic, and Khanmigo provide learning support and interactive educational experiences. Chatbots like Woebot, Wysa, and Babylon Health claim to offer therapeutic interactions, symptom checking, and personalized health advice in healthcare and mental health.

Table 1. List of major AI-powered chatbots

Category	Chatbot Names
General and Conversational AI	ChatGPT, Google Bard, DeepSeek, Microsoft Bing Chat, Claude, Replika, Character.AI, Perplexity AI
Customer Support and Service	IBM Watson Assistant, Ada, Zendesk Answer Bot, Drift, Intercom, LivePerson, Freshdesk Chatbot
Voice-Based Assistants	Amazon Alexa, Google Assistant, Apple Siri, Microsoft Cortana, Samsung Bixby
Social Media and Marketing	ManyChat, MobileMonkey, Chatfuel, Flow XO, TARS, Octane AI
Educational Chatbots	Duolingo Bot, Socratic (Google), Khanmigo (Khan Academy), Edmodo Bot
Healthcare and Mental Health	Woebot, Wysa, Youper, Babylon Health, Buoy Health, Ada Health, Florence
Business and Productivity	Slackbot, Salesforce Einstein, HubSpot Chatbot, SAP Conversational AI, Zoom Virtual Assistant
Entertainment and Gaming	Mitsuku (Kuki), AI Dungeon, Character.AI, Cleverbot
Coding and ICT Technical Assistance	GitHub Copilot, Codeium, TabNine, Amazon CodeWhisperer
Personalized AI Companions	Replika, Anima, Chai AI, Romantic AI

Business and productivity chatbots, represented by Slackbot, Salesforce Einstein, and HubSpot Chatbot, enhance organizational efficiency, data analytics, and automated processes. Entertainment and gaming platforms such as Mitsuku (Kuki), AI Dungeon, and Cleverbot offer interactive storytelling and playful engagements. Coding and ICT assistance tools like GitHub Copilot and Amazon CodeWhisperer support developers with code generation and technical problem-solving, while personalized AI companions like

Replika, Anima, and Romantic AI deliver individualized interactions aimed at emotional connection and companionship.

AI and Sustainable Development Goals (SDGs)

As AI-based industries claim to offer products and services that promote the SDGs, many countries have begun exploring their adoption and full use in various sectors. AI-driven methods enhance efficiency and sustainability across domains by optimizing resource use, mitigating climate risks, and reducing pollution. In healthcare, AI-enabled telemedicine provides access to health services for remote communities. AI-driven microfinance solutions and real-time supply chain analytics promote economic growth for small businesses and export-oriented industries, while AI-enhanced governance improves public service delivery. Meanwhile, “smart city” initiatives tackle urban congestion and waste management challenges. AI-driven adaptive learning and workforce upskilling programs increase digital literacy and support economies in transition. At the national level, ethical and inclusive AI implementation depends on robust data governance, bias reduction, and collaboration among diverse stakeholders. With strong AI frameworks and cooperative partnerships, AI can foster transformative change at all levels of society.

The 2020 UN Secretary-General’s Roadmap for Digital Cooperation, below (Figure 2), lists eight key areas for action. They all emphasize the importance of using digital technologies to advance the SDGs. It is generally acknowledged that AI can significantly accelerate progress toward a country’s SDGs (United Nations, 2021).

In health and well-being (SDG 3), for example, AI-powered diagnostic tools enhance the speed and precision of disease detection, while telemedicine and remote monitoring improve healthcare access, particularly in underserved areas. Machine learning–based epidemiological models assist in tracking, predicting, and managing outbreaks, strengthening public health strategies and interventions.

The potential contributions of AI in education have already made an impact. In ensuring quality education (SDG 4), adaptive learning platforms employ AI to customize lessons for each student, narrowing achievement gaps and enhancing outcomes. Automated grading frees educators to concentrate on interactive teaching, and AI-driven assistive technologies-such as text-to-speech and image recognition-promote inclusivity for learners with disabilities. Regarding economic growth and workforce development (SDG 8), AI-enabled credit scoring and fintech solutions broaden financial services for small businesses, spurring entrepreneurship and economic advancement. By analyzing labor-market trends, AI informs skill development and policy decisions, while process automation boosts efficiency-potentially creating new roles in emerging technology fields.

In Industry, Innovation, and Infrastructure (SDG 9), AI can bolster infrastructure reliability through predictive transportation, telecommunications, and energy grid maintenance. AI integration can help accelerate Research and Development (R&D) in materials science and

pharmaceuticals, fostering public-private partnerships that align technological progress with sustainable development goals. To reduce inequalities (SDG 10), AI-driven applications expand access to key services, including e-governance and healthcare, thereby addressing disparities among historically marginalized populations. Yet, while well-designed AI systems can help detect and mitigate bias in hiring or lending, constant oversight is essential to prevent new forms of discrimination.

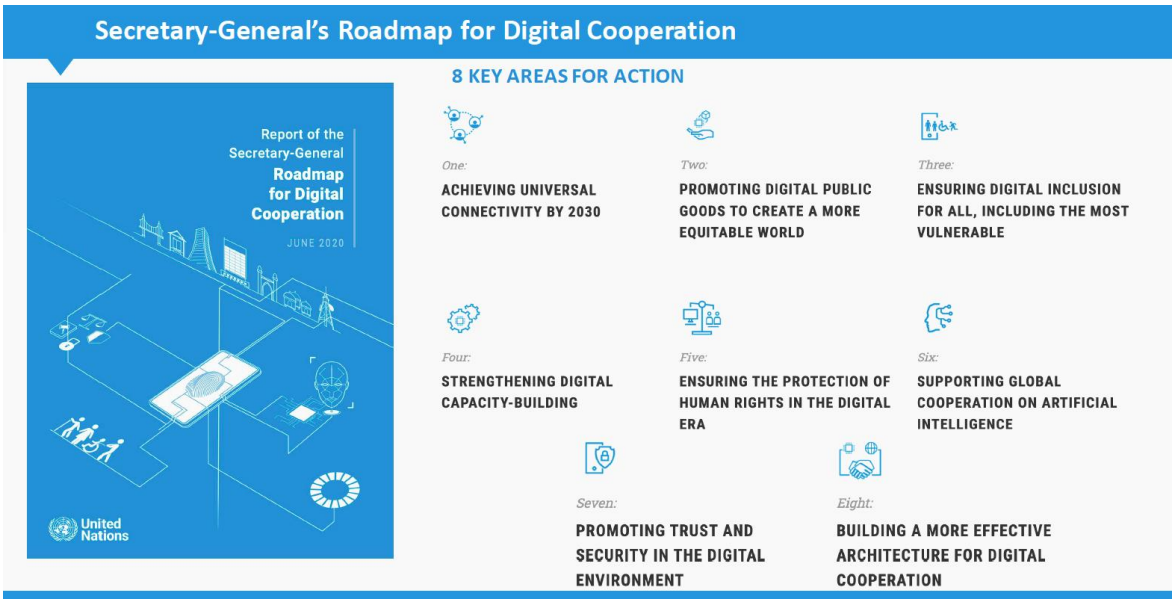

Figure 2. UN Secretary-General's Roadmap for Digital Cooperation (United Nations, 2020)

In sustainable cities and communities (SDG 11), AI improves urban mobility and traffic management by predicting congestion and optimizing public transport routes, thereby reducing travel time and emissions. It also enhances resource efficiency in water and energy systems, while real-time analytics bolster disaster preparedness and coordinated emergency responses. In the context of responsible consumption and production (SDG 12), AI-driven supply chain analytics minimize overproduction and waste across agriculture, manufacturing, and retail. Meanwhile, advanced lifecycle assessments promote more sustainable product design, manufacturing, and disposal, reducing the environmental footprint of goods and services.

Under climate action (SDG 13), machine learning improves climate modeling and informs mitigation and adaptation policies, while AI optimizes energy consumption and promotes renewable integration to decrease emissions. For life below water and life on land (SDGs 14 and 15), AI-assisted drones and satellite imagery track deforestation, pollution, and biodiversity changes, guiding targeted conservation efforts. In Peace, Justice, and Strong Institutions (SDG 16), AI aids in detecting irregularities within governance and finance, reinforcing accountability through transparent oversight and enhanced citizen engagement. Lastly, partnerships for the goals (SDG 17) benefit from AI-based platforms that promote collaboration among governments, NGOs, the private sector, and global

research networks that offer technical support and unified ethical frameworks to lower-income countries.

Ethics and regulations in the use of AI

Globally, the rapid advancement of artificial intelligence and its widespread application across various sectors have raised ethical concerns, prompting calls for increased regulation and oversight. Some of the examples include the misuse of facial recognition technology, which has led to wrongful arrests; the misapplication of AI diagnostic tools in hospitals, resulting in incorrect diagnoses; and the creation and dissemination of fake news stories and misinformation.

The EU's Artificial Intelligence Act, adopted in March 2024, bans the use of AI social scoring systems and applications that predict and assess an individual's risk of committing a crime based solely on profiling. This prohibition covers facial profiling using publicly available images (e.g., social media), the prediction or recognition of emotions in educational settings or workplaces, the use of biometric data to infer and classify individuals, the exploitation of their vulnerabilities, and the intentional manipulation or distortion of behavior to cause harm. We will discuss the importance of ethics in AI and the emerging challenges in more details in the subsequent sections of the report.

ITU's contribution to AI adoption

The International Telecommunication Union (ITU), a specialized agency of the United Nations, is dedicated to global information and communication technologies (ICTs). Established in 1865, ITU plays a vital role in managing global radio spectrum usage, creating technical standards, and improving access, particularly in underserved regions. It accomplishes this through its six regional offices and three bureaus: the Radiocommunication Bureau, Telecommunication Standardization Bureau, and Telecommunication Development Bureau. ITU promotes collaboration among governments, industries, and academic institutions to support inclusive, secure, and sustainable digital development (International Telecommunication Union, 2023).

The Radiocommunication Bureau (BR) is a core bureau of the International Telecommunication Union (ITU) responsible for managing the global use of the radio-frequency spectrum and satellite orbits—critical resources for wireless communications. BR ensures equitable access to these resources by coordinating international agreements, maintaining the Master International Frequency Register, and facilitating the implementation of the Radio Regulations. It also supports the work of the ITU Radiocommunication Sector (ITU-R) in developing global technical standards and conducting studies on spectrum efficiency, interference management, and emerging wireless technologies. Through its work, BR plays a vital role in enabling reliable, interference-free radiocommunication services worldwide.

The Telecommunication Standardization Bureau (TSB), one of the three core bureaus of the International Telecommunication Union (ITU), coordinates the development of global telecommunication standards through the ITU Telecommunication Standardization Sector (ITU-T). It brings together governments, industry, and academia to establish interoperable, secure, and cost-effective ICT systems that address technological advancements and emerging challenges such as cybersecurity, 5G, artificial intelligence (AI), and digital inclusion. The TSB also leads the ITU's efforts in responsible AI development by forming specialized focus groups in areas like AI in healthcare, 5G optimization, and autonomous driving, while producing research, white papers, and guidelines on AI ethics, data privacy, and sustainability. Notable initiatives include the ITU-T Y.3000-series, which outlines a roadmap for AI standardization, and the publication AI Ready – Analysis Towards a Standardized Readiness Framework, reflecting the ITU's commitment to harmonizing global standards for emerging technologies.

The Telecommunication Development Bureau (BDT) is dedicated to promoting equitable access to information and communication technologies (ICTs) worldwide. Its core mission is to support developing countries in building inclusive, secure, and sustainable digital economies through policy advice, capacity building, technical assistance, and project implementation. BDT plays a critical role in narrowing the global digital divide by fostering enabling environments for ICT development, including the adoption of AI at the national and sector levels and promoting collaborations among governments, industry, academia, and civil society. Additionally, it spearheads the ITU's initiatives to integrate digital transformation with the SDGs.

The ITU Regional Office for Asia and the Pacific, located in Bangkok, Thailand, is essential for promoting digital transformation and the responsible, inclusive development of AI across the Asia and the Pacific region. It provides policy advice, technical assistance, and capacity-building programs that align with national objectives and the Sustainable Development Goals (SDGs), emphasizing innovation, privacy, accountability, and ethical standards. The office helps developing nations enhance their AI infrastructure and skills, bridge the digital divide, and foster inclusive digital advancement, particularly for marginalized groups such as rural populations and persons with disabilities. It encourages regional cooperation through workshops, training sessions, and pilot initiatives and participates in global efforts like the AI for Good Global Summit, which brings together governments, academia, industry, and civil society to discuss AI solutions for challenges like poverty, healthcare, climate change, and disaster management. Through various partnerships, the office promotes the use of AI for social good in essential sectors such as healthcare, education, and agriculture.

2. Methodology

Scope and objectives

This study aims to conduct qualitative research through a desk-based assessment by reviewing existing online documents[2] regarding the feasibility of introducing Artificial Intelligence (AI) in developing countries, particularly focusing on Small Island Developing States (SIDS), Landlocked Developing Countries (LLDCs), and Least Developed Countries (LDCs) across the ITU Member States in the Asia-Pacific region.

This feasibility study assessed the current state of AI infrastructure and relevant capacities and capabilities using publicly available data and information sources. The study's objectives are to:

1. identify the essential infrastructure, data, human resources, institutional capacities and governance requirements needed to develop, implement, and utilize emerging technologies that accelerate digital transformation;
2. identify potential barriers to AI adoption in countries;
3. provide sector-specific use cases highlighting potential opportunities on how AI can drive socio-economic development; and
4. provide preliminary recommendations for AI adoption.

Country focus

The ITU's Asia-Pacific region comprises 39 member states, each at varying levels of AI adoption. To support the AI feasibility study and to illustrate varying levels of adoption in SIDS, LLDCs, and LDCs in the Asia-Pacific region, 21 countries were selected for analysis, and one representative country from each category was selected: Fiji (SIDS), Mongolia (LLDC), and Bangladesh (LDC).

[2] In this study, documents refer to a representative sample of existing AI frameworks, policies, legislation, case examples, academic reviews, industry reports, and the latest news articles relevant to the Asia-Pacific region.

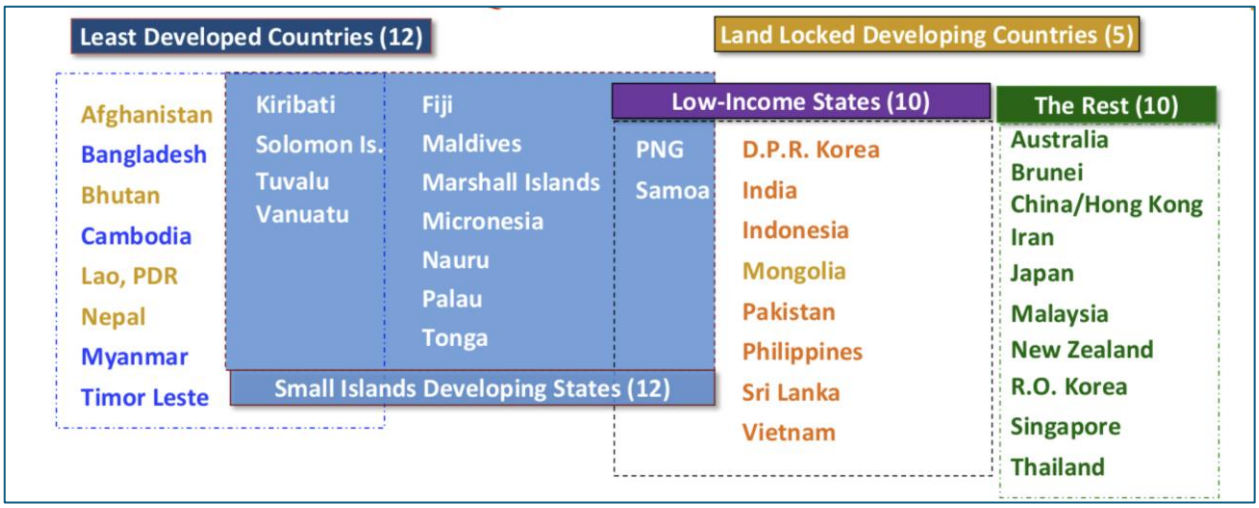

Figure 3. Member States of the ITU Asia-Pacific Region. Source: ITU Regional Office for Asia and the Pacific, 2024

Data sources

An extensive online search was conducted to identify documents relevant to the study using existing databases and search engines. These include the Association for Computing Machinery (ACM) Digital Library, Association of Southeast Asian Nations (ASEAN) Digital Library, United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) Digital Library, Electronic Development and Environment Information System (EDEIS), Google News, Google Scholar, DeepSeek, Academia, ChatGPT, Gemini, Web of Science, the World Bank Open Knowledge Repository, Institute of Electrical and Electronics Engineers (IEEE) Xplore, Organisation for Economic Co-operation and Development (OECD) Library, the United Nations Digital Library, regional and national newspapers, and the official websites of ITU member states in the Asia-Pacific region.

A set of consolidated search terms and phrases (Table 2) was used to locate publicly accessible policy papers, national strategies, regulatory guidelines, and development reports regarding AI adoption in the Asia-Pacific region. Given the extensive number of available publications, the search for original articles, government policies and frameworks, and secondary literature was limited to the period from 2015 to 2025.

Table 2. Consolidated search terms and phrases used to retrieve public documents

AI adoption in developing countries	Education technology LDCs AI
AI capacity assessment	Emerging technologies in LDCs/LLDCs/SIDS
AI Capacity Building in Asia-Pacific	Ethical AI in developing countries
AI for public sector innovation	Feasibility of AI technologies in developing economies
AI for sustainable development	Healthcare AI in SIDS, LDCs, LLDCs
AI governance feasibility study	ICT infrastructure assessment

AI implementation challenges developing nations	ITU AI for good developing countries
AI in agriculture Asia-Pacific	Landlocked Developing Countries Asia-Pacific
AI in climate resilience for island nations	LDC technology development
AI in Disaster Risk Reduction Asia-Pacific	Least Developed Countries in Asia-Pacific
AI in the Global South	LLDCs digital policy
AI infrastructure development	Machine learning applications in LDCs
AI policy framework	OECD AI Observatory LDCs
AI readiness assessment	Pacific island AI strategies
AI readiness index	SIDS innovation and AI
Artificial Intelligence feasibility study	Small Island Developing States Asia-Pacific
Challenges AI adoption in the Asia Pacific region	UNDP digital strategy
Definition Artificial Intelligence	UNESCAP AI policy
Digital skills gap analysis	World Bank AI Development Asia
Digital transformation in Asia-Pacific	

Approach to source document analysis

A structured, multidisciplinary approach was used to evaluate downloaded articles regarding the feasibility of AI adoption in developing countries. Subsequently, a comparative analysis of thematically similar documents was performed, with each document assessed against key analytical dimensions using a scoring system categorized as low, moderate, or high (Table 3). The retrieved documents were examined for relevance, strengths, weaknesses, opportunities, and threats related to AI adoption, considering political, economic, social, technological, legal, and environmental factors relevant to AI usage. Systematic reviews of summaries and abstracts helped narrow down the identified materials, leading to a final set of 176 documents for inclusion in the study.

Table 3. Analytical framework for reviewing documents in the feasibility study[3]

Analysis Diminsion	Analysis Criteria	Guiding Questions	Evidence
1. Policy Environment and Governance	- Presence of a national AI or digital strategy - Alignment with SDGs or broader development goals - Legal/regulatory frameworks for data protection, privacy, AI ethics	- Is there an overarching AI policy or strategic document? - Do existing laws address data governance, cybersecurity, and AI ethics? - Are there clear roles and responsibilities among government agencies?	- References to official AI roadmaps, national digital agendas, or development plans - Evidence of cross-ministerial coordination committees or government task forces - Legislation references

[3] References: ITU. **(**2023**);** OECD. (2019**);** Oxford Insights. (2024); UNESCO. **(**2021**);** World Bank. **(**2020**).**

2. Infrastructure and Technical Capacity	- ICT infrastructure coverage - Availability of computing resources - Accessibility in rural/remote areas	- Are there sufficient networks and data centers to support AI workloads? - How does the country address connectivity for underserved regions? - Is there mention of open data or data-sharing platforms?	- Statistics on internet penetration, mobile coverage, and broadband - National budget allocations to ICT infrastructure - Partnerships with cloud providers, local data centers, or high-performace computing facilities
3. Human Resources and Skill Development	- AI-related education and training programs - Availability of AI research institutions or centers of excellence - Policies on upskilling government employees	- Does the document detail plans for AI capacity-building at universities or vocational institutes? - Are there scholarships or incentives to encourage AI research? - Do government agencies have training or staff development programs in AI?	- References to AI/ML courses in curriculum reforms - Initiatives to develop local tech talent - Partnerships with academia, industry, or international donors for training
4. Sectoral Priorities and Use Cases	- Focus on specific sectors - Identification of pilot projects or success stories - Expected social or economic benefits	- Which sectors does the policy emphasize for AI adoption? - Are there documented pilot projects showing feasibility or early results? - How does the plan tie AI use cases to poverty reduction, service delivery, or other development outcomes?	- Case studies or examples - Sector-specific frameworks referencing AI adoption - Analysis of impact indicators
5. Data Governance and Ethics	- Guidelines or frameworks addressing data privacy, consent, fairness in AI - Transparent and explainable AI principles - Mechanisms for bias detection and mitigation	- Do the documents reference data ethics or responsible AI guidelines? - Are there provisions to handle algorithmic bias or accountability? - Is there a defined approach to stakeholder engagement on data usage?	- Policy statements on AI ethics or privacy - Existence of Data Protection Agencies or ethics committees - References to international guidelines
6. Institutional and Regulatory Setup	- Clarity on who oversees AI strategy - Existence of regulatory sandboxes or pilot frameworks - Inter-agency coordination mechanisms	- Which agency or ministry is tasked with implementing and monitoring AI policy? - Are there collaborative frameworks between government, private sector, and civil society? - Does the document	- Organizational charts or references to coordinating bodies - Announcements of partnerships or consortiums - Regulations or guidelines for AI testing in controlled environments

		discuss cross-border data flows or trade policies affecting AI?	
7. Funding and Partnerships	- Domestic funding - International development aid or grants - Incentives for private sector R&D	- How is AI development financed? - Are there tax breaks or subsidies for AI startups? - Do the documents mention international partnerships?	- Budget lines in official documents - References to venture capital or government seed funds - Memoranda of Understanding with international agencies
8. Implementation Timeline and Milestones	- Phased or time-bound approach to AI adoption - Key performance indicators or targets - Monitoring and evaluation frameworks	- Are there clear deadlines or milestones for AI rollouts? - What metrics will measure policy success? - Does the document outline a review process or accountability mechanism?	- Gantt charts or roadmaps detailing short, mid-, and long-term targets - Assigned M&E committees or performance dashboards - Evidence of iterative approach or scheduled policy reviews
9. Inclusivity and Equity	- Emphasis on marginalized groups - Provisions to close digital divides - Local language considerations in AI solutions	- Does the document address inclusive AI development? - Are strategies in place to ensure rural or remote communities benefit from AI? - How are local languages or cultural nuances integrated into AI applications?	- Specific references to bridging digital divides - Mentions of e-inclusion or digital literacy programs - Evidence of multi-language or culturally adapted AI solutions

The final set of documents included a representative sample of existing AI frameworks, policies, legislation, case examples, academic reviews, industry reports, and the latest news articles relevant to the Asia-Pacific region. The analysis of these documents was then incorporated into the findings; the content of the selected documents was summarized in a series of tables, and interpretations were presented in the corresponding chapters.

Study informants

The informant interviews from the Asia-Pacific region were scheduled during the AI Standards and Governance workshops in Delhi from 5 to 8 May 2025. Additionally, two more consultations are scheduled; Cambodia (September 2025), and Malaysia (September 2025), and the document will be updated. A survey and group meeting format will be used to collect additional information and validate the study's findings.

Limitations of the study

Many countries may have limited public information about technology policies available in English or in easily accessible formats when conducting desktop reviews. The research utilized only English to search for and retrieve publicly available data. Official policy documents are often published in the local language, which makes it challenging to analyze the content without translation resources.

3. Preliminary findings

The Asia-Pacific region's LDCs, LLDCs, and SIDS span a vast expanse with significant geographic and economic diversity. Table 4 provides a brief overview of the countries, including geographic area, population, and GDP.

Table 4. Population and GDP of LDCs, LLDCs, and SIDS in the Asia-Pacific Region[4]

Country	Area (km^2)	Population (2022 est.)	Category	Official Language/s	GDP (USD, 2022)
Afghanistan	652,230	41,128,771	LDC, LLDC	Pashto, Dari	$14.3 billion
Bangladesh	148,460	171,186,372	LDC	Bengali	$460.2 billion
Bhutan	38,394	782,455	LDC, LLDC	Dzongkha	$2.53 billion
Cambodia	181,035	17,168,639	LDC	Khmer	$29.96 billion
Micronesia	702	114,164	SIDS	English	$0.42 billion
Fiji	18,274	924,610	SIDS	English, Fijian, Fiji Hindi	$4.54 billion
Kiribati	811	131,232	LDC, SIDS	English, Gilbertese (also known as Kiribati)	$0.23 billion
Laos	236,800	7,529,475	LDC, LLDC	Lao	$15.72 billion
Marshall Islands	181	41,569	SIDS	Marshallese, English	$0.27 billion
Maldives	300	523,787	SIDS	Dhivehi (Maldivian)	$5.8 billion
Mongolia	1,564,116	3,439,000	LLDC	Mongolian	$15.3 billion
Myanmar	676,578	55,227,143	LDC	Burmese	$59.5 billion
Nauru	21	12,511	SIDS	Nauruan, English	$0.13 billion
Nepal	147,516	30,896,590	LDC, LLDC	Nepali	$40.8 billion
Palau	459	18,055	SIDS	Palauan, English	$0.23 billion
Solomon Islands	28,896	721,159	LDC	English	$1.73 billion
Samoa	2,842	222,382	SIDS	Samoan, English	$0.87 billion
Timor-Leste	14,874	1,361,000	LDC	Tetum, Portuguese	$2.0 billion
Tonga	747	107,773	SIDS	Tongan, English	$0.55 billion
Tuvalu	26	11,204	LDC, SIDS	Tuvaluan, English	$0.06 billion
Vanuatu	12,189	334,506	LDC, SIDS	Bislama, English, French	$1.1 billion

The Asia-Pacific region includes several Least Developed Countries (LDCs), Landlocked Developing Countries (LLDCs), and Small Island Developing States (SIDS), all of which encounter unique developmental issues. In 2022, the population of LDCs in this region reached approximately 326.5 million people, alongside a combined GDP of USD 628.13 billion, showcasing notable economic potential despite persistent development

[4] Sources: World Bank 2023), (ITU). (2022). Asian Development Bank. (2023). DataCommons.org. (2023).

obstacles. Notably, Bangladesh emerged prominently with a GDP of USD 460.2 billion and a population exceeding 171 million.

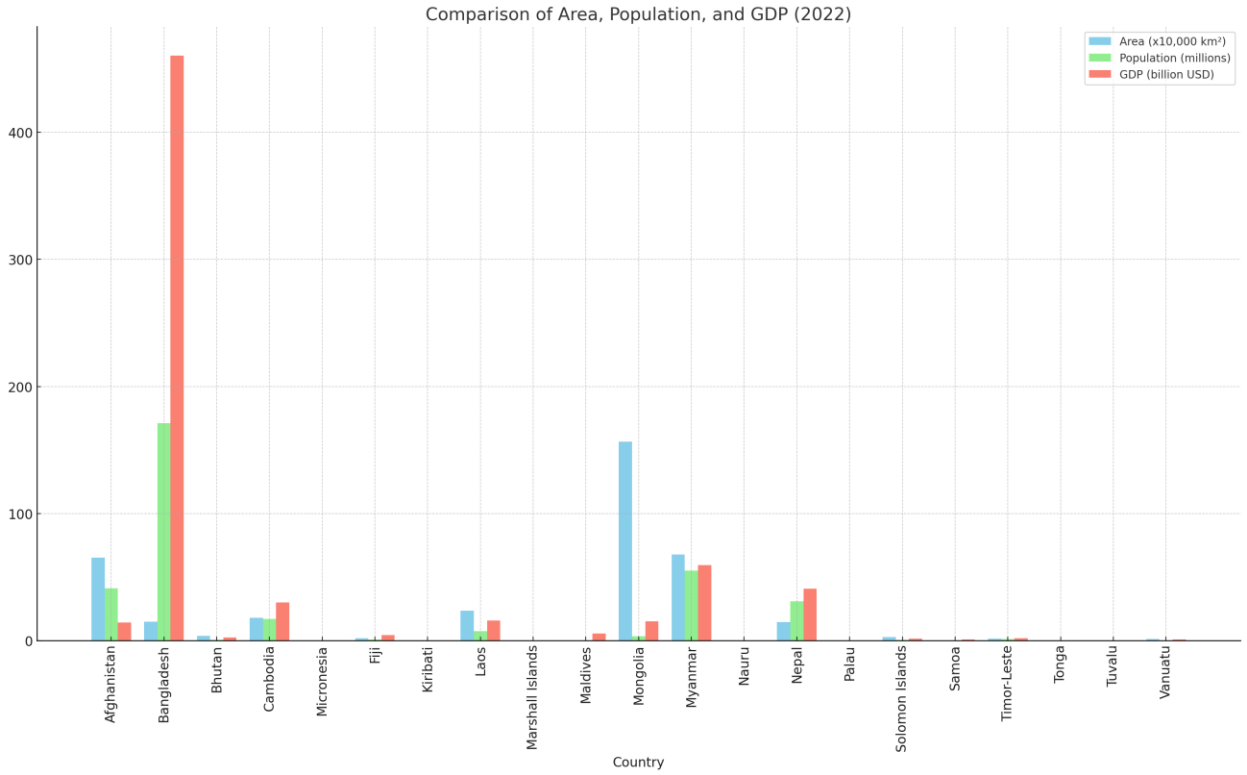

Figure 4. The combined bar graph comparing **Area**, **Population**, and **GDP** (2022) for selected Asia-Pacific countries: **Blue bars**: Area (scaled down by 10,000 km^2); **Green bars**: Population (in millions); **Red bars**: GDP (in billions USD).

LLDCs collectively had around 83.8 million people and a total GDP of USD 88.65 billion. Afghanistan stood out among these countries, boasting a population of over 41 million and a GDP of USD 14.3 billion, with Nepal and Laos following behind.

The SIDS of the region, known for their small land areas, had significantly smaller economies and populations. Together, their population was approximately 2.4 million, contributing to a total GDP of USD 14.2 billion. Fiji stood out with a GDP of USD 4.54 billion, while the Maldives followed at USD 5.8 billion, both showing comparatively stronger economic performance than other island nations.

Overall, the differences underscore substantial variations in population density, economic size, and developmental requirements among the categories, highlighting the need for customized support strategies for each group within the Asia-Pacific region.

Essential infrastructure needed for AI adoption

Infrastructure is especially vital in LDCs, LLDCs, and SIDS across the Asia-Pacific region due to challenges such as geographic isolation, limited connectivity, economic constraints, and vulnerabilities to climate change. In this study, infrastructure refers to the essential physical, digital, and institutional systems that facilitate the development, deployment, and sustainable use of AI technologies. While some literature includes human resources (skilled human capital) as part of infrastructure, this study elaborates human capital separately.

Table 5 provides a categorical list of infrastructure components needed to successfully deploy AI activities and their full-scale adoption at the national level.

Successful AI adoption in SIDS, LDCs, and LLDCs in the Asia-Pacific relies primarily on digital connectivity (elaborated at the end of this section). High-quality Internet access, broadband infrastructure, and reliable mobile networks establish the foundation for data transmission, cloud computing, and remote service delivery. These components are particularly crucial for reaching remote and underserved areas, ensuring that AI benefits are shared fairly across populations regardless of geography.

Reliable and affordable electricity is equally critical. AI systems, digital devices, and data centers depend on an uninterrupted power supply for seamless operation. In areas where power outages are frequent or electricity access is restricted, the performance and scalability of AI solutions face significant challenges. Therefore, developing a resilient energy infrastructure is vital for fostering stable AI ecosystems.

Computing infrastructure—including servers, data centers, and access to advanced processors like GPUs and TPUs—serves as the technical foundation of AI development. Countries need ample processing power and storage to effectively train, deploy, and scale AI applications. Additionally, cloud computing access is crucial for nations with limited on-site infrastructure, providing flexible and scalable computing resources.

The scalability of AI at a national level largely relies on a robust data infrastructure. Efficient systems for data collection, storage, and sharing are essential for training reliable AI models. Data quality, accessibility, and security significantly impact the performance of AI solutions. Cybersecurity infrastructure plays a supportive role by safeguarding data integrity, ensuring user trust, and bolstering national security in the digital era through firewalls, encryption, and identity verification mechanisms.

While not immediately apparent, physical infrastructure, including transport and logistics networks, is crucial. Roads, ports, and air transport facilitate the use of AI-driven tools across sectors such as healthcare, agriculture, and disaster management. Additionally, cloud and edge computing frameworks bolster AI development by allowing low-latency applications and ensuring operational capacity in areas with unreliable Internet access.

Ultimately, fostering human capital, establishing policy frameworks, and building innovation ecosystems are vital. Educational institutions and training centers cultivate local AI talent and enhance digital literacy. Strong policy and regulatory structures support ethical and sustainable AI implementation, while innovation hubs and research collaborations drive localized solutions. Collectively, these components form a vibrant and inclusive AI ecosystem tailored to the unique requirements of developing countries in the region.

Table 5. Infrastructure needs for AI adoption in LDCs, LLDCs, and SIDS in the Asia-Pacific Region[5]

Infrastructure Component	Description	Importance for AI Adoption
Digital Connectivity	Internet access, broadband infrastructure, mobile networks	Enables data transmission, cloud computing, and remote AI services. Fundamental for inclusive access in remote and rural areas.
Electricity and Power Supply	Reliable and affordable electricity	AI systems, data centers, and digital devices require uninterrupted power. Essential for running AI at scale.
Computing Infrastructure	Servers, data centers, GPUs/TPUs, cloud access	Provides the backbone for AI model training, deployment, and inference. Crucial for developing and scaling AI solutions.
Data Infrastructure	Data collection systems, storage, sharing platforms	High-quality, accessible, and secure data is key for AI training and decision-making.
Cybersecurity Infrastructure	Firewalls, encryption, identity management	Protects sensitive data and ensures trust in AI systems. Vital for national resilience and digital sovereignty.
Transport and Logistics Networks	Roads, ports, air transport, supply chains	Indirect but essential for physical deployment of AI-based solutions in health, agriculture, disaster response, etc.
Cloud and Edge Computing	Cloud platforms, edge devices, and infrastructure	Facilitates scalable and low-latency AI applications, especially in areas with intermittent connectivity.
Human Capital Infrastructure	Universities, technical schools, training centers	Develops AI talent, supports digital literacy, and builds local capacity for innovation and maintenance.
Policy and Regulatory Infrastructure	AI strategy, data governance, ethics frameworks	Ensures safe, equitable, and sustainable deployment of AI technologies. Also supports international collaboration and funding mechanisms.
Innovation and Research Ecosystems	Tech parks, incubators, R&D labs, public-private partnerships	Encourages local AI solutions tailored to contextual challenges in SIDS, LDCs, and LLDCs.

[5] Sources: Sources: World Bank (2021, 2023); ITU (2022); Asian Development Bank. (2023); and DataCommons.org. (2023).

Digital connectivity

Digital connectivity varies significantly among Least Developed Countries (LDCs), Landlocked Developing Countries (LLDCs), and Small Island Developing States (SIDS) in the Asia-Pacific region, highlighting differences in technological infrastructure and usage. Table 6 below presents the status of digital connectivity, including Internet penetration, mobile broadband subscriptions, and the average connection speed in the region.

Table 6. Status of digital connectivity in LDCs, LLDCs, and SIDS[6]

Country	Individuals Using Internet (%)	Mobile Broadband Subscriptions (per 100 people)	Average Connection Speed (Mbps)
Afghanistan	18.4%	21.5	
Bangladesh	39.5%	69.1	12.4
Bhutan	55.5%	88.6	15.2
Cambodia	54.5%	122.2	14.8
Micronesia (Fed. States)	41.2%	25.9	
Fiji	68.6%	98.2	17.5
Kiribati	23.1%	25.4	
Lao, PDR	47.7%	64.6	13.6
Marshall Islands	39.1%	30.6	
Maldives	67.2%	128.7	18.9
Mongolia	77.4%	115.3	25.1
Myanmar	41.0%	80.5	9.6
Nauru	48.2%	35.4	
Nepal	43.4%	57.2	7.8
Palau	74.2%	85.7	
Solomon Islands	24.6%	35.9	3.2
Samoa	38.7%	43.2	
Timor-Leste	32.1%	52.0	5.1
Tonga	45.9%	62.3	
Tuvalu	25.3%	29.1	
Vanuatu	36.2%	40.7	6.3

Internet usage across these nations shows considerable variation, ranging from a mere 18.4% in Afghanistan to 77.4% in Mongolia, which illustrates notable disparities in digital inclusion. Mongolia, alongside Bhutan (55.5%), Cambodia (54.5%), and Fiji (68.6%), has comparatively high adoption rates. In contrast, nations such as Kiribati (23.1%), the

[6] Source: GSMA. (2022). The Mobile Economy Asia Pacific 2022. GSMA.
International Telecommunication Union. (2023). *Measuring digital development: Facts and figures 2022*.
World Bank. (2023). *World Development Indicators: ICT*.
World Bank. (2023). *Mobile cellular subscriptions (per 100 people)*.

Solomon Islands (24.6%), and Tuvalu (25.3%) demonstrate markedly low Internet penetration rates.

Mobile broadband subscriptions per 100 individuals reveal considerable variation, with the Maldives leading at 128.7, trailed by Cambodia at 122.2 and Mongolia at 115.3. In contrast, nations such as Kiribati (25.4), Micronesia (25.9), and Tuvalu (29.1) exhibit low levels of mobile broadband access, highlighting a considerable need for advancements in connectivity infrastructure.

Internet connection speeds highlight disparities, with Mongolia leading at 25.1 Mbps, followed by the Maldives at 18.9 Mbps and Fiji at 17.5 Mbps. Meanwhile, Solomon Islands at 3.2 Mbps, Timor-Leste at 5.1 Mbps, and Nepal at 7.8 Mbps lag significantly, which may adversely affect digital services and economic growth.

These findings highlight the urgent need for focused investments and policy measures to close digital divides and improve connectivity infrastructure, fostering sustainable economic and social growth in these remote and at-risk areas.

Undersea cables and Internet connectivity

The undersea cables connecting the SIDS to major landing stations are crucial for sustainable AI deployment, providing essential Internet access. The map below illustrates the undersea cable networks interconnecting countries in the Asia-Pacific region, highlighting significant disparities in digital connectivity infrastructure. Major regional hubs such as Guam, New Zealand, Australia, and the United States (including Hawaii) serve as critical gateways, linking multiple island states through extensive submarine cable systems. These hubs facilitate vital international telecommunications and Internet connectivity, acting as anchors for regional digital integration.

However, several SIDS, including Kiribati, Nauru, Tuvalu, and the Marshall Islands, display limited cable connectivity, suggesting significant infrastructural vulnerability and heightened dependency on single or limited cable connections. Such limited infrastructure increases the risks associated with disruptions caused by natural disasters or technical failures, adversely affecting economic activities, governance, emergency responses, and overall socio-economic resilience.

In contrast, islands like Fiji and Papua New Guinea exhibit greater connectivity, benefiting from multiple cable landings, thus enhancing redundancy and reliability in their digital communications. The map underscores the strategic importance of investing in robust, redundant, and extensive submarine cable infrastructure to support resilient digital economies, reduce connectivity gaps, and foster sustainable economic growth and development among the region's more isolated and vulnerable nations.

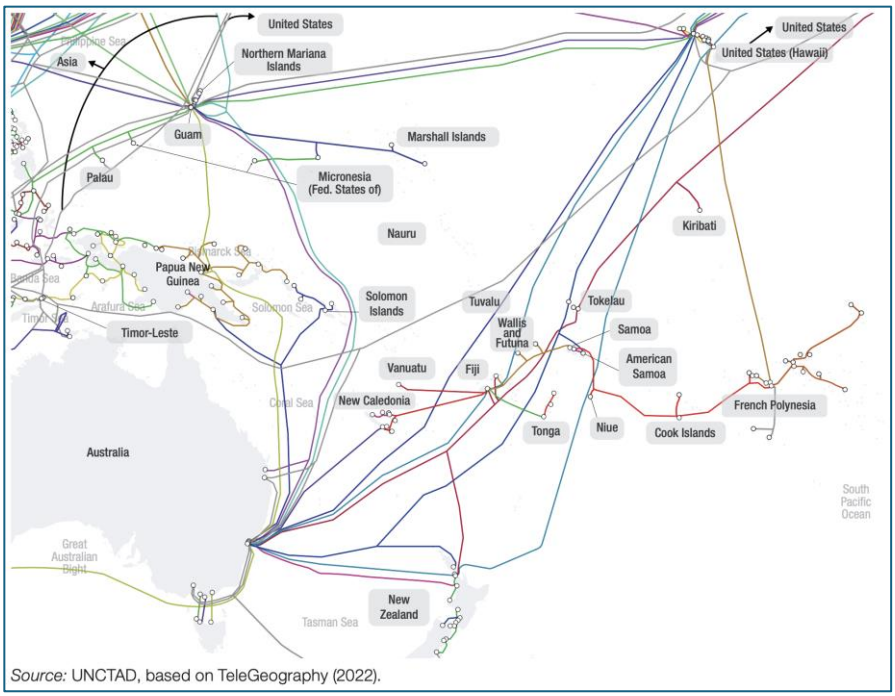

Figure 5. Submarine cable network connectivity in Pacific SIDS

Table 7 highlights significant variations in the digital infrastructure linking major island nations across the Asia-Pacific region via submarine cable systems. Fiji exhibits advanced connectivity through the Southern Cross and Southern Cross NEXT cables, offering capacities between approximately 10–25 terabits-per-second (Tbps), significantly enhancing Fiji's digital resilience and regional connectivity. Similarly, Sri Lanka benefit from multi-terabit-per-second cable systems, such as the APCN-2, EAC-C2C, and SEA-ME-WE series, positioning them as critical digital gateways within the Asia-Pacific.

Table 7. Selected undersea cables linking major Asia-Pacific islands[7]

Island / Island Group	Key Undersea Cable(s)	Approx. Cable Capacity	Main Landing Station(s)
Fiji	- Southern Cross Cable - Southern Cross NEXT	~10–25 Tbps (upgraded)	Suva (Viti Levu), Savusavu (Vanua Levu)
Papua New Guinea	- Coral Sea Cable System - APNG-2	~20–40 Gbps (APNG-2)	Port Moresby (PNG), Madang (PNG)
Solomon Islands	- Coral Sea Cable System	~20–40 Gbps	Honiara (Guadalcanal, Solomon Islands)
New Caledonia **(France)**	- Gondwana-1	~80 Gbps	Nouméa (New Caledonia)

[7] Source: International Telecommunication Union (ITU). (2022); Maldives Communications Authority. (2021); Southern Cross Cables. (2023); Submarine Telecoms Forum. (2023); TeleGeography. (2023); and World Bank. (2020).

French Polynesia **(Tahiti)**	- Honotua	~32 Gbps	Tahiti (French Polynesia)
Samoa	- Tui-Samoa Cable	~8–16 Gbps	Apia (Upolu Island), Tuasivi (Savai'i Island)
Tonga	- Tonga Cable System	~10 Gbps	Nuku'alofa (Tongatapu, Tonga)
Sri Lanka	SEA-ME-WE (Series) Bharat Lanka Cable	Up to multi–Tbps	Mount Lavinia, Colombo
Maldives	- Dhiraagu Cable Network - Maldives–Sri Lanka Cable	~1–2 Tbps (combined)	Hulhumalé (Greater Malé), Gan (Addu Atoll)

Conversely, several smaller island nations possess notably limited connectivity. Samoa (Tui-Samoa Cable, 8–16 Gbps), Tonga (Tonga Cable System, ~10 Gbps), and Solomon Islands (Coral Sea Cable System, ~20–40 Gbps) have considerably lower cable capacities, indicating limited bandwidth and increased susceptibility to connectivity disruptions. Papua New Guinea, despite its larger size, also faces bandwidth limitations with the APNG-2 and Coral Sea Cable, providing only moderate connectivity levels.

The Maldives maintains intermediate connectivity (~1–2 Tbps) through the Dhiraagu Cable Network and Maldives–Sri Lanka Cable, supporting a growing tourism-based digital economy. French territories, including New Caledonia (Gondwana-1, ~80 Gbps) and French Polynesia (Honotua, ~32 Gbps), have moderate but relatively lower capacities, underscoring opportunities for infrastructure enhancement. This summary highlights the crucial need for targeted infrastructure improvements, increased redundancy, and capacity upgrades to enhance digital resilience and support socio-economic development in less-connected Asia-Pacific island nations.

Institutional capacities and governance

Institutional capacities encompass national AI governance and strategy, regulatory and legislative frameworks (discussed in a separate section below), mechanisms for institutional coordination and collaboration, technical expertise and human resources (outlined in a separate section below), cybersecurity and risk management capabilities, as well as innovation and research capacities.

National AI Governance and Strategy enables countries to formulate comprehensive AI policies, strategies, and clear roadmaps at the national level (UNDP 2024). Developing robust legal and regulatory frameworks for data protection, privacy, ethical standards, and responsible use of AI is essential (Government of Mongoia, 2025). Institutional coordination and collaboration are necessary for AI oversight, policy coordination, and stakeholder engagement (World Bank, 2021). Capacity building through educational and training programs on data analytics, cybersecurity, and AI is critical (Asian Development Bank, 2020). Institutional capacity to manage cybersecurity risks, data protection, and operational vulnerabilities is essential. Innovations in AI and related research capacity with

academia, industry, and international organizations are pivotal in advancing the national AI agenda.

AI-related policies and legal frameworks

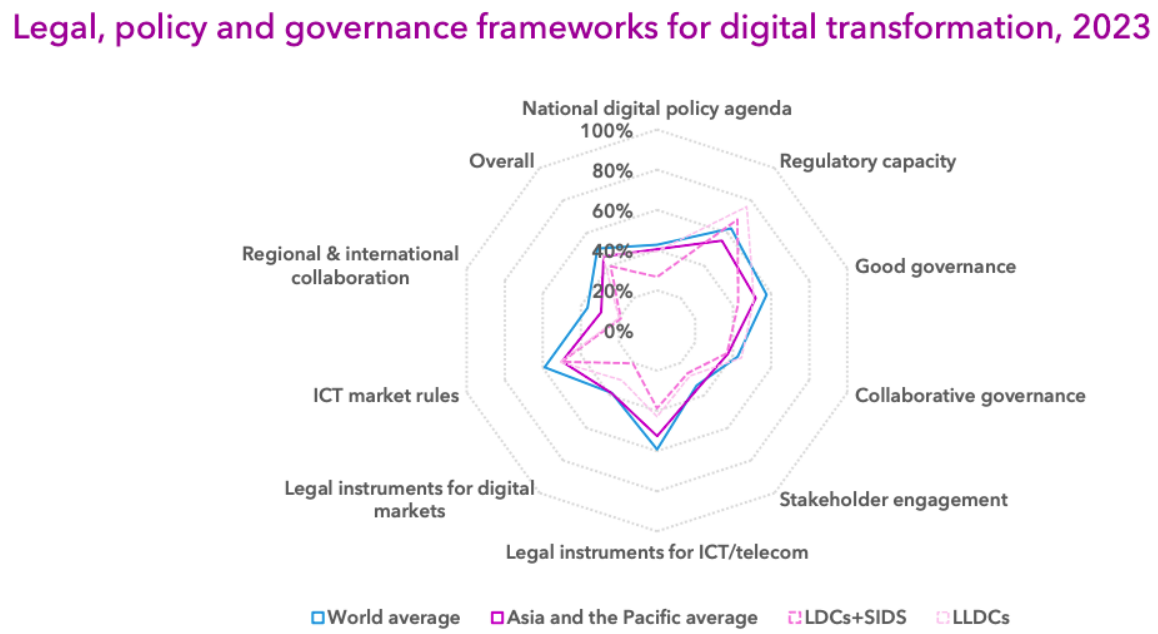

Figure 6. Progress on the nine benchmarks for the Asia-Pacific region (average for the group) compared to the world average and the average for LDCs and SIDS in the region (21 countries, including four members of the SIDS and LDCs groups). Source: ITU 2025

The study revealed that countries in the Asia-Pacific region exhibit varying degrees of policies and frameworks related to AI adoption. While some countries have frameworks specifically designed for AI, others employ a combination of frameworks that support the development and deployment of AI technologies in the region.

Figure 6 provides a comparative assessments of various criteria essential for digital transformation across different regions and country groupings, assessed by ITU. Specifically, it compares the world average, Asia and the Pacific average, LDCs combined with SIDS, and LLDCs based on multiple indicators. These indicators include national digital policy agenda, regulatory capacity, good governance, collaborative governance, stakeholder engagement, legal instruments for ICT/telecom, legal instruments for digital markets, ICT market rules, and regional and international collaboration.

A key insight from this chart is that the Asia-Pacific region consistently performs above the world average across most categories, highlighting its relatively strong foundation in legal, policy, and governance frameworks conducive to digital transformation. This advantage is particularly notable in national digital policy agendas and regulatory capacity, underscoring the region's proactive approach to digital readiness and governance.

Conversely, LDCs and SIDS demonstrate significantly lower scores across all measured dimensions. They notably lag behind in critical areas such as regulatory capacity, good governance, and legal instruments related to ICT and digital markets. The performance gap indicates substantial challenges these countries face in establishing comprehensive frameworks necessary for effective digital transformation, potentially impeding their progress towards digitalization goals.

LLDCs similarly exhibit performance below both the world and Asia-Pacific averages but fare slightly better than the LDCs and SIDS group across most categories. Their greatest strengths relative to the other vulnerable groups lie in having clearer national digital policy agendas and slightly better frameworks for stakeholder engagement. However, persistent weaknesses remain in terms of regulatory capacity, collaborative governance, and regional and international collaboration, reflecting systemic vulnerabilities that require targeted policy interventions and international support to address effectively.

The study further highlights the varying maturity levels of AI-related policies across different countries in the Asia Pacific region. Table 8 provides examples of the region's AI-related national policies and framework documents that have been publicly available.

Table 8. AI-related national policies and framework documents

Country	Document	Year	Reference
Afghanistan	None found		
Bangladesh	National Artificial Intelligence Policy 2024	2024	Ministry of Posts, Telecommunications and Information Technology. (2024). National Artificial Intelligence Policy 2024.
Bhutan	Artificial Intelligence Readiness Assessment (AIRA) 2024	2024	United Nations Development Programme. (2024). *Artificial Intelligence Readiness Assessment (AIRA) 2024*.
Cambodia	Cambodia Digital Government Policy 2022–2035	2022	Ministry of Post and Telecommunications. (2022). *Cambodia Digital Government Policy 2022–2035*.
Federated States of Micronesia	Digital Federated States of Micronesia Project	2020	World Bank. (2020). *Federated States of Micronesia - Digital Federated States of Micronesia Project*.
Fiji	AI Governance Framework -under development	2024	Tech in Pacific. (20 Mar 2024). *Fiji progresses towards establishing AI governance framework*.
Kiribati	None found publicly	-	-
Lao, PDR	Digital Government Master Plan	2024	Ministry of Technology and Communications, Lao PDR. (2024). *Digital Government Master Plan (Draft)*
Marshall Islands	Digital Republic of the Marshall Islands Project	2021	World Bank. (2021). *Marshall Islands - Digital Republic of the Marshall Islands Project*.
Maldives	Development of a National AI Strategy – in preparation	2024	Maldives Voice. (9 Sep 2024). *Maldives to develop AI strategy for economic growth*.

Mongolia	National Artificial Intelligence (AI) Vision and Strategy	2025	Ministry of Digital Development, Innovation and Communications. (3 Feb 2025). *Ministry of Digital Development, Innovation and Communications and UNDP Partner to Advance Mongolia's Artificial Intelligence Readiness and Strategy*.
Myanmar	National Artificial Intelligence (AI) Strategy and Policy	2025	Xinhua. (19 Feb 2025). *Myanmar drafts national AI strategy, policy*.
Nauru	Nauru Digital Strategy 2020–2025	2024	Nucamp. (2024). *Inside Nauru's Thriving Tech Hub: Startups and Success Stories*
Nepal	National AI Policy 2025	2025	The Annapurna Express. (12 Feb 2025). *National AI Policy 2025: Promise, pitfalls and the path ahead*.
Palau	Palau Development Plan 2023–2026	2023	Government of Palau. (2023). *Palau Development Plan 2023–2026*.
Solomon Islands	None found publicly	-	-
Samoa	National Digital Transformation Strategy	2022	United Nations Development Programme. (16 Dec 2022). *Samoa's Digital Strategy takes another step closer to being realized*.
Timor Leste	Timor Digital 2032	2023	Government of Timor-Leste. (2 June 2023). *Government launches strategic plan "Timor Digital 2032"*.
Tonga	Tonga Digital Government Strategic Framework 2019–2024	2019	Government of Tonga. (2019). Tonga Digital Government Strategic Framework 2019–2024.
Tuvalu	Digital Health Implementation Guide for the Pacific	2020	Asian Development Bank. (2020). *Implementing Digital Health in the Pacific: A Guide*
Vanuatu	None found publicly	-	-

A comparative analysis of AI-related national policies in SIDS, LDCs, and LLDCs across the Asia-Pacific reveals varying levels of engagement and preparedness. Countries such as Bangladesh, Myanmar, Mongolia, and Nepal stand out for having formalized or recently drafted national AI strategies and policies, all dated 2024 or 2025. These countries are clearly prioritizing AI development through state-led initiatives and international partnerships, reflecting growing political will and alignment with global digital transformation trends.

In contrast, countries like Afghanistan, Kiribati, Solomon Islands, and Vanuatu have no documented AI-related policies or frameworks. This gap suggests challenges in national capacity, resource availability, or political stability that may hinder policy formulation. These nations may also be prioritizing more fundamental digital infrastructure or governance needs before advancing to AI-specific agendas.

A notable group of countries—such as Cambodia, Fiji, Lao PDR, Maldives, Marshall Islands, and Timor-Leste-are focusing on broader digital government or digital

transformation strategies that embed AI-related objectives. While not dedicated AI policies per se, these frameworks signal intent to integrate AI within national development plans and could serve as a foundation for more targeted strategies in the future.

Development partners like the World Bank, UNDP, and ADB appear instrumental in supporting the digital and AI readiness journeys of these countries. Regional collaboration, technical assistance, and knowledge exchange are likely to remain crucial as more Asia-Pacific LDCs, LLDCs, and SIDS progress from general digital transformation plans to specialized AI governance and innovation ecosystems.

The table 9 below presents an overview of AI-related policy or legislative statements from countries in the Asia-Pacific region, highlighting their varied approaches to AI development and integration. Key themes across these nations include ethical frameworks, regulatory measures, data protection, industry integration, and human capital development. Prominent economies such as China, India, Australia, and Japan demonstrate comprehensive national strategies focusing on AI as a strategic sector, with clear goals to drive economic growth, societal progress, and maintain global competitiveness.

Table 9. Sample policy and legislative statements and excerpts on AI adoption

Country	Sample AI-Related Policy/Legislative Paragraph	Year	Reference
Australia	"To promote the ethical development of AI, the Commonwealth encourages responsible innovation, supports R&D in emerging technologies, and collaborates with industry to ensure that AI solutions respect privacy, security, and human rights."	2021	Australian Department of Industry, Science, Energy and Resources. (2021).
China	"The State shall prioritize AI as a strategic technology, fostering open innovation ecosystems, guiding the formation of AI industry clusters, and encouraging the integration of AI with manufacturing, healthcare, and education to accelerate economic and societal progress."	2017	China State Council. (2017).
India	"To ensure inclusive growth, AI applications will be leveraged in healthcare, agriculture, and education. The government shall facilitate data-sharing frameworks and skill development programs, aiming to position India as a global hub for AI innovation."	2018	India NITI Aayog. (2018). *National strategy for artificial intelligence*.
Indonesia	"National development policies shall integrate AI research to strengthen governance, improve public services, and enhance industrial competitiveness, ensuring that ethical guidelines and data security standards are embedded in all AI-driven initiatives."	2020	Indonesia Ministry of Research and Technology / National Research and Innovation Agency. (2020).
Japan	"The government shall invest in AI R&D and human capital development while upholding transparency, safety, and global ethical standards, thereby fostering AI-driven growth in	2021	Japan Cabinet Office. (2021)

	transport, healthcare, and other priority sectors for societal benefit."		
Malaysia	"This roadmap ensures that AI technologies are harnessed to create economic value and improve public service delivery, underpinned by data governance, workforce upskilling, and strategic public-private partnerships to build an AI-ready environment."	2021	Malaysia Ministry of Science, Technology and Innovation. (2021).
Philippines	"AI-led innovations shall advance local industries, with special focus on manufacturing, agriculture, and government operations. Regulatory measures will protect citizen data while encouraging domestic AI startups and collaborative research initiatives."	2021	Philippines Department of Trade and Industry. (2021).
Singapore	"We aim to develop AI solutions that enhance quality of life, from healthcare to urban planning, while instituting robust ethics guidelines and governance frameworks to maintain public trust and preserve social harmony."	2019	Info-communications Media Development Authority (IMDA). (2019).
South Korea	"Under the National AI Strategy, government agencies shall promote research collaboration, support AI startups, and ensure equitable access to AI technology. Ethical standards and legislative frameworks will protect citizens from misuse or discrimination."	2019	Korea Ministry of Science and ICT. (2019).
Thailand	"To drive digital transformation, public institutions shall apply AI in service delivery, regulatory reform, and risk management. The roadmap emphasizes data-driven decision-making, ethical AI development, and educational programs to cultivate AI expertise."	2022	Thailand Ministry of Digital Economy and Society. (2022).
Vietnam	"The state encourages AI R&D through tax incentives and grants, promoting integration of AI across industries to bolster socio-economic development. Data privacy, cybersecurity, and bias mitigation remain core legislative priorities."	2021	Vietnam Ministry of Science and Technology. (2021).
New Zealand	"Emerging technologies, including AI, shall be harnessed to bolster inclusive growth and sustainable development, guided by culturally responsive frameworks that respect indigenous data sovereignty and community engagement."	2022	New Zealand Ministry of Business, Innovation and Employment. (2022).
Papua New Guinea	"Government directives encourage the exploration of AI's potential in e-government and service delivery. While no dedicated AI law exists, legislation on data protection and ICT oversight implicitly covers AI applications."	—	Government of Papua New Guinea. (2020).
Fiji	"Digital transformation efforts may incorporate AI-based solutions for improved healthcare and disaster resilience, provided privacy safeguards and capacity-building initiatives accompany such deployments, especially in rural communities."	—	Fiji Ministry of Communications. (2018).

Sri Lanka	"AI applications in finance, e-government, and public services shall uphold local data protection regulations and ethical standards. Efforts to develop local AI talent and infrastructure form an integral part of the national digital strategy."	2020	Information and Communication Technology Agency (ICTA). (2020).
Myanmar	"Under ongoing digital reforms, emerging technologies such as AI must be assessed for relevance and responsibly introduced, with preliminary legislative measures to ensure privacy, transparency, and equitable access."	—	Ministry of Transport and Communications (Myanmar). (2020).
Mongolia	"In the pursuit of a 'Digital Mongolia,' the government shall explore AI solutions for e-governance, mining optimization, and rural health services, ensuring regulatory frameworks evolve to address ethical and security concerns."	2021	Government of Mongolia. (2021).
Laos	"Though AI adoption is at a nascent stage, the government recognizes the potential of advanced ICT solutions to spur economic modernization and improve public welfare, subject to guidance on data governance and capacity building."	—	Ministry of Posts and Telecommunications (Laos). (2021).
Cambodia	"As part of the Digital Economy and Society Policy, stakeholders are encouraged to pilot AI-driven initiatives that enhance productivity, particularly in agriculture and industry, while adhering to data protection regulations."	2021	Royal Government of Cambodia. (2021).
Brunei Darussalam	"AI is highlighted under the Digital Economy Masterplan for improved public sector efficiency and future-ready jobs; legislative frameworks will incorporate ethical guidelines and operational standards."	2020	Brunei Darussalam. (2020).
Maldives	"National digital strategy documents underscore the potential of AI in tourism and public service delivery, contingent on robust data privacy and security legislation."	2022	Ministry of Environment, Climate Change and Technology (Maldives). (2022).

Mid-tier and developing economies including Indonesia, Malaysia, the Philippines, Singapore, and South Korea emphasize integrating AI in public services, healthcare, agriculture, education, and urban planning. These nations underline the importance of robust ethical and governance frameworks designed to build public trust and ensure responsible innovation. Policies often highlight public-private collaboration, workforce upskilling, and sector-specific growth strategies to leverage AI effectively and inclusively.

Smaller or less digitally advanced economies such as Mongolia, Cambodia, Laos, Myanmar, Fiji, Papua New Guinea, and Maldives reveal an early-stage approach characterized by exploratory initiatives and foundational policy development. These countries typically stress the potential of AI in enhancing government operations, disaster resilience, tourism, agriculture, and public welfare, contingent upon improvements in data governance, legislative clarity, and institutional capacity building. Overall, despite varying

levels of maturity, there is a regional consensus that strategic, ethical, and inclusive adoption of AI technologies is critical for sustainable development and modernization.

Ethical use of AI

The ethical application of AI in national contexts is an emerging focus, as the connection between ethics and AI is nuanced and open to interpretation. Table 10 below showcases various examples of perceived unethical uses of AI, aiding in understanding the complexities and formulating tailored policies for ethical AI use. Although literature on LDCs, LLDCs, and SIDS is limited, this table offers essential information for Member States to prevent the harmful misuse of AI that could negatively impact the public.

Table 10. Examples of perceived inappropriate use of AI

Domain	Example of AI Misuse	Reference
Education	Intrusive AI-based proctoring systems compromising student privacy and fairness Misuse of AI-powered proctoring systems invading student privacy and unfairly penalizing students.	Electronic Frontier Foundation. (2022).
Employment	Bias in AI recruitment algorithms causing discrimination in hiring practices and employee monitoring.	Ajunwa, I. (2022).
Finance	AI-driven automated credit scoring leading to racial and economic discrimination	Aggarwal, N., and Jones, K. (2021).
Health	Misuse of AI diagnostic tools resulting in inaccurate medical diagnoses and patient care decisions Creating and distributing deepfake and revenge pornographic images	Topol, E. J. (2023).
Law Enforcement	Misuse of facial recognition technology resulting in wrongful arrests and biases	Amnesty International. (2021).
Military	Misuse of autonomous weapon systems raising ethical and humanitarian concerns	International Committee of the Red Cross (ICRC). (2021).
Political Campaigns	Use of deepfakes and AI-generated misinformation to manipulate elections.	Council on Foreign Relations (2023)
Politics	Creation and dissemination of deepfakes for political disinformation and manipulation	Chesney, R., and Citron, D. K. (2023).
Social Scoring	Use of AI-driven social scoring systems leading to discrimination and privacy violations and surveillance.	European Commission. (2021).
Surveillance	AI-powered mass surveillance infringing on individual privacy rights	Human Rights Watch. (2023).

The table presents examples of inappropriate AI applications in various sectors, emphasizing important ethical, legal, and social issues. AI proctoring systems often intrude on student privacy and impose unfair penalties in education. These practices prompt essential discussions about the ethical limits of surveillance and the consequences for students' rights and fair treatment in educational settings.

In the employment and finance industries, the incorporation of AI algorithms has resulted in significant discrimination concerns. AI recruitment systems exhibit biases that cause unfair hiring practices and troubling employee monitoring, which may exacerbate existing disparities in job access. Likewise, AI-driven automated credit scoring systems have disproportionately affected marginalized communities, resulting in racial and economic discrimination. These challenges underscore the urgent need for transparent, accountable, and bias-free algorithms in sectors with substantial economic implications.

The healthcare and law enforcement sectors face significant issues stemming from AI misuse, which severely impacts individual welfare. AI diagnostic tools can occasionally deliver erroneous medical diagnoses and inappropriate patient care choices, jeopardizing patient safety and health. Moreover, the improper use of facial recognition technologies by law enforcement has resulted in wrongful arrests and increased societal biases, prompting urgent questions regarding accuracy, accountability, and the safeguarding of civil rights.

Ultimately, serious abuses in areas like the military, political campaigns, social scoring, and surveillance reveal widespread societal dangers. The use of autonomous weapon systems has sparked deep ethical and humanitarian questions regarding accountability in military operations. In addition, political interference via deepfakes and misinformation has skewed democratic systems. Systems powered by AI for social scoring and mass surveillance have violated individual privacy and liberty, resulting in biased outcomes and the growth of surveillance states.

Overall, these examples highlight the critical need for comprehensive regulations and ethical standards to steer the responsible implementation of AI across sectors.

Human resources

Implementing artificial intelligence (AI) at the national level necessitates a broad range of human resource skills and multidisciplinary expertise spanning various institutions, sectors, and fields. Effective execution requires not just technical know-how but also the incorporation of policy, ethics, and education frameworks (UNESCO, 2021).

Technical specialists play a crucial role in implementing national AI strategies. Key roles involve AI and machine learning engineers, data scientists, data analysts, data engineers, cloud architects, robotics engineers, and experts in natural language processing, computer vision, cybersecurity, and AI ethics (OECD, 2021). These professionals facilitate the design, development, and large-scale deployment of AI systems.

In addition, other professionals are essential for the governance and management of AI initiatives in a responsible manner. This group includes policymakers knowledgeable about AI, legal advisors focused on data protection and AI regulations, ethicists, and social scientists trained to evaluate AI's impact on society. Furthermore, experts in intellectual property, technology compliance officers, and AI project managers are crucial in ensuring that technical implementations align with ethical and legal requirements. A comprehensive skills framework for overseeing national AI programs can be found below in Table 11 (ITU, 2022).

To promote long-term sustainability, national strategies should also focus on education and capacity building. There is a demand for curriculum developers specializing in STEM and AI to refresh educational materials, and trainers who can reskill workers for roles that integrate AI are crucial for sustaining a competitive workforce. For Least Developed Countries (LDCs), Landlocked Developing Countries (LLDCs), and Small Island Developing States (SIDS), focused capacity development is crucial for nurturing local talent that can manage and enhance national AI ecosystems (UNESCAP, 2022).

Table 11. Key skill sets for AI project management at the national level

Skill Set	Description	References
Technical Understanding of AI and Data Science	Familiarity with machine learning algorithms, data preprocessing, model evaluation, and computational requirements.	IBM. (2020). Russell, S., and Norvig, P. (2021).
Project Management Expertise	Proficiency in methodologies (Agile, Scrum), effective scope definition, scheduling, and risk management tailored to AI's experimental nature.	Project Management Institute. (2021). Larson, E. W., and Gray, C. F. (2021
Collaboration and Communication	Ability to coordinate cross-functional teams (data scientists, engineers, domain experts), translate technical concepts for stakeholders, and foster teamwork.	De Mauro, A., Greco, M., and Grimaldi, M. (2018); McKinsey and Company. (2019).
Domain Knowledge	Understanding of the specific industry (e.g., healthcare, finance) including regulations, standards, and contextual nuances for AI-driven solutions.	Davenport, T. H., and Ronanki, R. (2018); Dwivedi, Y. K. et al. (2021).
Strategic Thinking and Business Acumen	Aligning AI projects with organizational goals, conducting cost-benefit analyses, and planning for scalability and ROI.	Barton, D., Woetzel, J., and Seong, J. (2017); Davenport, T. H. (2018).
Ethical and Responsible AI	Identifying and mitigating bias, protecting data privacy, ensuring transparency, and adhering to legal and societal standards.	Jobin, A., Ienca, M., and Vayena, E. (2019); High-Level Expert Group on Artificial Intelligence. (2020).

Financing AI adoption at the national level

AI adoption at the national level requires sustainable funding. Table 12 provides a sample list of eight cost categories for AI implementation and adoption at the national level.

A crucial category of financing is *AI infrastructure and computing resources*. National AI strategies greatly depend on strong digital infrastructure, encompassing data centers, high-performance computing (HPC) resources like GPU/TPU clusters, and network advancements such as broadband and 5G connectivity. These elements constitute the essence of AI ecosystems by providing the scalable, secure, and high-speed environments necessary for training and deploying AI systems. Without this foundational layer, other AI activities would encounter considerable hurdles in processing power and data availability.

Successful AI implementation relies on robust *data management and governance*. This involves creating national data repositories and open data portals that adhere to stringent quality standards and privacy regulations. It is essential to have cybersecurity measures and to comply with ethical data-use policies to safeguard citizens' rights and foster trust. Effective data governance guarantees the integrity and security of AI inputs while facilitating improved interoperability and reuse across different sectors.

Table 12. Sample cost categories for AI Implementation at the national level

Cost Category	Description	Reference
Infrastructure Development	Costs related to establishing the physical and technological infrastructure necessary for AI deployment.	OECD. (2021). OECD Digital Economy Outlook 2021. OECD Publishing. https://doi.org/10.1787/bb167041-en
Research and Development	Expenditures on AI research activities, including funding for research institutions and innovation hubs.	UNESCO. (2022). Artificial Intelligence Needs Assessment Survey in Africa. UNESCO Publishing.
Data Acquisition and Management	Investments needed for data collection, storage, and management frameworks necessary for effective AI usage.	World Bank. (2021). World Development Report 2021: Data for Better Lives. World Bank Publications.
Regulatory and Policy Frameworks	Costs associated with the creation, implementation, and enforcement of legal and ethical AI regulations.	European Commission. (2020). White Paper on Artificial Intelligence: A European Approach. COM(2020) 65 final.
Human Capital and Skills Training	Expenses for education, training programs, workforce upskilling, and	World Economic Forum. (2020). The Future of Jobs Report 2020. World Economic Forum.

	capacity-building initiatives.	
Public Engagement and Awareness	Costs incurred through campaigns, consultations, and outreach programs to increase public awareness and acceptance.	Government of Canada. (2021). Directive on Automated Decision-Making. Treasury Board of Canada Secretariat.
Cybersecurity and Risk Management	Investments to safeguard AI systems, protect data, and manage cybersecurity risks effectively.	National Institute of Standards and Technology (NIST). (2020). AI Risk Management Framework. NIST.
Monitoring, Evaluation, and Audits	Funds allocated for ongoing monitoring, evaluation, and audit mechanisms for AI systems and policy effectiveness.	United Nations. (2022). Roadmap for Digital Cooperation. United Nations Publications.

Investing in *research and development* is crucial for driving local AI innovation. Mechanisms like research grants, AI innovation centers, and pilot project testbeds cultivate an environment ripe for experimentation and refinement. Additionally, public-private partnerships play a vital role in translating research findings into practical uses. By backing *pilot projects* in targeted sectors, governments can evaluate the real-world effects prior to extensive implementations.

Building a *skilled workforce* is vital for maintaining AI ecosystems. This involves incorporating AI and machine learning into university programs, reskilling civil servants, and providing scholarships or fellowships in AI-related areas. Emphasizing human capital guarantees a consistent influx of professionals who can design, implement, and oversee AI systems while improving *digital literacy* throughout the public sector.

Creating *legal and ethical guidelines* is essential for the responsible implementation of AI. Governments must craft legislation, conduct public consultations, and develop regulatory sandboxes for testing AI systems in controlled settings. Ethical frameworks ensure that AI deployment aligns with human rights and societal values, promoting transparency, fairness, and accountability in decision-making processes.

Funding initiatives for *AI in specific sectors* is crucial for maximizing its potential. Integrating AI into vital areas like healthcare, agriculture, education, and finance helps governments tackle national priorities. For example, AI can improve telemedicine, facilitate precision agriculture, enhance online learning platforms, and boost fraud prevention in financial services. Setting aside budgets for these applications ensures that AI technologies provide measurable public benefits and economic gains.

Establishing public trust is crucial for effectively adopting AI. Governments should *invest in AI-related initiatives* that boost awareness through campaigns, community workshops, and straightforward *educational materials* that explain AI concepts. By actively involving the public, these initiatives can reduce misconceptions, prepare citizens for workforce changes, and build confidence in government-led AI projects, thereby reinforcing social acceptance as a key component of national AI strategies.

All national AI initiatives must be regularly monitored and evaluated. Ongoing assessment guarantees that AI projects provide value and maintain accountability. This process includes establishing performance metrics, evaluating social and economic effects, and integrating feedback loops to enhance policies and programs. Furthermore, scalable frameworks are essential for broadening the reach of successful pilot projects across different regions or sectors, ensuring that initial investments lead to enduring systemic advantages.

4. Potential barriers to AI adoption

The study identified potential barriers to AI adoption, broadly classified into infrastructure deficits, cultural and linguistic challenges, human resource constraints, funding challenges, ICT obstacles, policy barriers, and organizational barriers.

Infrastructure deficits

The infrastructure barriers in Asia-Pacific SIDS are multifaceted, involving connectivity, redundancy, cost, geographic dispersion, local technical capacity, affordability, and bandwidth limitations. Collectively, these barriers impede equitable and sustainable ICT development and require targeted interventions and international support to overcome. The table below provides a summary of the infrastructure barriers in Asia-Pacific Small Island Developing States (SIDS).

Table 13. Infrastructure barriers in Asia-Pacific SIDS

Country / Island Group	Infrastructure Barriers	Rational	Reference
Fiji	Limited Submarine Cable Redundancy	Many routes rely on a single international cable, creating vulnerability to outages.	ITU. (2022); World Bank. (2021).
	High Cost of Satellite Services	Remote islands still depend on satellite backhaul, which is expensive to deploy and maintain.	Pacific Community (SPC). (2021).
Kiribati	No or Single Cable Connection	Many atolls rely on satellite due to lack of undersea cable access, resulting in low bandwidth and high latency.	United Nations Conference on Trade and Development (UNCTAD). (2022).
	Low Mobile Penetration	Scattered population across atolls makes infrastructure rollout costly; mobile coverage <60%.	ITU. (2022).
Marshall Islands	High O&M Costs for Infrastructure	Operational and maintenance costs for undersea cables, satellite services, and terrestrial networks are disproportionately high due to remoteness and small economies of scale.	World Bank. (2020); UN-OHRLLS. (2021).
	Lack of Local Technical Capacity	Skilled ICT workforce is limited, slowing network upgrades and troubleshooting.	ITU. (2021).
Samoa	Bandwidth Constraints	While Samoa has submarine cable access, capacity upgrades can be slow and costly, affecting service quality, especially in rural areas.	Asian Development Bank (ADB). (2021).
	Expensive Mobile Broadband	Consumer broadband prices remain high, making internet access less affordable for low-income households.	UNCTAD. (2022).

Solomon Islands	Geographic Dispersion of Islands	More than 900 islands spread over large distances complicate infrastructure deployment and maintenance.	World Bank. (2021).
	Limited Domestic Fiber Backbone	Most connectivity concentrated around the capital (Honiara), leaving outer islands reliant on satellite or microwave links.	ITU. (2022).
Tonga	Vulnerability to Cable Breaks	Tonga experienced multiple nationwide internet outages due to undersea cable damage from natural disasters, highlighting the need for redundancy.	SPC. (2021); World Bank. (2020).
	High Satellite Costs for Back-up	Satellite is still the main backup option, but capacity and cost issues persist.	UNCTAD. (2022).
Tuvalu	No Submarine Cable Connection	Relies almost entirely on satellite-based internet, leading to low speeds and high latency.	ITU. (2022); SPC. (2021).
	Affordability Challenges	High per capita operating costs make broadband prices unaffordable for many citizens.	UN-OHRLLS. (2021).
Vanuatu	Submarine Cable Gaps Among Islands	While the main island has cable access, smaller islands rely on lower-capacity links, creating uneven coverage.	World Bank. (2020); SPC. (2021).
	Limited Local Data Centers	Most data hosting remains overseas, raising latency and data sovereignty issues.	UNCTAD. (2022).

Connectivity and Redundancy: Fiji, Tonga, and Vanuatu face challenges due to limited redundancy in submarine cable infrastructure. Fiji's reliance on single international cables creates significant vulnerability, while Tonga has already experienced nationwide Internet outages following cable damage from natural disasters, underscoring the urgent need for additional redundancy. Similarly, Vanuatu experiences uneven connectivity, with submarine cable access primarily benefiting the main island, leaving smaller islands dependent on limited-capacity satellite or microwave links.

Dependence on Costly Satellite Services: Satellite-based connectivity remains essential but expensive for several SIDS, notably Fiji, Kiribati, Tonga, and Tuvalu. In Kiribati, submarine cable connections' absence or limited presence means most atolls rely heavily on satellites, resulting in persistent bandwidth limitations and high latency. Fiji's remote islands, Tonga's reliance on satellites as a backup, and Tuvalu’s near-total dependence on satellites further emphasize this infrastructure barrier's costly and performance-limiting impact.

Economic and Operational Challenges: Due to their remote locations and limited economies of scale, the Marshall Islands and Tuvalu encounter disproportionately high operational and maintenance (O&M) costs. These heightened costs significantly affect the affordability and sustainability of Internet infrastructure. The Marshall Islands, in particular, face pronounced difficulties managing and maintaining diverse ICT infrastructure, adding pressure to already constrained resources.

Geographic and Technical Constraints: The Solomon Islands and Kiribati exemplify the challenges of geographic isolation, with dispersed populations complicating both infrastructure deployment and service delivery. Solomon Islands' extensive dispersion across more than 900 islands and Kiribati's scattered atolls significantly increases the complexity and cost of infrastructure deployment and maintenance, leading to uneven coverage and limited accessibility. Additionally, the Marshall Islands face a shortage of local technical expertise, constraining network improvements and efficient operations.

Affordability and Bandwidth Issues: High broadband prices and bandwidth constraints hinder widespread Internet access in Samoa, Tuvalu, and the Solomon Islands. Despite having access to submarine cables, Samoa faces expensive and slow capacity upgrades, which particularly affect service quality in rural areas. In Tuvalu and Samoa, high broadband costs disproportionately impact low-income populations, worsening digital inequality. Additionally, the limited domestic fiber infrastructure in the Solomon Islands leads to dependence on less effective satellite or microwave links outside the capital, further undermining service quality and affordability.

Sociocultural barriers

Language diversity and low linguistic representation in content are cultural and linguistic barriers to AI adoption at the national level**.** The limited development of AI applications in local languages restricts effective AI adoption, with usability identified as a key barrier (Joshi et al., 2020). The dominance of AI systems trained primarily on datasets from significant languages such as English and Chinese diminishes their effectiveness and applicability in LDC contexts (ITU and UNESCO, 2019).

Cultural hesitance or resistance stemming from fears of job displacement, loss of privacy, or a misunderstanding of AI benefits is another key barrier primarily linked to generational gaps (OECD, 2020). The absence of culturally appropriate communication strategies and public awareness campaigns contributes to misunderstandings or skepticism toward AI technologies (UNESCO, 2019). Cultural biases and gender disparities that limit inclusive participation, particularly impacting the integration of women and marginalized groups into AI-driven economies, are also recognized as a barrier (World Bank, 2021).

A deep-rooted mistrust or suspicion of technology stemming from concerns about surveillance, privacy breaches, and historical misuse is a barrier to fully utilizing AI technologies (IEEE, 2020). Furthermore, cultural inequalities exacerbate the unequal access to digital technologies, hindering the equitable distribution of AI benefits (ITU, 2021). Lastly**,** AI systems are predominantly developed with western-centric data, leading to biases and diminished applicability in culturally diverse contexts (Stanford University, 2023).

Human resource constraints

A primary challenge in advancing artificial intelligence (AI) adoption is the shortage of skilled professionals. The lack of qualified data scientists, AI engineers, and machine learning experts hinders the effective deployment and maintenance of AI systems (UNESCO, 2019). Furthermore, insufficient educational resources, including a shortage of training programs and institutions that offer advanced technical education, exacerbate this problem (World Bank, 2021). This issue is worsened by brain drain, as talented AI professionals leave their home countries for better opportunities abroad, resulting in a talent deficit (ITU, 2021). Additionally, the lack of ongoing professional development programs further constrains the existing workforce's ability to keep pace with the new AI technologies (Oxford Insights, 2021).

Furthermore, low levels of digital literacy remain a major obstacle, as many people do not possess the basic digital skills needed to navigate AI-driven changes in the workplace (OECD, 2020). Cultural resistance and fears of job loss further fuel distrust and hesitation toward AI technologies (McKinsey and Company, 2021). The scarcity of attractive career prospects and incentives has a significant impact on talent retention, resulting in high attrition rates and a persistent brain drain (UNDP, 2021). Additionally, inadequate collaboration between academic institutions and industry results in skill mismatches and a lack of practical experience for graduates, thus impeding the creation of a robust AI-ready workforce (Stanford University, 2023).

Financial barriers

The integration of artificial intelligence (AI) technologies frequently faces financial hurdles linked to substantial initial investment costs. Establishing AI infrastructure necessitates significant capital, posing challenges for numerous organizations and governments (World Economic Forum, 2020). This dilemma is worsened by restricted funding opportunities, particularly in developing regions where attracting international investments in AI is challenging (UNDP, 2021). Moreover, the high expenses tied to data management—including its collection, processing, and secure storage—intensify the financial strain (World Bank, 2021). Additionally, governments encounter inadequate public budget allocations for AI projects, often due to competing priorities in other sectors (Oxford Insights, 2021).

The involvement of the private sector in AI adoption is hindered by limited financial incentives. The lack of subsidies or supportive funding mechanisms decreases businesses' motivation to invest in AI technologies (OECD, 2019). Furthermore, building capacity and providing skills training demand substantial investment, particularly in the development of educational programs and a proficient AI workforce (UNESCO, 2019). Additionally, research and development in AI involves significant expenses, making it challenging to maintain long-term innovation efforts without adequate financial backing (Stanford University, 2023).

Furthermore, the financial risk and uncertainty greatly hinder investment in AI. Many potential investors consider AI initiatives to be high-risk because of ambiguous returns on investment and unpredictable market conditions (McKinsey and Company, 2021). Additional expenses stem from the necessity to adhere to regulatory standards, including data privacy and ethical AI guidelines, at both local and international levels (European Commission, 2021). Finally, continuous operational and maintenance expenses—like system upgrades, infrastructure maintenance, and technical support—further impact budgets and restrict wider AI adoption (OECD, 2020).

ICT barriers

The effective deployment of AI technologies is significantly hindered by inadequate ICT infrastructure. Insufficient broadband and connectivity options restrict access to essential resources like cloud computing and AI platforms (World Economic Forum, 2020). Moreover, the low availability of broadband internet in various regions impedes the extensive rollout of AI systems (ITU, 2021). Additionally, the lack of high-quality, structured, and accessible data undermines the development and efficiency of AI models (World Bank, 2021). Furthermore, the absence of advanced computing resources, such as GPUs and TPUs required for sophisticated AI applications, presents a notable technological challenge (Oxford Insights, 2021).

A shortage of technical expertise exacerbates the challenges in infrastructure. The lack of qualified AI professionals and data scientists significantly hinders the implementation and maintenance of AI systems (UNESCO, 2019). Furthermore, cybersecurity presents a significant concern, as inadequate security measures leave AI systems vulnerable to cyber risks, breaches, and data misuse (ITU, 2021). Many systems still depend on outdated legacy infrastructure, obstructing modern AI technologies' seamless integration and effective operation (Oxford Insights, 2021).

Limited access to advanced hardware and inconsistent national digital integration standards is a significant challenge. Many areas struggle with inadequate availability of essential hardware like GPUs, TPUs, and data center resources vital for AI development (Stanford University, 2023). Furthermore, the lack of standardized interoperability frameworks among digital systems hinders AI deployment, making it challenging to integrate with existing infrastructure seamlessly (IEEE, 2020). Additionally, energy constraints represent a frequently overlooked obstacle. An unstable electricity supply and underdeveloped energy infrastructure impede the continuous functioning of AI systems (World Bank, 2021).

Institutional barriers

Many governments face significant institutional challenges in promoting national AI initiatives, primarily due to weak capacities and disconnected structures. A major limitation is the scarcity of technical expertise and skills within government agencies,

which hampers their ability to effectively manage, regulate, and implement AI (Oxford Insights, 2021). Additionally, insufficient coordination among institutional frameworks, along with overlapping mandates and unclear responsibilities, hinders the development of a cohesive national AI strategy (OECD, 2019). These challenges are exacerbated by a lack of government commitment and leadership; without strong institutional support and clearly defined leadership roles, coordination and strategic guidance deteriorate (UNDP, 2021). Furthermore, poor collaboration between agencies intensifies these issues, as ineffective communication among government entities leads to fragmented policymaking and diminished coherence (World Bank, 2021).

Public institutions face difficulties implementing and enforcing AI policies due to limited resources and structural obstacles (Oxford Insights, 2021). A persistent lack of technical know-how within public agencies complicates the effective governance of AI technologies (UNESCO, 2019). Moreover, the lack of specialized departments or agencies focusing on AI ethics, governance, and policy development worsens this problem (World Bank, 2021). Institutional resistance to technological change, driven by organizational inertia and cultural hesitance, further impedes the adoption of innovative technologies such as AI (McKinsey and Company, 2021). These structural shortcomings highlight the need for capacity building, reforms, and robust leadership to foster responsible and effective AI governance.

Policy barriers

Least Developed Countries (LDCs) encounter various structural obstacles in embracing artificial intelligence (AI), starting with inadequate regulatory frameworks. Many of these countries do not possess comprehensive regulations for AI usage and data management, making it hard to enforce standards and promote responsible AI development (World Bank, 2021). This issue is intensified by limited institutional capabilities, as governmental bodies often operate with insufficient resources and lack the technical expertise to effectively oversee AI systems (Oxford Insights, 2021). Moreover, shortcomings in data governance policies worsen the situation, as weak data protection and privacy regulations hinder the secure implementation of AI technologies (European Commission, 2021).

The lack of clear ethical guidelines poses a major challenge, fueling public mistrust and reluctance toward AI adoption (IEEE, 2020). Inadequate policy coordination and integration worsen these problems, as disjointed AI policies do not align with national development strategies or broader economic objectives (OECD, 2019). Additionally, policy uncertainty and instability characterized by frequent changes in strategic focus and vague long-term visions deter both domestic and international investments in AI innovation (McKinsey and Company, 2021). These uncertainties hinder the prospects for sustained growth in the sector.

Public engagement is hindered by insufficient stakeholder involvement and a lack of effective awareness campaigns, leading to widespread concerns about AI among the

public (OECD, 2020). Additionally, inadequate education and workforce development initiatives create a talent gap, as national strategies often neglect the necessity for enhancing AI-related skills (UNESCO, 2019). Furthermore, investment policies are insufficient, offering few incentives to attract private or international funding for AI infrastructure and innovation (World Economic Forum, 2020). Finally, least-developed countries (LDCs) typically possess limited policies for international collaboration, hindering access to the global knowledge-sharing and technical support essential for AI progress (UNDP, 2021).

5. Regional AI-readiness analyses

Oxford Insights (2024) provides indicator data on promoting AI readiness for countries worldwide. This section uses their data to briefly analyze the three pillars (government sector, technology sector, and data and infrastructure pillars) concerning AI adoption in LDCs, LLDCs, and SIDS within the Asia-Pacific region.

According to their reports from 2023 and 2024, governmental readiness is evaluated through a comprehensive analysis of each country's vision for implementing AI, governance, and ethics (including data protection, cybersecurity, and regulatory quality), digital capacity (such as online services, public sector AI skills development, and foundational IT infrastructure), and adaptability (government effectiveness and responsiveness) — this collective evaluation is known as the government pillar. Countries attaining a maximum score of 100 are assessed based on specific indicators. The following figure illustrates government readiness for AI adoption among the Asia-Pacific region's LDCs, LLDCs, and SIDS.

Table 14 below illustrates the AI readiness scores and global rankings for LDCs, LLDCs, and SIDS in the Asia Pacific Region. The findings reveal that Mongolia, Bangladesh, Fiji, Maldives, and Nepal are within the top 100 countries globally. Conversely, several Small Island Developing States (SIDS)- such as Tuvalu, Nauru, and Palau- are ranked at 172, indicating very low readiness for AI adoption in public sector governance. This distribution points to a notable concentration of countries near the bottom of the global rankings, highlighting the digital and infrastructural disparities within the region.

Table 14. AI readiness scores of LDCs, LLDCs, and SIDS in the Asia-Pacific Region

Countries in the Asia Pacific Region	Global Rank[8]	Total Score	Government Pillar	Technology Sector Pillar	Data and Infrastructure Pillar
Afghanistan	139	16.92	8.27	22.46	20.05
Bangladesh	83	47.12	58.52	26.26	56.59
Bhutan	98	38.78	34.02	25.58	56.73
Cambodia	108	36.63	29.18	29.31	51.40
Federated States of Micronesia	172	-	-	-	-
Fiji	86	44.22	37.02	32.32	63.31
Kiribati	172	34.45	30.85	26.96	45.55
Lao, PDR	111	36.08	28.10	28.79	51.36
Marshall Islands	172	37.62	29.94	31.65	51.29
Maldives	91	31.43	33.71	17.22	43.36
Mongolia	77	42.36	36.94	26.78	63.36
Myanmar	132	34.26	24.24	33.85	44.69
Nauru	172	-	-	-	-

Asian Development Bank. (2020). *Implementing digital health in the Pacific: A guide.* Asian Development Bank.

Nepal	94	33.14	30.61	25.44	43.37
Palau	172	-	-	-	-
Solomon Islands[9]	172	29.09	23.72	23.41	40.14
Samoa	172	37.16	31.82	27.41	52.26
Timor Leste	143	33.68	27.03	26.70	47.30
Tonga	172	38.63	31.75	34.89	49.25
Tuvalu	172	-	-	-	-
Vanuatu	137	39.04	34.44	30.85	51.82

Source: Oxford Insights (2024).

According to data from Oxford Insights (2024), there are significant differences in AI readiness among Least Developed Countries (LDCs), Landlocked Developing Countries (LLDCs), and Small Island Developing States (SIDS) in the Asia-Pacific region. The rankings and overall, AI readiness scores reveal varying ability levels to adopt and use artificial intelligence technologies effectively. Mongolia (77th globally) and Bangladesh (83rd globally) stand out in this group, showing relatively better total scores of 42.36 and 47.12, respectively. Notably, Bangladesh shines in the Government Pillar (58.52), highlighting its strong government initiatives and policies that support AI adoption, while Mongolia excels in Data and Infrastructure (63.36), indicating a more developed digital framework.

Countries such as Fiji (ranked 86th), Bhutan (98th), and the Maldives (91st) exhibit moderate readiness for AI adoption. Fiji distinguishes itself with a notable score in the Data and Infrastructure Pillar (63.31), indicating strong connectivity and advanced digital systems that support AI implementation. While Bhutan and the Maldives have lower overall scores than Fiji, they still achieve respectable results in Data and Infrastructure, with Bhutan scoring 56.73. However, their performance in the Technology Sector Pillar is less impressive, pointing to potential weaknesses in technological innovation and private sector involvement.

Several countries, particularly those with much lower rankings such as Afghanistan (139), Timor-Leste (143), and Myanmar (132), face considerable challenges, evident in their lower total AI readiness scores. Afghanistan records one of the lowest scores (16.92), significantly impacted by minimal governmental support and major infrastructural gaps. Myanmar and Timor-Leste also reveal critical weaknesses in government engagement and data infrastructure, creating significant barriers to developing AI technologies.

A notable gap is observed in nations such as the Federated States of Micronesia, Nauru, Palau, and Tuvalu, where data was either unavailable or not assessed. This suggests a significant lack of structured AI readiness frameworks or challenges in data collection itself. This gap highlights a crucial need for targeted international cooperation, capacity

[9] Data from Oxford Insights (2022).

building, and investment to enhance AI readiness, ensuring that these smaller island nations are not further disadvantaged in their journey of digital transformation.

Government sector pillar readiness

Figure 7 below illustrates that Bangladesh has achieved the highest score, signifying substantial progress in its digital government strategy for AI, institutional capacity, political will, and investment in AI-related governance. Moderate performers include Fiji, Mongolia, Vanuatu, Bhutan, the Maldives, and Tonga, with scores ranging from 40 to 55. This indicates emerging government-led AI initiatives, established digital governance mechanisms, and the potential for enhanced AI adoption and frameworks in the public sector.

The mid-to-low-tier group consists of countries like Samoa, Kiribati, Nepal, Marshall Islands, Lao PDR, Cambodia, and Timor-Leste, which score between 25 and 40. These governments may have some form of digital governance or data strategies but lack comprehensive AI frameworks or cross-sector collaboration.

Countries that need more support include Myanmar, Afghanistan, the Solomon Islands, Micronesia, Nauru, Palau, and Tuvalu, which have very low scores (below 25). These nations likely face significant challenges such as low digital literacy, insufficient policy frameworks, and limited government investment in AI capacity.

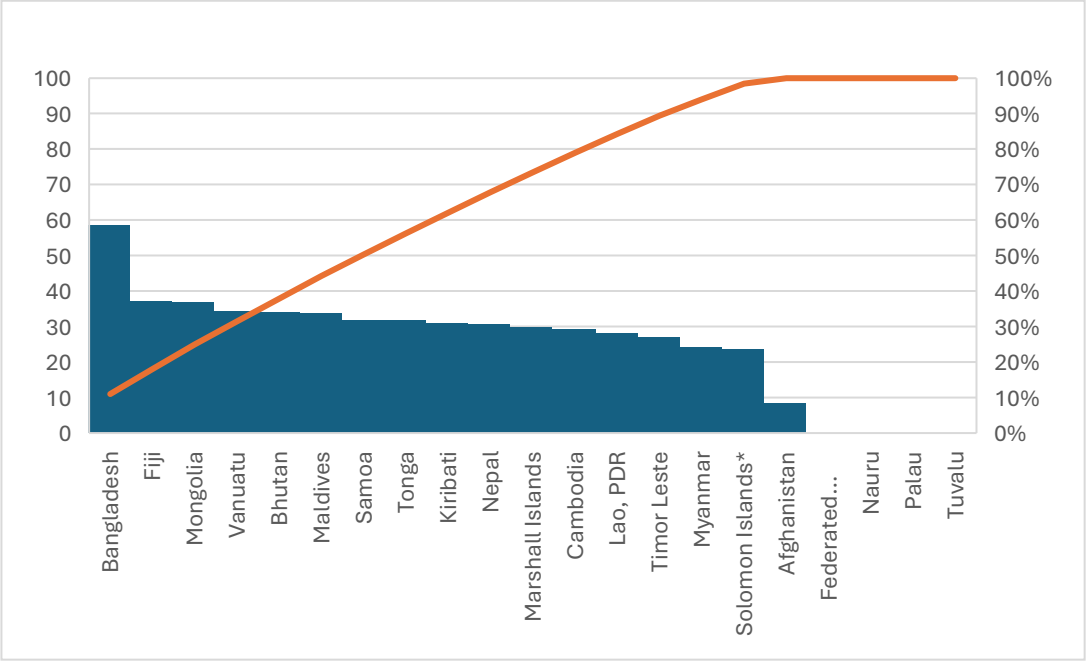

Figure 7. Government Sector Pillar Readiness in AI adoption in the SIDS, LDCs, and LLDCs in the Asia-Pacific Region. Source: Oxford Insights, 2024. Note: No data is available for the Federated States of Micronesia, Nauru, Palau, and Tuvalu.

The cumulative percentage line illustrates that the top five countries comprise the majority of AI readiness in the government sector within the region (countries on the left contribute most to the total). The curve's steepness following the mid-ranking countries underscores a significant drop-off, indicating a considerable gap in AI readiness among less digitally advanced governments.

The analysis shows a significant disparity in public sector AI readiness: most Asia-Pacific SIDS, LDCs, and LLDCs lag far behind global leaders and their regional peers. There is an urgent need for digital transformation in the public sector of these underperforming countries. Regional collaboration and international support, including digital public infrastructure and capacity building, are essential for bridging this gap. Bangladesh and Fiji could potentially serve as models or hubs for knowledge sharing in the region among LDCs, LLDCs and SIDS.

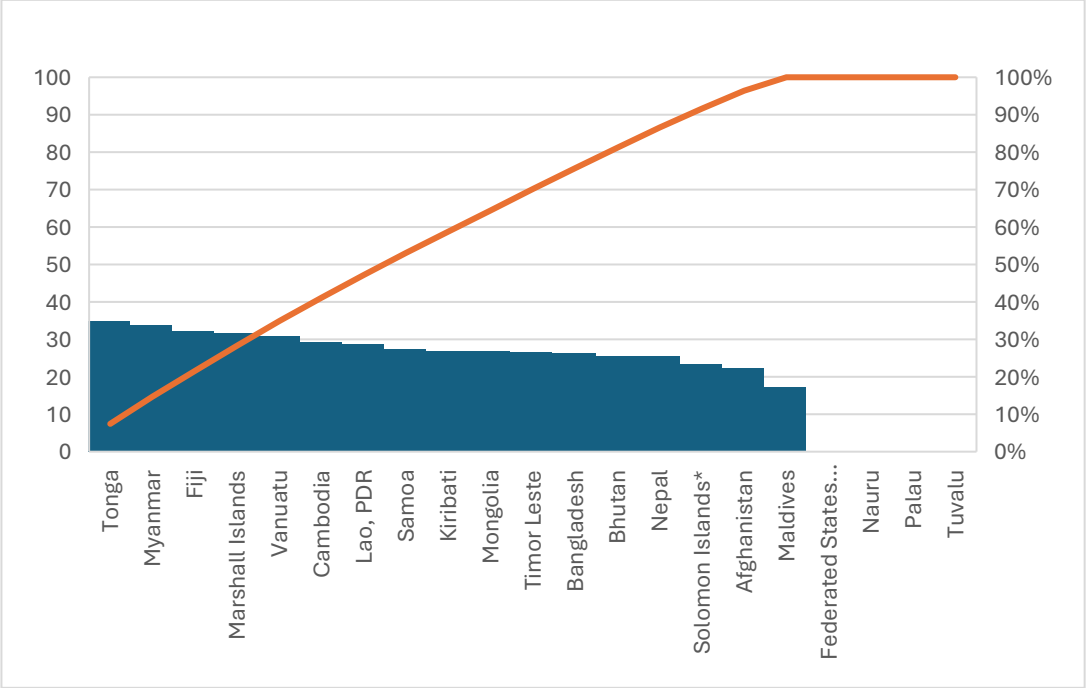

Figure 8. Technology Sector Pillar Readiness in AI adoption in the SIDS, LDCs, and LLDCs in the Asia-Pacific Region. Source: Oxford Insights, 2024. Note: No data is available for the Federated States of Micronesia, Nauru, Palau, and Tuvalu.

Technology sector pillar readiness

As shown in Figure 8, several countries in the region perform relatively well compared to the global average regarding data and infrastructure readiness. Countries such as Mongolia, Fiji, Bangladesh, and Bhutan perform better in this category, each scoring above 50. They exhibit robust Internet and broadband infrastructure, improved data availability,

enhanced digital services, advanced platforms, and solid cybersecurity and AI frameworks.

The mid-level readiness countries include Samoa, Vanuatu, Cambodia, Lao PDR, the Marshall Islands, and Tonga, all scoring between 40 and 50. These nations may have made moderate investments in digital infrastructure but could still lack comprehensive open data policies or advanced connectivity.

In lower-tier readiness countries such as Timor-Leste, Nepal, Myanmar, Kiribati, and the Solomon Islands, rankings range from 30 to 40. There are likely gaps in data availability, cloud access, and the digital tools needed to enable AI.

Afghanistan, the Federated States of Micronesia, Nauru, Palau, and Tuvalu score below 30, indicating limited internet penetration, a lack of open data initiatives, poor technological infrastructure, and low digital inclusion.

The orange line illustrates cumulative contributions, emphasizing that the top five countries represent a significant portion of total readiness in the region. The steep curve also indicates a digital infrastructure gap between the leading and lagging countries.

The analysis reveals that digital infrastructure among LDCs, LLDCs, and SIDS is uneven: There is a stark contrast in readiness within countries in the region. The digital divide poses a significant challenge for regional AI adoption. Priority areas include broadband expansion, cloud infrastructure, data governance policies, and cybersecurity standards.

Data and Infrastructure pillar readiness

Regarding the total AI readiness score in Figure 5 below, Bangladesh, Fiji, Mongolia, and Vanuatu stand out with the highest scores among the listed countries, ranging from 35 to 45 but still under 50%. These nations are more advanced in developing infrastructure, governance frameworks, and digital strategies to support AI integration.

Countries such as Bhutan, the Maldives, Tonga, the Marshall Islands, Samoa, Cambodia, and Lao PDR score between 25 and 35. These nations show moderate readiness but may need to improve their digital policies, data availability, or institutional capacity for AI governance. Meanwhile, Timor-Leste, Nepal, Myanmar, and the Solomon Islands fall within the 15 to 25 range, facing challenges related to internet infrastructure, education, innovation capacity, or digital governance. Afghanistan, Micronesia, Nauru, Palau, and Tuvalu register the lowest scores (below 15).

These nations lag significantly in AI readiness and will likely need international support and long-term digital capacity-building strategies. The orange line shows the cumulative distribution of scores as a percentage of the total, potentially indicating a concentration of

readiness in a few countries. A steep curve reveals a sharp decline in readiness, emphasizing disparities among the nations.

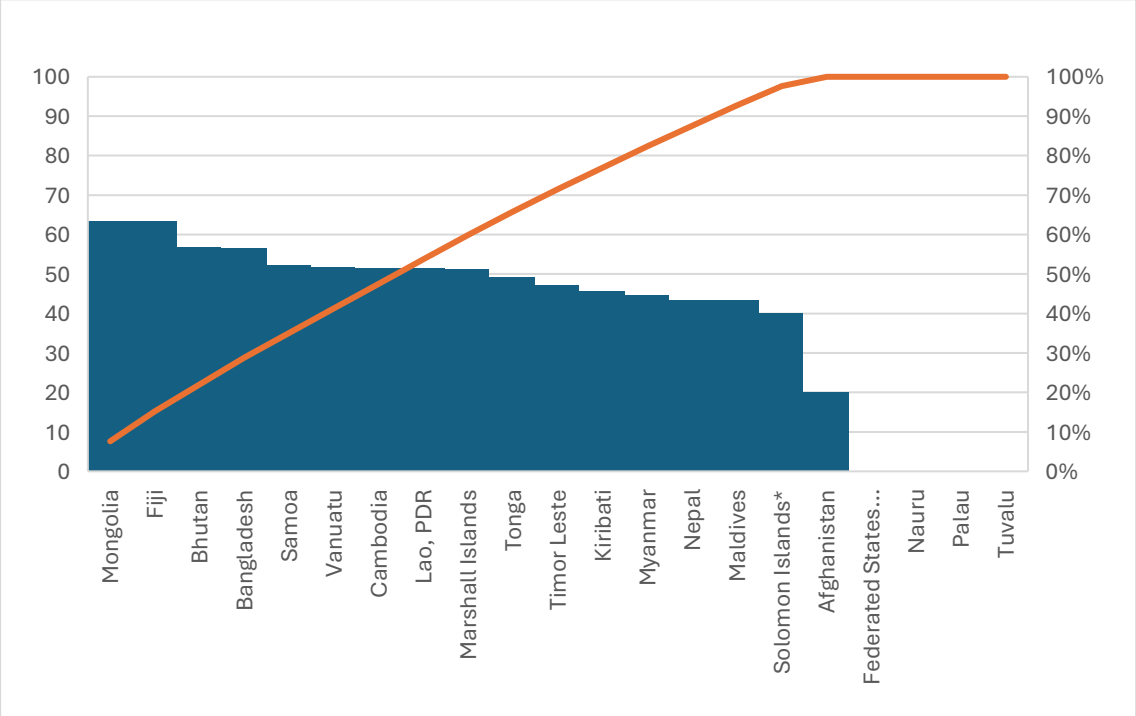

Figure 9. Data and Infrastructure Pillar Readiness in AI adoption in the SIDS, LDCs, and LLDCs in the Asia-Pacific Region. Source: Oxford Insights, 2024. Note: No data is available for the Federated States of Micronesia, Nauru, Palau, and Tuvalu.

Total AI Readiness Score

Figure 10 illustrates the AI preparedness of various countries, calculated using the arithmetic mean of several pillars. According to the data, Bangladesh tops the list, closely followed by Fiji, Mongolia, Vanuatu, and Bhutan, all showing comparatively higher levels of AI readiness. These countries have likely significantly advanced digital infrastructure, data governance, and AI policy development. Conversely, as the rankings decline, there is a noticeable decrease in readiness among nations such as Timor-Leste, the Maldives, the Solomon Islands, and especially Tuvalu, which has the lowest score, indicating major obstacles to AI adoption.

The line graph overlaid on the bar chart illustrates the cumulative percentage of countries with specific readiness scores. The steep rise in the initial segment indicates that only a few countries have surpassed the halfway point in AI readiness. This graph reveals that many SIDS, LDCs, and LLDCs in the Asia-Pacific region remain primarily unprepared to utilize AI technologies, underscoring an urgent need for investments in infrastructure, policy development, and capacity building. Such data can be crucial for regional

organizations and development partners to effectively target their support the widening AI gap.

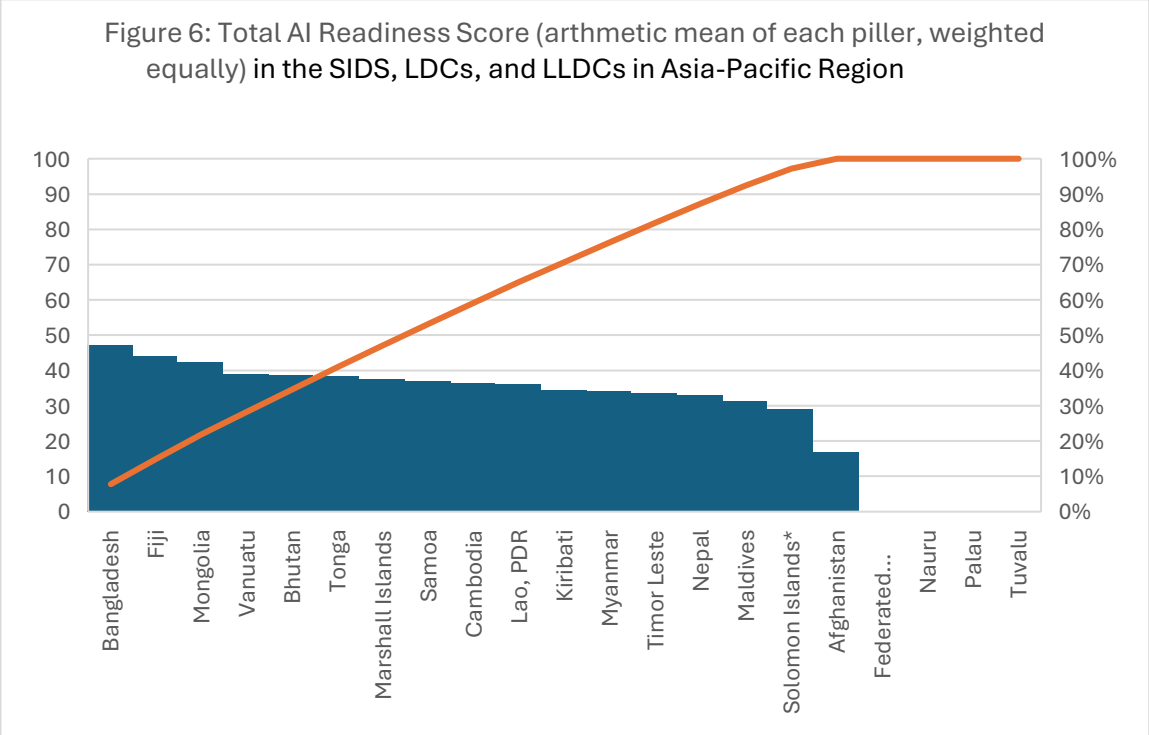

Figure 10. Data and Infrastructure Pillar Readiness in AI adoption in the SIDS, LDCs, and LLDCs in the Asia-Pacific Region. Source: Oxford Insights, 2024. Note: No data is available for the Federated States of Micronesia, Nauru, Palau, and Tuvalu.

6. Sector-specific use cases of AI technologies

Table 14 presents a strategic overview of AI initiatives aimed at enhancing national health and driving economic growth. In the healthcare domain, two main AI applications are emphasized. First, AI-driven telemedicine and remote monitoring improve access to specialist care in rural locations and assist in the continuous management of chronic diseases. This strategy lowers morbidity and mortality rates while increasing workforce productivity by reducing absenteeism (World Health Organization, 2019; India NITI Aayog, 2018). Second, predictive analytics on disease outbreaks deliver early warnings that facilitate swift containment, thereby diminishing the health effects of epidemics and easing economic disruptions, including supply chain issues (WHO, 2020; UNDP, 2021).

Table 15. Example of sector-specific AI projects for economic growth

Sector	AI Project/Initiative	Rationale	Estimated Impact on Health and GDP	Illustrative References (APA)
Healthcare	AI-Enhanced Telemedicine and Remote Monitoring	- Improves access to specialist care in remote areas - Early detection and continuous monitoring of chronic conditions	- Health: Reduced morbidity and mortality, especially among rural populations - GDP: Lower healthcare costs and improved workforce productivity	World Health Organization. (2019); India NITI Aayog. (2018)
Healthcare	Predictive Analytics for Disease Outbreaks	- Early warning systems can guide swift interventions - Minimizes disruption to economic activities	- Health: Rapid containment of infectious diseases - GDP: Prevents shutdowns, supply chain disruption, and lost productivity	WHO. (2020); United Nations Development Programme (UNDP). (2021).
Agriculture	Precision Farming using AI and IoT	- Optimizes water, fertilizer, and pesticide use - Increases crop yields and resilience to climate variability	- Health: Better nutrition from stable food supply - GDP: Higher agricultural output, export potential, and farmer incomes	Food and Agriculture Organization (FAO). (2021); McKinsey Global Institute. (2020).
Manufacturing	AI-Based Predictive Maintenance	- Reduces downtime and accidents - Enhances operational efficiency in industrial plants	- Health: Safer working environments, fewer industrial accidents - GDP: Increased output and competitiveness	Asian Development Bank. (2021); World Economic Forum. (2018).
Finance	AI-Driven Microfinance and Lending Platforms	- Expands financial inclusion for SMEs and rural entrepreneurs - Mitigates credit	- Health: Indirect—income growth can improve food security and healthcare access - GDP: Stimulates	World Bank. (2020); International finance Corporation (2021).

		risk via automated assessments	entrepreneurship and consumer spending	
Education	Adaptive Learning and Skill Development	- Improves educational outcomes, upskills the workforce for a knowledge-based economy	- Health: Indirect—better-educated population makes informed health decisions - GDP: Higher workforce productivity and innovation capacity	United Nations Educational, Scientific and Cultural Organization (UNESCO). (2022); New Zealand Ministry of Business, Innovation and Employment. (2022).
Infrastructure (Smart Cities)	AI-Powered Traffic Management	- Reduces congestion and pollution - Enhances public safety and emergency response	- Health: Lower emissions and stress from congestion - GDP: Improved logistics efficiency, less time lost in traffic	Singapore Info-communications Media Development Authority (IMDA). (2019); Japan Cabinet Office. (2021).
Public Administration	AI-Enhanced Policy Formulation and Social Services	- Analyzes citizen data for targeted interventions - Automates administrative tasks, reducing bureaucracy	- Health: Better allocation of healthcare resources - GDP: Streamlined government operations and improved investment climate	ITU. (2022); European Commission. (2020).

In agriculture, AI and IoT-driven precision farming optimize resource usage, such as water and fertilizers, resulting in increased crop yields and enhanced resilience to climate impacts. These innovations not only promote better nutritional outcomes and establish a more stable food supply but also elevate farmers' incomes and boost agricultural exports (FAO, 2021; McKinsey Global Institute, 2020).

In the manufacturing sector, predictive maintenance powered by AI improves plant safety by minimizing equipment failures and accidents while enhancing efficiency and production, making national industries more competitive (Asian Development Bank, 2021; World Economic Forum, 2018).

In finance**,** AI-driven microfinance and lending platforms enhance access to capital for underserved populations, particularly small businesses and rural entrepreneurs. These technologies utilize data analytics to lower credit risk. Although the health effects are indirect, stemming from improved income and living standards, the economic impacts include increased entrepreneurship and heightened consumer spending (World Bank, 2020; International Finance Corporation, 2021). Similarly, the education sector benefits from AI-powered adaptive learning platforms, which enhance student learning outcomes

and equip the future workforce with essential skills. This progress fosters informed health choices and lays the groundwork for long-term economic innovation (UNESCO, 2022; New Zealand Ministry of Business, Innovation and Employment, 2022).

AI is transforming infrastructure and governance profoundly. For instance, advancements in smart cities, like AI-driven traffic management systems, help alleviate urban congestion and reduce emissions. This not only promotes public health but also enhances economic efficiency by streamlining logistics (Singapore IMDA, 2019; Japan Cabinet Office, 2021). Additionally, AI improves public administration by aiding in policy formulation and service delivery, enabling more effective targeting of social services and reducing administrative costs. This approach supports equitable access to healthcare and creates a more appealing climate for investment (ITU, 2022; European Commission, 2020). These instances underscore the diverse advantages of AI when integrated thoughtfully into national development plans.

Sample AI projects relevant to SIDS

Table 16 highlights AI initiatives suitable for SIDS. These islands face unique vulnerabilities due to their geographic remoteness and limited resources, particularly in public health. An essential initiative to address these challenges is the implementation of AI-Driven Disease Outbreak Detection systems. Given the rapid spread of diseases that can strain inadequate healthcare resources, AI-enabled early detection allows for timely interventions. This proactive strategy can significantly reduce morbidity and mortality while helping to maintain workforce productivity by alleviating economic disruptions caused by widespread illness (World Health Organization, 2020; Pacific Community, 2021).

Table 16. Sample AI Projects for emergency management in SIDS

Sector	AI Project/Initiative	Rationale for Small Island Nations	Expected Impact	References
Public Health (Pandemics and Outbreaks)	AI-Driven Disease Outbreak Detection	- Rapid spread can strain limited healthcare resources - Early detection prevents overwhelming local clinics/hospitals	- Reduced Morbidity/Mortality: Faster response times - Sustained Workforce: Limits economic disruptions caused by widespread illness	World Health Organization (WHO). (2020); Pacific Community (SPC). (2021).
Natural Disaster Management	Predictive Analytics for Cyclones and Storm Surges	- Island economies heavily rely on coastal areas - Strong storms can disrupt supply chains and infrastructure, isolating communities	- Saved Lives and Property: Advanced warnings and evacuations - Faster Recovery: Targeted distribution of relief aid	United Nations Office for Disaster Risk Reduction (UNDRR). (2019); World Bank. (2020).

Agriculture and Fisheries	AI-Based Pest, Crop, and Marine Monitoring	- Climate change affects yields and fish stocks - Real-time monitoring needed for food security and livelihood protection	- Food Security: Improved yield forecasting and sustainable fishing - Economic Stability: Reduces dependency on imports and strengthens local markets	Food and Agriculture Organization (FAO). (2021); Pacific Community (SPC). (2022).
Tourism and Hospitality	AI-Enhanced Disaster Communication and Evacuation Systems	- Tourism is a major GDP contributor for many islands - Rapid evacuation and clear communication to tourists can reduce casualty and reputational damage	- Maintained Tourism Revenue: Protects visitor safety, preserves destination appeal - Swift Crisis Management: Minimizes economic losses	UN World Tourism Organization (UNWTO). (2019); Pacific Tourism Organisation (PTO). (2021).
Infrastructure and Utilities	AI-Driven Structural Health Monitoring	- Critical infrastructures (ports, airports, power grids) are limited - Timely maintenance avoids catastrophic failures that may cut off entire islands	- Reduced Downtime: Fewer disruptions to vital services - Cost Savings: Early detection of structural risks lowers repair expenses	Asian Development Bank. (2021); International Telecommunication Union (ITU). (2022).
Communication and Coordination	AI-Powered Crisis Information Platforms	- Island communities often face communication bottlenecks - Real-time, multilingual alerts are essential for remote populations	- Effective Emergency Response: Agencies and citizens receive accurate, timely updates - Community Trust: Transparent data fosters cooperation	International Telecommunication Union (ITU). (2021); United Nations Office for the Coordination of Humanitarian Affairs (OCHA). (2021).
Finance and Insurance	AI-Based Parametric Insurance and Risk Modeling	- Catastrophic events can devastate small island economies - AI-driven parametric insurance pays out quickly, aiding post-disaster recovery	- Swift Economic Relief: Rapid payouts help rebuild infrastructure and livelihoods - Better Risk Assessment: Government and insurers can predict and price risk more accurately	World Bank. (2020); OECD. (2021).

SIDS can significantly benefit from predictive analytics focused on cyclones and storm surges in managing natural disasters. These islands depend mainly on coastal regions at high risk from intense storms that can disturb supply chains and separate communities. Enhanced AI forecasting offers early warnings and facilitates timely evacuations, saving lives and protecting property. Furthermore, these analytics enable faster recovery by ensuring the efficient distribution of relief aid (United Nations Office for Disaster Risk Reduction, 2019; World Bank, 2020).

Agriculture and fisheries play a vital role in ensuring food security and supporting the livelihoods of individuals in SIDS, yet they are becoming more vulnerable to the impacts of climate change. AI-Based Pest, Crop, and Marine Monitoring tools offer real-time insights that bolster sustainable practices in agriculture and fishing. These technologies improve yield predictions and resource management, aiding in the stabilization of local economies while diminishing the dependence on food imports. This strategy not only enhances food security but also reinforces domestic markets (Food and Agriculture Organization, 2021; Pacific Community, 2022).

The tourism industry, a significant economic engine for many Small Island Developing States (SIDS), is especially susceptible to crises. AI-Enhanced Disaster Communication and Evacuation Systems play a crucial role in safeguarding tourists with prompt alerts and effective evacuation procedures. These tools help sustain tourism revenue by protecting the industry's image and minimizing casualties. Furthermore, such systems facilitate rapid crisis management and lessen economic losses, thereby maintaining the attractiveness and operational stability of tourist destinations (UN World Tourism Organization, 2019; Pacific Tourism Organisation, 2021).

Examples of AI activities in countries outside of LLDCs, LDCs, and SIDS

The table below presents an overview of various national AI initiatives from more developed Asia-Pacific nations. Australia focuses on smart cities and Industry 4.0, driven by its Digital Transformation Agency and the Prime Minister's Industry 4.0 Taskforce, which advocate for incorporating AI into public services and industrial systems (UNESCO, 2021). In a similar vein, Malaysia is integrating AI within its manufacturing sector via the *Industry4WRD* policy, aimed at enhancing efficiency and competitiveness in smart manufacturing (UNESCO, 2021).

China and Singapore stand out as key AI leaders in the region. China utilizes AI for educational reforms and smart city projects, particularly through initiatives like "City Brain," which enhances urban management (Reuters, 2025). In contrast, Singapore's Smart Nation initiative exemplifies remarkable AI integration across transportation, governance, and urban infrastructure, boosting its regional AI preparedness (Campaign Asia, 2023). Likewise, South Korea illustrates this evolution through its cutting-edge medical AI and robotics, focusing on diagnostics and device innovations (RWS, 2024).

Many nations are harnessing AI to tackle challenges in agriculture, the environment, and healthcare. For instance, India leverages AI for predictive healthcare diagnostics and precision agriculture, with the goal of boosting rural productivity and enhancing public health (Deloitte, 2024). Similarly, New Zealand employs AI in environmental monitoring and precision farming to promote sustainable agricultural practices (Deloitte, 2024). Vietnam is following suit, improving both agriculture and education through AI technologies (Deloitte, 2024), highlighting a rising focus on inclusive development.

Table 17. Examples of AI activities in countries outside of LLDCs, LDCs, and SIDS in the Asia-Pacific Region

Country	AI Application	Description	Reference
Australia	Smart Cities & Industry 4.0	Australia's Digital Transformation Agency and the Prime Minister's Industry 4.0 Taskforce promote AI integration in public services and industrial sectors.	UNESCO. (2021). *Southeast Asia and Oceania*. In *UNESCO Science Report: the Race Against Time for Smarter Development*.
China	Education Reform & Smart Cities	China integrates AI into education systems and urban planning, including initiatives like the "City Brain" for smart city management.	Reuters. (2025, April 17). *China to rely on artificial intelligence in education reform bid*.
India	Healthcare & Agriculture	AI applications in India focus on predictive healthcare diagnostics and precision agriculture to enhance productivity.	Deloitte. (2024). *Generation AI in Asia Pacific*.
Indonesia	Digital Infrastructure & Education	Microsoft's $1.7 billion investment aims to bolster AI and cloud infrastructure, enhancing digital services and education.	AP News. (2024, April 30). *Microsoft will invest $1.7 billion in AI and cloud infrastructure in Indonesia*.
Japan	Robotics & Healthcare	Japan leverages AI in robotics for elder care and automates healthcare diagnostics to address an aging population.	AI Magazine. (2024). *Top 10: AI Companies in APAC*.
Malaysia	Industry 4.0 & Smart Manufacturing	Malaysia's Industry4WRD policy promotes AI adoption in manufacturing to enhance efficiency and competitiveness.	UNESCO. (2021). *Southeast Asia and Oceania*. In *UNESCO Science Report: the Race Against Time for Smarter Development*.
New Zealand	Agriculture & Environmental Monitoring	AI technologies are employed for precision farming and monitoring environmental	Deloitte. (2024). *Generation AI in Asia Pacific*.

		changes to support sustainable agriculture.	
Philippines	Assistive Technologies	Development of AI-powered brain-computer interfaces to aid patients with locked-in syndrome in communication.	IIC. (2020). *Artificial Intelligence in the Asia-Pacific Region*.
Singapore	Smart Nation Initiatives	Singapore leads in AI readiness, implementing AI in public services, transportation, and urban planning.	Campaign Asia. (2023, March 21). *Singapore tops list of APAC countries for AI readiness: Salesforce study*.
South Korea	Medical AI & Robotics	South Korea invests in AI for medical diagnostics and robotics, including the development of AI-based medical devices.	RWS. (2024). *AI's Growing Influence in APAC Life Sciences*.
Thailand	Public-Private AI Initiatives	Thailand supports experimental AI projects through collaborations between government and private sectors.	IIC. (2020). *Artificial Intelligence in the Asia-Pacific Region*.
Vietnam	AI in Agriculture & Education	Vietnam applies AI in agricultural practices and educational tools to enhance productivity and learning outcomes.	Deloitte. (2024). *Generation AI in Asia Pacific*.

Indonesia is enhancing its AI and cloud capabilities through a $1.7 billion investment from Microsoft, aimed at improving education and digital services (AP News, 2024). Meanwhile, the Philippines is progressing in assistive technologies, particularly brain-computer interfaces designed to help patients with locked-in syndrome, showcasing AI's focus on human needs (IIC, 2020). Additionally, Thailand promotes collaboration between public and private sectors by encouraging experimental AI projects through strategic alliances (IIC, 2020).

Japan utilizes AI across various established and emerging industries. In Japan, a significant focus is placed on **robotics and eldercare** to address its aging population, where AI enhances diagnostics and care provision (AI Magazine, 2024). These initiatives demonstrate how some nations in the region are leveraging AI to address systemic challenges and foster national innovation.

LLDCs, LDCs, and SIDS can utilize the above examples through a cooperative agreement to enable similar projects in their countries.

7. Moving forward

As LDCs, LLDCs, and SIDS in the Asia-Pacific region strive for comprehensive AI adoption, it is essential to establish country-specific national principles that promote public trust, ensure ethical and secure AI practices, and encourage citizens to embrace the social benefits of AI-driven products and services.

National principles for AI adoption and governance

Table 17 outlines ten foundational principles that should guide national AI governance frameworks, focusing on ethical, legal, and societal considerations. Core among these is *transparency*, which emphasizes the importance of explainability and documentation in AI systems to foster public trust (European Commission, 2020; World Economic Forum, 2020). *Accountability* ensures that developers and organizations are responsible for AI outcomes, particularly when errors or harms occur (OECD, 2019; G20, 2019). Closely linked is *fairness and non-discrimination*, which calls for AI systems to avoid bias and uphold dignity and equity (UNESCO, 2021).

Table 18. Suggested national principles for AI adoption and governance

Principle	Brief Description	References (APA)
1. Transparency	AI systems should be explainable and auditable, with clear documentation on data sources and decision-making processes.	European Commission. (2020); World Economic Forum. (2020).
2. Accountability	Organizations and developers must take responsibility for AI outcomes, ensuring mechanisms exist to address errors, harms, or unethical use of AI systems.	OECD. (2019); G20. (2019).
3. Fairness and Non-Discrimination	AI should be designed and deployed in ways that avoid unjust biases, ensure equitable treatment, and respect human dignity.	UNESCO. (2021).
4. Privacy, Security and Data Protection	Personal data used by AI systems must be collected, processed, and stored securely and lawfully, maintaining individuals' right to privacy and data ownership.	IEEE. (2020).
5. Safety, Control and Reliability	AI solutions should undergo rigorous testing, validation, and continuous monitoring to minimize risks of malfunction, cybersecurity threats, and potential physical or societal harm.	High-Level Expert Group on AI. (2019); ISO/IEC. (2022).
6. Human-Centric Approach	AI should serve human interests and values, maintaining human oversight or intervention, and prioritizing societal benefit over purely economic or technological gains.	European Group on Ethics in Science and New Technologies. (2022); UNESCO. (2021).
7. Inclusiveness and Accessibility	AI must consider diverse user needs (e.g., persons with disabilities) and ensure broad accessibility, bridging digital divides rather than exacerbating them.	World Bank. (2021); (UNDP). (2022).

8. Continuous Monitoring, Evaluation and Governance	Regulatory frameworks and oversight bodies should adapt to AI's evolving nature, reviewing AI systems for compliance with ethical, legal, and societal standards over their entire lifecycle.	OECD. (2019). European Commission. (2021).
9. Collaboration and Ecosystem	AI development should engage a wide range of stakeholders—governments, industry, academia, civil society—to align technical progress with public interests and ethical standards.	World Economic Forum. (2021). United Nations. (2020).
10. Pursuit of Human Benefit and Happiness	Ensure AI system developers and deployers leverage AI technologies to enhance human well-being and respect individual rights	https://securiti.ai/malaysia-national-guidelines-on-ai-governance-and-thics/

Another essential set of principles centers on individual rights and system integrity. The *importance of lawful data practices and* the protection of personal information is underscored by privacy, security, and data protection (IEEE, 2020). S*afety, control, and reliability* concepts emphasize the need for ongoing testing and monitoring of AI systems to avert failures or harm (High-Level Expert Group on AI, 2019; ISO/IEC, 2022). A *human-centered approach* guarantees that AI is aligned with human values, ensuring human oversight and fostering collective societal well-being rather than merely pursuing narrow technological or commercial interests (European Group on Ethics in Science and New Technologies, 2022; UNESCO, 2021).

The final set of principles highlights the importance of inclusive development and governance. Ensuring i*nclusiveness and accessibility* means that AI technologies must serve all users fairly, especially marginalized groups, to avoid exacerbating digital divides (World Bank, 2021; UNDP, 2022). Ongoing *monitoring and governance* are crucial for adapting AI regulation in parallel with technological advancements (OECD, 2019; European Commission, 2021). *Collaboration and ecosystem development* require extensive stakeholder involvement across various sectors to synchronize innovation with ethical guidelines (World Economic Forum, 2021; United Nations, 2020). Finally, focusing *on human benefit and happiness* emphasizes AI's aim: improving human well-being and protecting fundamental rights.

Essential steps to AI-related activity implementation at the national level

Before initiating any national AI-related initiative, it is advisable to establish a clear roadmap for comprehensive implementation. The table presents a systematic roadmap consisting of eleven steps crucial for executing AI-related activities at the national level. The process starts with a *situational analysis and readiness assessment*, which entails examining a country's current digital infrastructure, technical skills, digital literacy, and economic readiness to pinpoint gaps and prospects (Oxford Insights, 2021). Following this, *stakeholder engagement and consultation take place*, where extensive dialogue with industry, academia, civil society, and the public ensures inclusivity and transparency in developing AI policies (OECD, 2020).

The next phase involves *drafting a national AI strategy* that outlines a strategic vision, goals, timelines, and ethical guidelines for AI implementation (OECD, 2019). This is complemented by the *creation of regulatory frameworks* that guarantee responsible AI use, emphasizing privacy, transparency, accountability, and non-discrimination (European Commission, 2021). At the same time, *substantial investments in infrastructure* are needed to build the essential technological foundation—such as broadband access, data centers, and high-performance computing systems—necessary to foster AI ecosystems (World Economic Forum, 2020).

Table 19. Steps needed for AI-related activity implementation at national level

Step	Detailed Description
1. Situational Analysis and Readiness Assessment	Conduct national-level assessments of infrastructure, technical capacity, digital literacy, and economic readiness for AI adoption. Identify gaps, opportunities, and strategic sectors for initial implementation (Oxford Insights, 2021).
2. Stakeholder Engagement and Consultation	Engage with industry leaders, academia, civil society, and citizens to create a participatory approach. Facilitate workshops, conferences, and public consultations to incorporate diverse perspectives (OECD, 2020).
3. Development of National AI Strategy	Formulate a comprehensive, strategic policy document outlining the vision, goals, objectives, timelines, and priority sectors for AI implementation. Include ethical guidelines and considerations (OECD, 2019).
4. Establishment of Regulatory Frameworks	Develop robust regulatory frameworks and guidelines for ethical AI usage, data privacy, transparency, accountability, and protection against bias and discrimination (European Commission, 2021).
5. Infrastructure Development	Invest in technological infrastructure, including cloud computing capabilities, nationwide broadband, data centers, and computing hardware to support AI ecosystems (World Economic Forum, 2020).
6. Capacity Building and Human Capital Development	Implement targeted training programs and curricula in AI and data science within academic institutions, vocational training centers, and professional workshops to prepare a skilled workforce (UNESCO, 2019).
7. Funding and Promoting AI Research and Development	Allocate government funding to encourage AI research, innovation, and development in partnership with universities, industry, and international collaborations (Stanford University, 2023).
8. Pilot Projects and Evaluation	Launch AI pilot projects across key sectors such as healthcare, education, agriculture, and transportation to evaluate feasibility, impact, scalability, and gather insights for refinement (UNDP, 2021).
9. Public Awareness Campaigns	Execute national-level communication campaigns to increase public awareness, understanding, and acceptance of AI technologies and their benefits and challenges (OECD, 2020).
10. National Rollout and Implementation	Scale successful pilot programs to national levels, ensuring adequate resource allocation, monitoring, and continuous feedback mechanisms (McKinsey and Company, 2021).
11. Monitoring, Evaluation, and Continuous Improvement	Establish ongoing monitoring and evaluation frameworks to measure the effectiveness, ethical compliance, societal impact, and economic outcomes of AI initiatives, adjusting strategies as necessary (IEEE, 2020).

Establishing a strong human resource foundation is also vital. The step for *capacity building and human capital development* focuses on incorporating AI and data science into educational programs and professional training to create a workforce ready for the future (UNESCO, 2019). Governments are urged to support *AI research and development* through collaboration with academic institutions, industry, and international partners to enhance innovation (Stanford University, 2023). To evaluate and improve strategies*, pilot initiatives and assessments* need to be conducted in key sectors, including health, agriculture, and education, yielding evidence-based insights into scalability and impact (UNDP, 2021).

The final stages emphasize public inclusion and sustainability. *Public awareness campaigns* are critical for building trust, clarifying misconceptions, and increasing public acceptance of AI technologies (OECD, 2020). A successful *national deployment and implementation* expands on validated initiatives, ensuring comprehensive monitoring and sufficient resource allocation (McKinsey & Company, 2021). Lastly, frameworks for *monitoring, evaluation, and continuous improvement* are established to measure the persistent effectiveness, ethical compliance, and societal impact of AI programs, allowing for adaptable policy modifications (IEEE, 2020).

Prioritization of tasks for national AI adoption

Prioritization plays a crucial role in national initiatives, and the prioritization of tasks for the national adoption of AI is no exception. Below is a phased plan—short, medium, and long term—for implementing a comprehensive national AI strategy. In the *short term (0–2 years)***,** the focus is on establishing foundational policies and initial capacity building. Key actions include crafting a National AI Strategy to define a clear vision and ethical governance framework, setting data governance and privacy standards to foster public confidence, and starting pilot projects by developing essential infrastructure in sectors such as health and agriculture. These efforts involve various stakeholders, including government entities, legal professionals, and industry participants, with the goal of laying a coordinated, secure, and experimental foundation for AI adoption.

Table 20. Prioritization of tasks for national AI adoption[10]

Priority Phase	Key Task	Objective	Key Stakeholders	Expected Outcome
Short Term (0–2 yrs)	1. Formulate National AI Strategy	Define overarching vision, goals, and scope of AI initiatives; outline governance and ethical frameworks.	Relevant government agency/s, Policy Advisors, Industry Reps	A clear policy roadmap and set of guidelines that align AI projects with national priorities.
	2. Establish Data Governance & Privacy Standards	Ensure secure data management, protect individual rights, and lay the foundation for	National Data Protection Authority, Legal	Trust in AI initiatives through transparent and compliant handling of

[10] Sources: OPEC Fund, 2023; GECD Clearinghouse, 2023.

		responsible AI development.	Experts, Civil Society	data; reduced legal/ethical risks.
	3. Build Core Infrastructure & Pilot Projects	Invest in basic computing resources (cloud, HPC), telecom upgrades, and run pilot AI solutions in key sectors (health, ag, etc.)	Telecom Providers, Tech Vendors, University Labs	Proof-of-concept successes demonstrating AI's potential, shaping future large-scale deployments.
Medium Term (2–5 yrs)	4. Expand AI Talent & Education Initiatives	Develop workforce through specialized university programs, online courses, and vocational training in AI/ML.	Ministry of Education, Universities, Private Sector	A larger pool of skilled AI practitioners and researchers; a self-sustaining talent pipeline.
	5. Scale Successful Pilot Solutions	Transition early-stage AI projects into nationwide implementations in domains like healthcare, agriculture, smart cities, etc.	Sector Ministries, Regional Governments, NGOs	Tangible impact on social services, economic productivity, and public sector efficiency.
	6. Strengthen Policy & Regulatory Frameworks	Refine or enact legislation addressing AI ethics, bias mitigation, liability, and data sharing; establish regulatory sandboxes.	Lawmakers, Regulatory Agencies, Legal Experts	Clear legal structures ensuring responsible, fair, and transparent AI adoption across industries.
Long Term (5+ yrs)	7. Foster Advanced R&D & Innovation Clusters	Create technology parks, research centers, and incentives to attract AI startups and international collaborations.	Science & Tech Ministries, Tech Investors, Global Partners	Ongoing breakthroughs in AI capabilities, spurring economic growth and global competitiveness in high-value sectors.
	8. Integrate AI into National Ecosystems & Public Services	Embed AI systems across government services (e.g., e-governance, transport, environmental monitoring) and private industries.	Central & Local Governments, Corporate Sector, Citizens	Highly digitized, data-driven governance and business ecosystems, improved public service delivery, and robust AI-based economy.
	9. Establish Continuous Monitoring & Evaluation	Set up metrics to assess AI's socio-economic impact, resource usage, and policy efficacy; refine strategies based on findings.	AI Governance Bodies, Statistical Agencies, Independent Auditors	Sustainable, evidence-based AI governance; iterative improvements to maintain relevance and public trust.

In the *medium term (2–5 years)*, the emphasis transitions to scaling up and institutionalizing initiatives. The primary focus is on broadening AI-related education and training programs through universities and vocational training to develop a proficient workforce. Successful pilot projects are anticipated to expand nationally, influencing critical sectors like healthcare, agriculture, and urban development. At the same time, it is

essential to enhance policy and regulatory frameworks to tackle new challenges, such as ethical dilemmas and liability issues. Stakeholders include educational institutions, private sector collaborators, lawmakers, and regulators, all working together to create a robust and inclusive AI ecosystem.

Over the longer term (*five years and beyond)*, national strategies could promote innovation and deeply integrate AI into governance and industrial frameworks. The creation of AI research and development clusters, technology parks, and international partnerships is expected to stimulate ongoing innovation and attract investments. Furthermore, incorporating AI into public services—such as e-governance, transportation, and environmental monitoring—will enhance service delivery and boost economic competitiveness. This phase aims to create a fully digital, AI-powered society that involves ministries, the private sector, and citizens, all supported by robust infrastructure and cohesive policies.

Ultimately, a key principle of project management is to maintain ongoing ***monitoring and evaluation*** to assess the socio-economic impacts of AI and adjust strategies accordingly. This involves establishing governance bodies and auditing systems to ensure policies remain effective, inclusive, and adaptable. The goal is to achieve sustainable, evidence-based governance of AI that fosters public trust and aligns with changing national objectives. Collectively, these phased priorities outline a clear roadmap for responsible, scalable, and transformative AI adoption at the national level.

8. Preliminary recommendations

Based on the study's analysis, the following recommendations are provided for LDCs, LLDCs, and SIDS in the Asia-Pacific region regarding national AI adoption, with suggested projects or activities tailored to each country's stage of AI development.

1. Develop a National AI Vision and Strategy corresponding to the developmental objectives, sustainability targets, and inclusive digital transformation. This strategy must involve broad stakeholder consultation, including academia, private sector, and civil society. Suggested activities include national workshops, regional consultations, and publication of a strategic roadmap.

2. Establish a national AI task force or governance body to create a centralized organization for overseeing AI policy coordination, standard-setting, and project alignment across ministries and sectors. This organization should include experts in technology, ethics, law, and development planning. Initial efforts can focus on capacity building and establishing a permanent secretariat.

3. Establish Data Governance and Privacy Frameworks: Implement or enhance legal structures for data protection, privacy, and ethical AI usage. These frameworks are essential for fostering public confidence and safeguarding human rights within digital systems. Efforts may involve legal reforms, public engagement, and training programs for regulators.

4. Invest in Digital and AI Infrastructure: Enhance digital infrastructure, including broadband, data centers, and cloud computing platforms, to facilitate AI deployment. Focus on developing infrastructure in underserved rural or remote regions to promote inclusivity. Governments can collaborate with international donors or the private sector to jointly fund infrastructure initiatives.

5. Initiate Public AI Awareness Campaigns: Enhance public comprehension of AI technologies via media initiatives, community discussions, and inclusion in educational curricula. This awareness nurtures trust and equips society to interact with AI ethically and purposefully. Proposed projects comprise radio broadcasting, AI exhibitions, and competitions at the school level.

6. Establish Open Government Data Platforms: Providing open access to public datasets can stimulate local innovation and enhance AI development. These platforms ought to focus on high-impact areas like health, agriculture, education, and climate. Key activities involve digitizing historical data, improving metadata quality, and creating usage policies.

7. Develop AI-Ready Education Policies: Integrate AI and data science courses into secondary and tertiary education systems to equip upcoming generations. The curriculum should emphasize both technical expertise and ethical implications. Governments can collaborate with universities and ed-tech companies to jointly create content.

8. Offer Vocational and Workforce Training in AI: Initiate short-term technical training programs and certifications designed for youth and workers moving into the digital economy. These programs should incorporate practical experience with machine learning tools and platforms. Recommended activities feature coding bootcamps and AI-for-development training.

9. Support Women and Marginalized Groups in AI: Foster inclusion by providing AI scholarships, mentorship opportunities, and community initiatives aimed at women and marginalized populations. This approach guarantees diverse viewpoints and equity within the AI workforce. Initiatives might encompass women-in-tech networks, role model campaigns, and safe educational environments.

10. Initiate AI Pilot Projects in Key Areas: Implement AI solutions in agriculture, healthcare, education, or disaster response to showcase their effectiveness and foster local insights. These pilot projects must be cost-effective, scalable, and developed with community involvement. Illustrative examples include AI systems for crop advice or tools for predicting disease outbreaks.

11. Expand Successful Pilots into National Initiatives: Once pilot projects prove effective, broaden their reach for national implementation. Governments ought to finance the expansion process and weave these programs into public service frameworks. This could encompass comprehensive nationwide AI-enabled health triage systems or intelligent irrigation solutions.

12. Establish AI Regulatory Sandboxes: Enable startups and developers to test AI innovations within supervised and adaptable regulatory environments. These sandboxes can drive innovation while ensuring ethical oversight. Governments can offer legal frameworks and operational support to assist in this process.

13. Encourage Local AI Startups and Experts: Establish innovation funds and tax benefits for small enterprises creating AI solutions that address local issues. Public-private innovation contests can draw talent and stimulate investment. These activities may involve AI hackathons, grant competitions, and incubator programs.

14. Promote Regional and South-South Collaboration: Work together with neighboring nations to address common AI issues, develop standards, and enhance capacities. Regional partnerships can facilitate the sharing of resources and expertise.

Possible initiatives may involve establishing regional AI centers, conducting joint research projects, and exchanging technology.

15. Adapt AI Tools and Language Models: Create AI models in regional languages and dialects to enhance accessibility and fit cultural contexts. Localization facilitates wider application in sectors like governance, education, and healthcare. Potential projects could encompass NLP tools, voice assistants, or AI tutors in indigenous languages.

16. Encourage AI Utilization for Environmental Monitoring and Climate Adaptation: Utilize AI to assess climate threats, monitor deforestation, and evaluate air and water quality, along with refining disaster response strategies. These technologies can significantly boost resilience, especially in island and coastal regions. Potential projects comprise AI satellites for reef health assessment and early warning systems for cyclones.

17. Incorporate AI in Public Administration: Utilize AI technology to digitize public services, enhance document processing, deploy citizen service chatbots, and improve fraud detection. This approach boosts governance efficiency and transparency. Initial pilot projects could focus on high-demand areas such as licensing, benefits, and e-health.

18. Establish Research and Innovation Clusters: Assist universities and innovation centers in performing applied AI research that is pertinent to local contexts. These clusters can also draw in international partnerships and funding. Recommended activities encompass research fellowships, innovation hubs, and co-working laboratories.

19. Create Metrics to Assess AI Impact: Establish indicators to measure the socio-economic, ethical, and environmental effects of AI. Regular reporting can inform policymaking and enhance accountability. Essential activities include baseline studies, national AI dashboards, and evaluations by external parties.

20. Ensure Long-Term Policy Adaptability: AI governance must evolve alongside technology. Establish mechanisms for regular policy updates, stakeholder input, and scenario planning. Governments should institutionalize policy review cycles and maintain interdisciplinary advisory boards.

Annexes

Country AI Profiles

Bangladesh

Bangladesh has recognized artificial intelligence (AI) as a transformative technology capable of driving national development and economic growth. The country has articulated its ambitions through the National Strategy for Artificial Intelligence of Bangladesh, developed under the a2i (Aspire to Innovate) program. This strategy prioritizes seven sectors—health, agriculture, education, smart mobility, finance, manufacturing, and public service delivery—for AI integration. The overarching goal is to enhance governance, improve service efficiency, and foster innovation in alignment with the broader "Smart Bangladesh Vision 2041," which aims to transform Bangladesh into a knowledge-based, innovative, and inclusive economy (a2i, 2020; Chambers and Partners, 2024).

Significant progress has been made across sectors through both government-led and grassroots AI initiatives. In healthcare, AI is used for the early detection of diabetic retinopathy and personalized maternal health monitoring (Islam et al., 2021; APRU, 2023). In agriculture, smart farming pilots integrate AI and IoT for real-time monitoring and boosting productivity. EdTech platforms like Science Bee are leveraging AI to provide STEM education to rural students, while legal tech initiatives are exploring AI-powered language models for processing legal documents in Bengali (Wikipedia, 2024; Islam et al., 2023). AI is also gaining traction in transportation, particularly in Dhaka, with vehicle detection systems designed to alleviate traffic congestion (Rahman et al., 2023).

Despite its expanding AI ecosystem, Bangladesh encounters significant challenges, including limited R&D infrastructure, a shortage of skilled professionals, and worries about data governance and AI ethics. To tackle these issues, the government is investing in high-tech parks, AI education, and public-private partnerships, while also creating localized AI ethics frameworks (Ahmed et al., 2023). With strategic planning and ongoing investment, Bangladesh has the potential to emerge as a regional leader in responsible and inclusive AI deployment.

The following are examples of AI adoption in multiple sectors in Bangladesh.

Sector	Initiative	Description	Reference
Healthcare	AI in Pregnancy Monitoring	AI-based personalized pregnancy monitoring system to improve maternal healthcare.	Asia-Pacific Research University. (2023).
Healthcare	AI in Diabetic Retinopathy Screening	Use of CNN models to detect diabetic retinopathy among Bangladeshi patients.	Islam, M. T., et al. (2021).

Agriculture	Smart Farming Initiatives	Integration of AI technologies to improve agricultural productivity and sustainability.	Chambers and Partners. (2024).
Legal Services	AI-Powered Legal Assistance	Development of legal AI tools to assist in legal research and court processes.	Islam, M. T., et al. (2023).
Transportation	AI in Traffic Management	Vehicle detection using YOLOv9 model to manage traffic congestion in Dhaka.	Rahman, M. et al. (2023).
Education	Science Bee EdTech Platform	STEM education platform using AI to provide accessible learning resources.	Wikipedia contributors. (2024).
Finance	AI in Financial Crime Detection	Adoption of NLP and ML to detect fraudulent transactions and financial crime.	Chambers and Partners. (2024).
Research and Ethics	AI Ethics Framework	Development of a local AI ethics framework to guide responsible AI deployment.	Ahmed, S. et al. (2023).

Fiji

Fiji is actively exploring the transformative potential of Artificial Intelligence (AI) to enhance public services, improve disaster resilience, and modernize education. As a Small Island Developing State (SIDS), Fiji faces unique challenges—including vulnerability to climate change, limited infrastructure, and resource constraints—which make the adoption of AI both critical and complex. The Fijian government has expressed a growing interest in integrating AI into its development agenda, particularly through international partnerships and pilot programs. Although Fiji does not yet have a formal national AI policy, collaborations with global tech firms and development agencies have initiated AI-driven solutions in aviation, disaster management, and education (UNDP, 2022).

One of the most innovative AI initiatives in Fiji is its partnership with Tractable and the United Nations Capital Development Fund (UNCDF) to implement AI-powered disaster recovery tools. This project enables affected communities to use a smartphone app that employs computer vision to assess property damage after cyclones or floods. The app accelerates insurance evaluations and facilitates quicker recovery processes—an essential capability in a country frequently impacted by natural disasters (UNCDF, 2023). Fiji Airways has partnered with Assaia to deploy the AI-based Turnaround Control system in the transportation sector. This solution uses real-time video analytics to optimize aircraft turnaround times, enhancing operational efficiency and ensuring timely departures (Fiji Airways, 2024).

Fiji has taken a progressive approach to education by partnering with EON Reality to establish the nation's first Spatial AI Center. This center enables the delivery of over 10,000 customized courses that incorporate Extended Reality (XR) and AI technologies. The objective is to provide students and professionals with immersive, future-ready learning

experiences while enhancing national digital literacy. This initiative aligns with Fiji's broader strategy to develop a resilient and inclusive digital economy and prepare its workforce for the Fourth Industrial Revolution (EON Reality, 2023). Although Fiji is in the early stages of its AI journey, these initiatives illustrate a strong commitment to leveraging AI for sustainable development, education, and resilience.

The following are examples from Fiji that use AI technologies.

Sector	Initiative	Description	Reference
Disaster Recovery	AI-Powered Damage Assessment App	Tractable, in partnership with UNCDF, launched a smartphone app using AI and computer vision to assess post-disaster property damage, enabling faster recovery and insurance claims.	UNCDF. (2023, June 6).
Aviation	Turnaround Control AI System	Fiji Airways implemented Assaia AI-powered Turnaround Control system to optimize aircraft turnaround times using real-time video analytics.	Fiji Airways. (2024, March 7).
Education	Spatial AI Center and XR Learning Platform	EON Reality partnered with Fiji to launch its first Spatial AI Center, offering over 10,000 XR-based AI-integrated courses for immersive education.	EON Reality. (2023, July 13).

Mongolia

Mongolia is actively developing its artificial intelligence (AI) capabilities to drive economic growth and technological advancement. In collaboration with the United Nations Development Programme (UNDP), the Mongolian government is formulating a national strategy for artificial intelligence, focusing on sectors such as mining and energy. The country's unique climate and abundant energy resources make it an attractive destination for AI infrastructure investments. This strategic initiative aims to harness AI's potential to enhance productivity and foster innovation across various industries (Montsame News Agency, 2025).

Mongolia showcased its commitment to AI development at the 2025 World Economic Forum in Davos, where the delegation emphasized the importance of attracting investments in AI education, training, and its integration into both business and government services. These initiatives are part of a broader strategy to diversify the economy beyond mining and to cultivate human capital skilled in navigating the digital landscape. Nevertheless, challenges such as bridging the digital divide and securing adequate investments in the digital sector continue to persist.

To further its AI goals, Mongolia has partnered with the World Economic Forum to develop an AI-focused Strategic Intelligence platform. This platform is designed to improve strategic decision-making by providing extensive insights into important sectors crucial to Mongolia's economic and industrial progress. By leveraging advanced technologies and

international knowledge, Mongolia aims to modernize governance and expedite economic growth in alignment with its 'Vision 2050' initiative.

Following are the latest examples of Mongolia's effort in AI adoption.

Sector	Initiative	Description	Reference
National Policy	National Strategy for Artificial Intelligence	Mongolia, in partnership with UNDP, is developing a national AI strategy focusing on strategic sectors such as energy, mining, and digital innovation.	Montsame News Agency. (2025, February 13).
Economic Development	AI Promotion at World Economic Forum	The Mongolian government promoted AI investment opportunities at Davos 2025, highlighting initiatives in AI education, business integration, and diversification beyond mining.	Lkhaajav, B. (2025, January 29).
Governance	Strategic Intelligence Platform with WEF	Mongolia partnered with the World Economic Forum to build an AI-driven platform that supports strategic planning and governance in key sectors.	Government of Mongolia. (2025, January 21).

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