

AI Readiness, Capability Gaps, and Productivity Pathways

in Selected APO Members

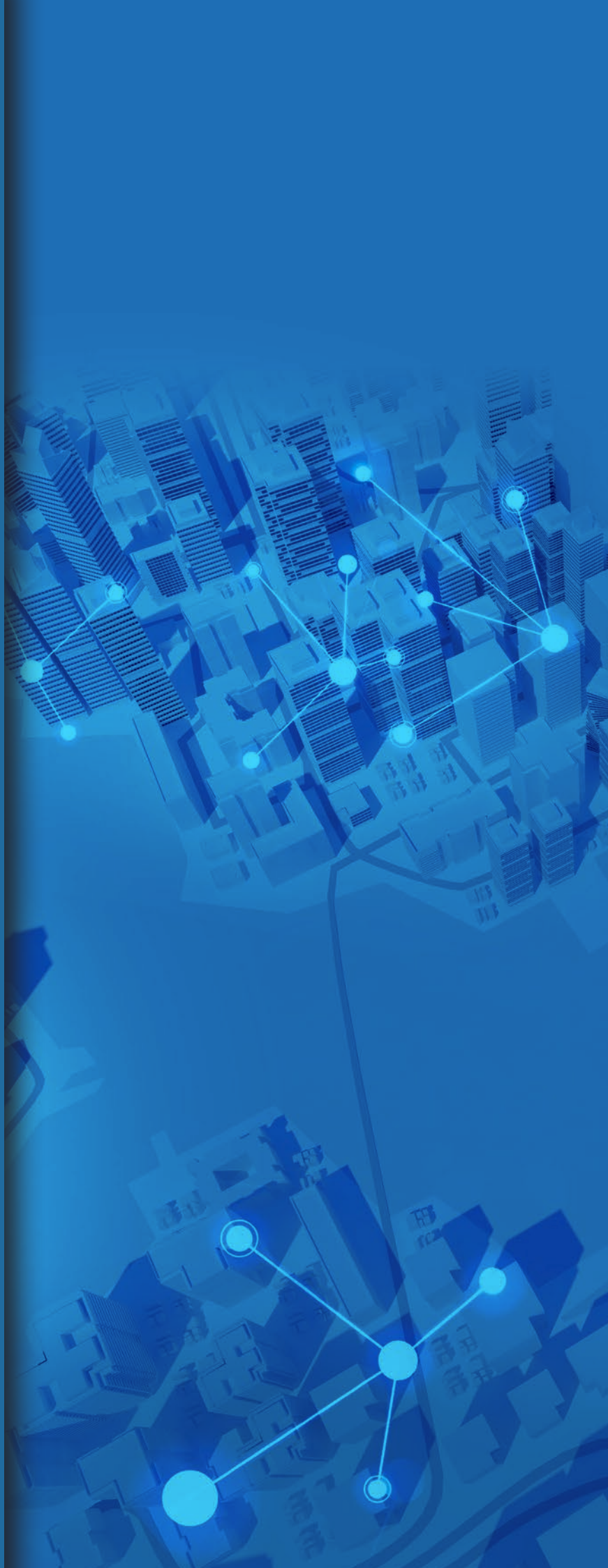
Asian Productivity Organization



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CONTENTS

FOREWORD	ix
EXECUTIVE SUMMARY	x
PART I: CONTEXT AND FOUNDATIONS	1
CHAPTER 1 – OVERVIEW	2
AI and the Digital Divide	2
Objectives of the Study	2
AI and the Knowledge Economy	3
Research Questions	4
Avenues for Future Research	4
CHAPTER 2 – AI READINESS AND STRUCTURAL TRANSFORMATION	5
The Emergence and Importance of AI	5
AI as a General-purpose Technology	5
AI as a New Basis of National Advantage	7
Structural Transformation Driven by AI Innovation	10
From Industrial Upgrading to the Knowledge Economy	10
Essential Enabling Prerequisites: Inclusion, Trust, and Governance	13
AI Readiness as a Systemic Capability	14
The Need for a Policy Response: Uncertainty, AI Utilization, and Economic Outcomes	14
PART II: ANALYTICAL FRAME AND DIAGNOSTIC ASSESSMENT OF AI POLICIES	16
CHAPTER 3 – ANALYTICAL FRAMEWORK AND METHODOLOGY	17
Framework Overview	17
Methodological Rationale	17
Analytical Framework	18
Methodology	18
Scope of Work	19
Annex A. Summary of the Provided Scope of Work	19
AI Policy Landscape	21
Global Trends in AI Policy	21
AI Policies in APO Member Economies	22
Survey Results and Capability Gaps	23
Member-level AI Readiness Assessment Results	23
PART III: NATIONAL AI ECOSYSTEMS – ASSESSMENT, POSITIONING, AND ROADMAP	31
CHAPTER 4 – STRUCTURE AND ANALYTICAL APPROACH TO MEMBER ECONOMIES' PROFILES	32
AI Ecosystem Baseline Assessment	32
National AI Policies and Strategies	32
Key Stakeholder Mapping	33
Strategic Positioning and Recommendations	33
Future Needs and Collaboration Pathways	33
Cross-cutting Needs	33
Collaboration Pathways	34

CHAPTER 5 – INDIA	35
AI Ecosystem Baseline Assessment	35
Global Benchmarking and Adoption Metrics	35
AI Adoption in India	35
AI R&D in India	38
AI Workforce in India	39
National AI Policies and Strategies	41
India's National AI Strategy	41
India's AI Policies	43
Summary of AI-related Policies and National Strategies	48
Key Stakeholder Mapping	50
Private Sector	50
Other Core Products and Services	51
Public Sector and Parastatals	52
Use Cases and Investment	56
Strategic Positioning and Recommendations	58
SWOT Analysis	58
Summary	62
Future Needs and Collaboration Pathways	63
Domestic Priorities	63
Collaborations Opportunities	65
APO Joint Initiatives	66
 CHAPTER 6 – JAPAN	 68
AI Ecosystem Baseline Assessment	68
Manufacturing Automation	68
AI R&D and Investment in Japan	68
Patent Activity and Intellectual Property Development	68
AI Workforce in Japan	70
National AI Policies and Strategies	71
National AI Strategy in Japan	72
AI Policies of Japan	72
Key Stakeholder Mapping	76
Private Sector	76
Public Sector and Parastatals	78
Potential Entry Points for APO Collaboration	80
Strategic Positioning and Recommendations	84
SWOT Analysis	85
Summary	90
Future Needs and Collaboration Pathways	90
Domestic Priorities	90
Collaboration Opportunities	91
APO Joint Initiatives	92
 CHAPTER 7 – REPUBLIC OF KOREA	 95
AI Ecosystem Baseline Assessment	95
AI Research and Development (R&D) and Investment in the ROK	98
AI Workforce in the ROK	103
National AI Policies and Strategies	104
National AI Strategy of the ROK	104
AI Policies of the ROK	106

Key Stakeholder Mapping	107
Private Sector	107
Public Sector and Parastatals	109
Potential Entry Points for APO Collaboration	112
Strategic Positioning and Recommendations	117
SWOT Analysis	117
Summary	120
Future Needs and Collaboration Pathways	120
Domestic Priorities	120
Collaboration Opportunities	121
APO Joint Initiatives	122
 CHAPTER 8 – LAO PDR	 124
AI Ecosystem Baseline Assessment	124
AI Adoption in Lao PDR	124
AI R&D and Investment in Lao PDR	124
National AI Policies and Strategies	126
Key Measures and Programs	127
Key Stakeholder Mapping	130
Private Sector	130
Public Sector and Parastatals	131
Use Cases and Adoption Signals	132
Strategic Positioning and Recommendations	134
SWOT Analysis	134
Summary	138
Future Needs and Collaboration Pathways	138
Domestic Priorities	138
Collaboration Opportunities	139
APO Joint Initiatives	140
 CHAPTER 9 – MALAYSIA	 142
AI Ecosystem Baseline Assessment	142
AI Adoption in Malaysia	142
AI Workforce in Malaysia	144
AI R&D and Investment in Malaysia	145
National AI Policies and Strategies	148
National AI Strategy of Malaysia	148
AI Policies in Malaysia	149
Key Stakeholder Mapping	153
Private Sector	153
Public Sector and Parastatals	154
Academia	155
Strategic Positioning and Recommendations	157
SWOT Analysis	157
Summary	159
Future Needs and Collaboration Pathways	160
Domestic Priorities	160
Collaboration Opportunities	161
APO Joint Initiatives	161

CHAPTER 10 – MONGOLIA	162
AI Ecosystem Baseline Assessment	162
AI Adoption in Mongolia	162
AI R&D and Investment in Mongolia	163
AI Workforce in Mongolia	163
National AI Policies and Strategies	163
Key Measures and Programs	163
Policy Analysis	165
Key Stakeholder Mapping	167
Private Sector	167
Public Sector and Parastatals	168
Strategic Positioning and Recommendations	171
SWOT Analysis	171
Summary	174
Strategic Implications	174
Future Needs and Collaboration Pathways	175
Domestic Priorities	175
Collaboration Opportunities	176
APO Joint Initiatives	176
 CHAPTER 11 – NEPAL	 178
AI Ecosystem Baseline Assessment	178
AI Adoption in Nepal	178
AI R&D and Investment in Nepal	180
AI Workforce in Nepal	181
National AI Policies and Strategies	181
National AI Strategy of Nepal	181
Key Measures and Programs	183
Key Stakeholder Mapping	184
Private Sector	184
Public Sector and Parastatals	186
Academia	187
Strategic Positioning and Recommendations	188
SWOT Analysis	188
Summary	191
Future Needs and Collaboration Pathways	192
Domestic Priorities	192
Collaboration Opportunities	192
APO Joint Initiatives	193
 CHAPTER 12 – PAKISTAN	 194
AI Ecosystem Baseline Assessment	194
AI Adoption in Pakistan	194
AI R&D and Investment in Pakistan	197
AI Workforce in Pakistan	198
National AI Policies and Strategies	199
National AI Strategy of Pakistan	199
Key Measures and Policies	200
Key Stakeholder Mapping	202
Private Sector	202
Public Sector and Parastatals	205
Strategic Positioning and Recommendations	206
SWOT Analysis	207

Summary	212
Future Needs and Collaboration Pathways	213
Domestic Priorities	214
Sectoral Integration and Inclusivity	214
Collaboration Opportunities	214
APO Joint Initiatives	215
 CHAPTER 13 – SRI LANKA	 217
AI Ecosystem Baseline Assessment	217
AI Adoption in Sri Lanka	217
AI Adoption by Sector	218
National AI Policies and Strategies	219
National AI Strategy of Sri Lanka	219
AI Policies in Sri Lanka	220
Key Stakeholder Mapping	223
Private Sector	223
Public Sector and Parastatals	225
Academia and Research	226
Strategic Positioning and Recommendations	227
SWOT Analysis	228
Summary	230
Future Needs and Collaboration Pathways	230
Domestic Priorities	230
Collaboration Opportunities	231
APO Joint Initiatives	231
 CHAPTER 14 – TURKIYE	 232
AI Ecosystem Baseline Assessment	232
AI Adoption in Turkiye	232
AI R&D and Investment in Turkiye	236
National AI Policies and Strategies	240
National AI Strategy of Turkiye	240
Key Programs and Measures	242
Key Stakeholder Mapping	244
Private Sector	245
Public Sector and Parastatals	246
Academia and Research	248
Ecosystem Events and Professional Associations	249
Strategic Positioning and Recommendations	249
SWOT Analysis	250
Summary	254
Future Needs and Collaboration Pathways	255
Domestic Priorities	255
Collaboration Opportunities	256
APO Joint Initiatives	257
 CHAPTER 15 – VIETNAM	 258
AI Ecosystem Baseline Assessment	258
AI Adoption in Vietnam	258

AI R&D and Investment in Vietnam	258
National AI Policies and Strategies	260
National AI Strategy of Vietnam	260
Key Policies and Measures	261
Safety and Ethics	261
Cooperation and Partnerships	262
Key Stakeholder Mapping	262
Private Sector	262
Public Sector and Parastatals	264
Academia and Research	264
Civil Society and International Partners	265
Strategic Positioning and Recommendations	265
SWOT Analysis	265
Summary	268
Future Needs and Collaboration Pathways	268
Domestic Priorities	268
Collaboration Opportunities	270
APO Joint Initiatives	270
 PART IV: CONCLUSION AND FUTURE DIRECTIONS	 271
CHAPTER 16 – TOWARD INCLUSIVE AI PROSPERITY THROUGH STRATEGY AND COOPERATION	272
The Importance of Systemic Capacity Building and the AI Transition	272
State of AI among APO Members	273
Policy Recommendations: Three Strategic Tasks for Mutual AI Prosperity	283
Contributions to the Literature and Avenues of Future Research	284
 REFERENCES	 285
 LIST OF TABLES	 318
 LIST OF FIGURES	 320
 ABBREVIATIONS AND ACRONYMS	 322
 LIST OF CONTRIBUTORS	 332

FOREWORD

Artificial intelligence (AI) is rapidly reshaping productivity and economic competitiveness as organizations worldwide integrate it into manufacturing, services, public administration, and innovation systems. However, the pace and depth of AI adoption remain uneven. Differences in digital infrastructure, workforce preparedness, institutional coordination, and policy capacity have resulted in varying levels of AI readiness. As AI increasingly shapes productivity outcomes, these disparities risk widening structural gaps rather than narrowing them.

In this context, it is essential to understand not only where economies stand in terms of AI adoption but also what they require to progress. Many economies have introduced AI-related initiatives and strategies, but capability gaps constrain effective implementation, as weak AI readiness limits organizations' ability to leverage AI for productivity gains. Identifying these gaps requires a structured, comparative needs assessment to ensure AI efforts align with national development priorities and are supported by appropriate capacity-building strategies.

This report provides a comprehensive and comparative analysis of AI readiness and capacity across 11 APO member economies, highlighting differences in adoption patterns, infrastructure conditions, workforce capabilities, institutional maturity, and ecosystem development. It identifies priority areas to strengthen diffusion, workforce transition capacity, and governance frameworks, linking readiness to broader productivity transformation. In doing so, the report clarifies the structural conditions shaping AI diffusion and pinpoints areas where national capacity and productivity transformation can be enhanced.

The APO extends its gratitude and appreciation to all experts who contributed to this report, led by the Korea Institute for Industrial Economics and Trade (KIET) as well as to the national experts from India, Japan, Lao PDR, Malaysia, Mongolia, Nepal, Pakistan, Sri Lanka, Türkiye, and Vietnam. We hope the findings and recommendations in this report strengthen regional cooperation, guide capacity-building initiatives, and support the effective, responsible, and productivity-enhancing adoption of AI across the Asia-Pacific region.

Dr. Indra Pradana Singawinata
Secretary-General
Asian Productivity Organization
Tokyo

EXECUTIVE SUMMARY

Artificial intelligence (AI) technology is rapidly advancing and has become a transformational force, reshaping economies and influencing the trajectory of sustainable development. In response, this research aims to inform actionable strategies that improve the utilization of AI and maximize its positive impacts among the Asian Productivity Organization's (APO) members. It does so by providing a comprehensive assessment of AI readiness and cooperation potential within the APO bloc.

First, the study presents a survey of recent global AI trends and identifies their implications for productivity, industrial upgrading, and inclusive growth. It then evaluates the AI capabilities across the APO member economies through a structured SWOT framework, identifying strengths, weaknesses, opportunities, and threats at the national level. Building on this diagnostic assessment, the study outlines member-specific needs for AI adoption and performance enhancement, and proposes differentiated policy directions and collaborative frameworks to promote shared prosperity in the AI era.

This research builds upon the findings of the 2025 APO report “AI and the Knowledge Economy”, which examined AI from the perspective of the knowledge economy and sustainable growth. The earlier study empirically demonstrated significant disparities in AI capabilities among APO member economies using patent data and identified fields ripe for intra-bloc cooperation based on national policy trends. The work was a pioneering effort to systematically map AI progress within the APO framework. However, its reliance on patent-based indicators and policy announcements limited its ability to capture qualitative factors, such as workforce capabilities, institutional readiness, and real-time digital adoption dynamics.

To address these limitations, the present study adopts a broader analytical approach, incorporating multiple AI-related indicators that reflect the status of infrastructure, human capital, institutional conditions, and digital ecosystems. Furthermore, rather than relying solely on official policy announcements and documents, it utilizes a standardized survey framework developed in collaboration with National Experts to capture multifaceted and demand-driven cooperation needs. Particular attention is given to practical collaboration between relatively advanced AI economies (especially Japan, the Republic of Korea, and India) and developing members seeking to accelerate digitization and AI adoption. Recognizing that APO members are at diverse stages of economic and industrial development, the study emphasizes differentiated, inclusive, and demand-oriented cooperation strategies.

The results of the analysis point to three overarching strategic priorities for promoting mutual AI prosperity within the APO community. First, there is a pressing need to establish trust-based common governance and institutional integration. As global AI norms are largely shaped by North America and Europe, APO members should pursue standardization efforts that reflect the unique socioeconomic contexts and cultural values of the bloc. Regional data

interoperability standards, ethical guidelines for trustworthy AI, and the creation of an APO Policy Sandbox would facilitate cross-border experimentation and scaling of innovative services while strengthening the collective voice of APO members in international standard-setting processes.

Second, it is essential to strengthen human capital development and operationalize knowledge-sharing ecosystems within the bloc to narrow intra-APO capacity gaps. Institutionalizing an APO-wide knowledge-sharing platform would enable systematic diffusion of policy best practices from frontier to foundational economies. Cooperative initiatives, such as an AI Labor Mobility Program, joint certification schemes, and an APO Common AI Literacy Certification for workers could address talent shortages, mitigate brain drain, and reduce labor market polarization. Such efforts would foster a virtuous cycle of workforce development and utilization, enhancing the overall value of digital human capital across the region.

Third, shared technical collaboration platforms and physical infrastructure would help APO members overcome resource constraints that hinder AI adoption and utilization. In particular, the establishment of an APO Regional Data and Computing Center could provide affordable access to high-performance computing resources for SMEs and start-ups, facilitating AI development and commercialization. In parallel, the creation of an APO Data Commons aggregating sector-specific data would enhance the efficiency of joint R&D and cross-border innovation, strengthen the regional AI ecosystem, and safeguard collective interests in a global digital landscape characterized by the concentration of data and assets among a small number of dominant firms.

Overall, this study contributes to the literature by offering a systematic and comparative overview of the AI landscape in the Asia-Pacific region through a unified analytical framework that integrates both quantitative and qualitative indicators. By providing in-depth, member-level analyses that reflect distinct developmental and industrial contexts, it offers practical guidance for tailored national AI strategies and effective cooperation models.

Moreover, the findings of this research and the data generated constitute a valuable intellectual foundation for advancing AI-driven digital transformation and sustainable development across APO member economies. Future research may further refine measurement methodologies, deepen sector-specific analyses, and evaluate the long-term impact of intra-APO cooperation initiatives to ensure that AI serves as a catalyst for inclusive and sustainable growth across the region.



PART I

CONTEXT AND FOUNDATIONS

CHAPTER 1

OVERVIEW

AI and the Digital Divide

Artificial intelligence (AI) has become a cornerstone of digital transformation. With all the hallmarks of a quintessential general-purpose technology (GPT), it is poised to trigger a cascade of successive innovations that touches every sector of the economy. However, despite high expectations and strong potential for innovation, significant uncertainty remains about the actual performance and economic outcomes of AI advancement and diffusion. Generative AI (GenAI), in particular, exemplifies how rapidly a new technology can reshape the technological, investment, and policy landscape.

Compared to previous waves of innovation, AI is expected to induce qualitatively different transformations in industrial competitiveness, labor markets, and governance systems, demanding a more comprehensive and forward-looking policy response.

To realize the full potential of AI, investment in intangible assets and robust institutional support are required. Without intangible assets such as organizational restructuring, the upskilling of human capital and institutional frameworks for regulatory reform, there is a substantial risk that AI will fail to translate into immediate productivity gains or enhanced social welfare.

This disparity is further exacerbated by the uncertainty surrounding the tangible benefits of AI. Currently, AI utilization is largely concentrated among a small number of technologically capable firms while others remain hesitant due to a lack of necessary infrastructure and skills. When expected returns fail to materialize, these firms may scale back their initiatives, leading to a “cycle of delayed adoption.” Ultimately, these disparities in firm-level utilization deepen the technological and economic divide between member economies, necessitating targeted interventions to bridge the gap.

Furthermore, the advancement of AI technology is expected to widen existing economic and industrial development gaps between nations. For one, intensive AI adoption and integration is currently limited to a small number of enthusiastic firms; many in the private sector remain uncertain and even skeptical of the benefits of AI adoption, and this has the potential to exacerbate the existing divides between early adopters and laggards.

These firm-level disparities contribute to widening international divides. Variations in national capacity, determined by intangible assets and institutional readiness, are decisive factors in a member’s development trajectory. AI has the power to drive structural changes and national growth, but differences in corporate and national capabilities may inadvertently worsen structural disparities and sap economic vitality.

Objectives of the Study

The primary objective of this study is to develop strategies to enhance AI utilization and maximize its impact among member economies of the Asian Productivity Organization (APO). To this end, the study first provides an overview of the recent rise and trends of AI as well as key issues regarding its role in structural economic change and sustainable development. Second, it diagnoses the current state of AI in each member economy through a SWOT analysis (strengths, weaknesses, opportunities, and threats). Third, the specific needs for AI utilization and performance at the national level are analyzed

in detail. Based on these findings, this study derives policy directions for each member and proposes collaborative policy frameworks among APO members to ensure sustainable growth in the era of AI.

AI and the Knowledge Economy

This research serves as a follow-up to the 2025 APO study, also known as “AI and the Knowledge Economy”. This report examined AI through the lens of the knowledge economy and sustainable growth, describing their linkages and identifying key challenges for sustainable development. By utilizing patent data, the authors empirically demonstrated significant disparities in AI capabilities among APO members and suggested potential sectors for cooperation based on national policy trends. While the APO study (2025) was the first attempt to construct an extensive survey of APO members’ progress in relation to AI and the knowledge economy, there remains a need for more detailed analysis and refined methodologies to derive actionable policy solutions.

To address these gaps, this present study explores avenues of practical cooperation between APO members, focusing on how nations with relatively more advanced AI capabilities, such as Japan, the Republic of Korea (ROK), and India, could partner with developing economies to facilitate digitization and AI adoption. APO members are at different stages of development, and this mandates a differentiated and demand-driven approach. Intra-APO cooperation projects with strong potential include technology transfers, talent exchanges, and joint R&D initiatives. Endeavors such as these promise a more inclusive technological foundation for shared prosperity going forward.

The following table summarizes the ways in which this report expands on the foundational work of APO study (2025).

TABLE 1.1

APO (2025) AND THE PRESENT STUDY

Category	APO (2025)	This Study (Follow-up & Expansion)
Primary Focus	Linkages between AI and the knowledge economy; macro trends	Practical policy needs and actionable cooperation strategies
Data Source	Patent data analysis (quantitative)	Multidimensional AI indicators and national expert surveys
Analytical Method	Empirical analysis of innovation capacity (patents)	SWOT analysis, AI Readiness Frame evaluation
Strategic Insight	Broad identification of cooperation sectors/functions	Identification of specific policy implications and operational schemes
Addressed Limitation	Time lag and technical bias of patent-based metrics	Capture of real-time needs and intangible readiness (skills, etc.)

Source: Compiled by the authors.

Overall, in comparison to the 2025 APO study, this work represents a more sophisticated comparative analysis of the AI infrastructure and capabilities of the APO member economies. It also seeks to identify specific national needs. The AI and the Knowledge Economy study used patent data to assess innovation capacity, but this approach has clear limitations, including registration delays. It also struggled to capture qualitative factors like workforce skills. This study, by contrast, incorporates a broader range of AI-related indicators to capture a more realistic portrait of the current state of digitization and AI adoption across APO member economies. Furthermore, while the APO study (2025) identified cooperation sectors based on official policy announcements, this study aims to identify multifaceted cooperation needs through a standardized survey framework shared with national experts.

Research Questions

The basic research questions of this study are as follows:

1. What is the current state of AI readiness, infrastructure, and institutional capacity across the APO member economies?
2. What are the key barriers and capability gaps hindering AI adoption for productivity enhancement?
3. How do the AI-related needs and priorities differ among APO members, and what opportunities exist for targeted capacity-building?
4. What strategic approaches can the APO pursue to support inclusive and effective AI-driven productivity growth?

Avenues for Future Research

While the fundamental analysis of this report draws on the results and implications of qualitative surveys, which limits direct numerical comparison across APO members, comparative statistics (such as the OECD AI Diffuse Project) are currently available only for a small number of developed nations. This analysis therefore contributes significantly to a better understanding of the digital and AI landscape in developing economies with low levels of data availability and provides one of the most complete portraits of AI adoption and the policy landscape for APO members. Despite some challenges in verifying the objectivity of individual expert judgments, the use of a comparable framework to collect information is nonetheless valuable. This study could serve as a foundation for future research in a field where cross-national studies on APO members are currently scarce.

The structure of this report is organized into four parts. Part I establishes the content and foundations, with Chapter 2 providing an overview of the rise and significance of AI, and how AI-driven innovation drives economic growth and structural transformation.

Part II introduces the analytical framework and diagnostic assessment of AI policies, with Chapter 3 outlining the methodology, scope of work, and key findings on capability gaps.

Part III provides a comprehensive assessment of national AI ecosystems. Chapter 4 sets out the structure and analytical approach to member economy profiles while Chapters 5 to 15 present detailed member-level analyses, covering AI ecosystem baseline conditions, national AI policies and strategies, key stakeholder mapping, strategic positioning and recommendations, and future needs and collaboration pathways.

Part IV concludes the report. Chapter 16 summarizes the overall findings and offers recommendations to support sustainable prosperity and growth among APO member economies through AI.

CHAPTER 2

AI READINESS AND STRUCTURAL TRANSFORMATION

Chapter 2 establishes the conceptual foundation for this report by framing AI not merely as a digital tool, but as a transformative capability with profound economy-wide implications. The chapter begins by outlining the emergence of contemporary AI as a general-purpose technology (GPT), emphasizing its expansion into cognitive tasks. It then addresses a critical policy challenge: how AI can be harnessed to drive sustainable productivity gains and inclusive growth. This chapter further describes the mechanisms of structural transformation, where AI-driven changes unfold through firm-level organizational redesign, value-chain reconfiguration, and shifting labor market dynamics. By positioning AI readiness as the essential bridge between technological potential and tangible economic productivity, this chapter provides the analytical rationale for the evaluation framework introduced in Part II, Chapter 3.

The Emergence and Importance of AI

AI has moved beyond the status of a discrete technology adopted by a limited set of frontier firms. It is increasingly understood as a foundational capability that reshapes how economies produce, innovate, and govern. Unlike earlier waves of automation that primarily affected routine physical tasks, contemporary AI, especially machine learning and generative AI, extends into cognitive domains, such as prediction, classification, content generation, decision support, and autonomous control. This expansion is notable in that it changes not only the productivity frontier but also the mechanisms through which value is created and captured.

For policymakers and productivity researchers, this shift raises a central question: what determines whether AI becomes a broad-based driver of productivity and inclusive growth rather than a force that amplifies existing disparities involving firms, regions, and countries? The answer depends on more than just the presence of AI tools in the marketplace. Rather, it hinges on a country's readiness to integrate AI into production systems, business processes, public services, and innovation ecosystems. In this sense, AI readiness should be understood not as a narrow digital metric but as a systemic capacity that links infrastructure, data governance, skills, organizational change, and policy coordination to real economic outcomes.

AI as a General-purpose Technology

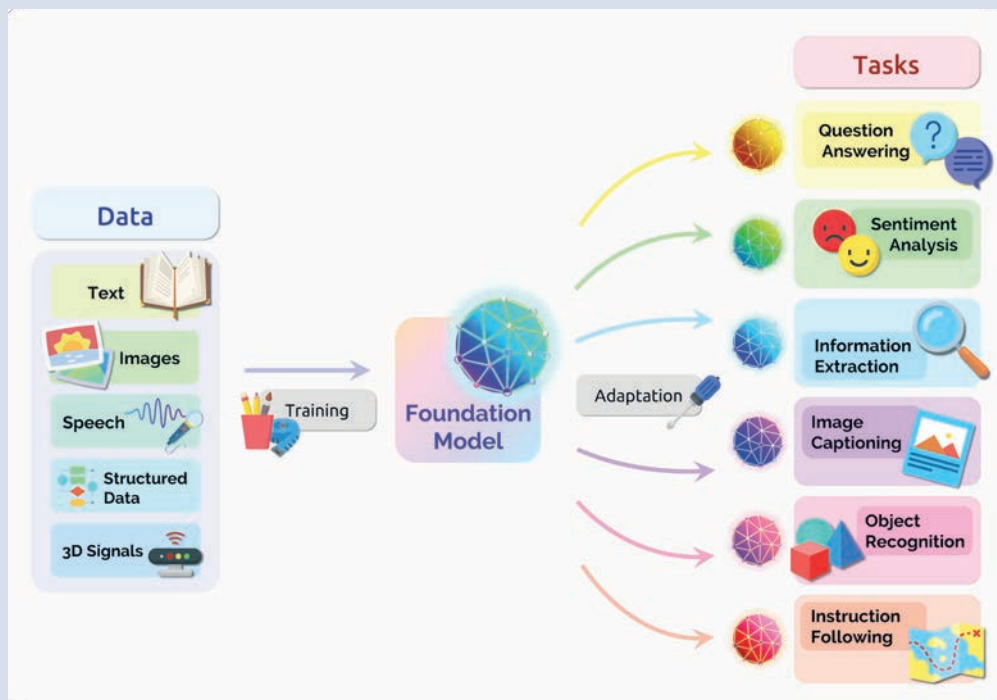
AI is not a single technique or product category but a family of computational methods that perform tasks commonly associated with human intelligence, including perception, language processing, decision-making, and learning from experience. Contemporary AI is increasingly characterized by data-driven learning; the field has evolved from early symbolic approaches based on explicit rules and logic toward statistical learning from data, with the recent wave of capability driven by deep learning and, more recently, by large-scale foundation models trained on vast and diverse datasets (Bommasani et al., 2021). These advances have expanded the practical scope of AI from narrow, domain-specific applications to more general capabilities that can be applied across several sectoral contexts.

One way to understand AI today is to examine how it is deployed. AI is increasingly embedded in software and physical systems (e.g., predictive maintenance, quality inspection, fraud detection),

delivered as scalable platform services via cloud and Application Programming Interfaces (APIs), and through generative AI, made accessible to a broader set of users for knowledge work, such as drafting, coding, and summarization (OECD, 2022; 2024). Importantly, the economy-wide significance of AI stems from its emerging role as a GPT: like earlier GPTs, its impact comes not from a single application but from broad applicability across sectors and its capacity to enable complementary innovations that reorganize production and management (Bresnahan & Trajtenberg, 1995).

FIGURE 2.1

CONCEPTUALIZATION OF AN AI FOUNDATION MODEL



Source: Bommasani et al. (2021).

Economically, the value of AI can be summarized through three core functional channels: prediction, optimization, and generation. Prediction refers to inferring outcomes from data, including demand forecasting, defect detection, credit risk assessment, or failure prediction (Agrawal et al., 2018). Optimization refers to selecting actions that can improve an objective function, such as minimizing downtime, reducing energy use, improving logistics, or scheduling production more efficiently (Bertsimas & Kallus, 2014). Generation refers to producing new outputs, such as text, code, designs, and potentially scientific hypotheses, which can accelerate innovation and lower the cost of knowledge-intensive tasks (Bommasani et al., 2021). This framing highlights that AI is not merely an automation tool. Rather, it can enable new products, new service models, and new forms of personalization, thereby affecting both cost structures and value-creation opportunities (Agrawal et al., 2018; OECD, 2025a).

TABLE 2.1

AI SYSTEM TASKS

Task	What It Does	Type of Learning/Reasoning	Examples
Recognition	Identifies and categorizes data (e.g. image, video, audio and text) into specific classifications. Output is often one label, e.g. “this is a cat”.	Supervised classification.	• Image & object detection • Facial recognition • Audio, sound, handwriting and text recognition • Gesture detection
Event detection	Connects data points to detect patterns as well as outliers or anomalies.	Uses non-machine learning cognitive approaches as well as machine learning. Event detection increasingly uses unsupervised and reinforcement learning techniques in which the AI system does not know what it is looking for.	• Fraud and risk detection • Flagging human mistakes • Intelligent monitoring
Forecasting	Uses past and existing behaviors to predict future outcomes, generally to help make decisions. Contains a clear temporal dimension.	Tends to use machine-learning techniques, such as supervised learning, and is adaptive and helps improve forecasting over time. Some knowledge-based symbolic systems also perform forecasting, mostly based on uncertainty representation. Forecasting is generally used for decision support. It may include descriptive analytics, predictive analytics, and projective analytics.	• Assisted search • Predicting future values for data • Predicting failure • Predicting population behavior • Identifying and selecting best fit • Identifying matches in data • Optimizing activities • Intelligent navigation
Personalization	Develops a profile of an individual and then learns and adapts to that individual over time. The output is usually a ranking, e.g. a search engine ranking.	Most personalization algorithms are based on supervised or reinforcement learning models.	• Recommender systems based on search and browsing (Netflix, Amazon) • Personalized fitness, wellness, finance

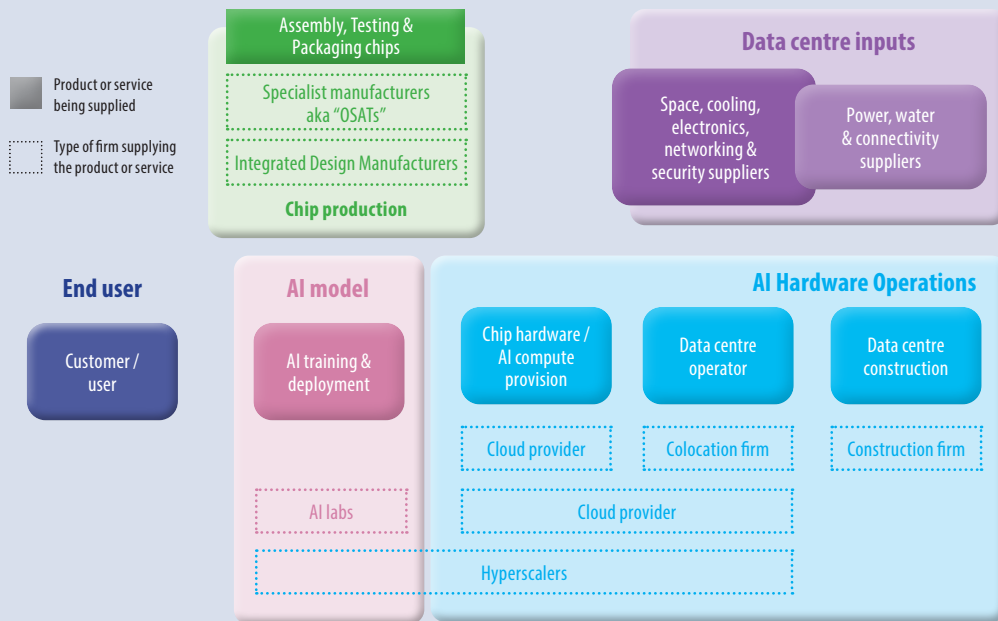
Source: OECD (2022).

AI as a New Basis of National Advantage

AI is increasingly regarded as a key component of national competitiveness, not only because it can raise productivity but also because it can shape how value is distributed along global value chains and how industries position themselves in high-value segments (Xing et al., 2021). Traditional sources of advantage, including capital accumulation, labor cost differentials, and incremental process improvements, remain important, but AI is introducing new strategic dimensions centered on data, computing, and algorithmic capabilities (OECD, 2025b; UNCTAD, 2021).

FIGURE 2.2

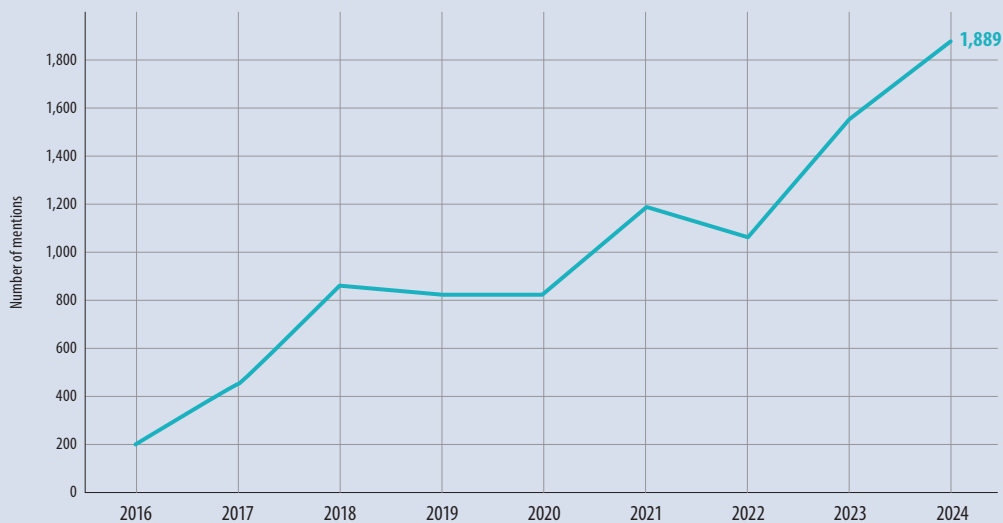
DATA CENTERS: KEY PARTICIPANTS AND INPUTS



Source: OECD (2025b).

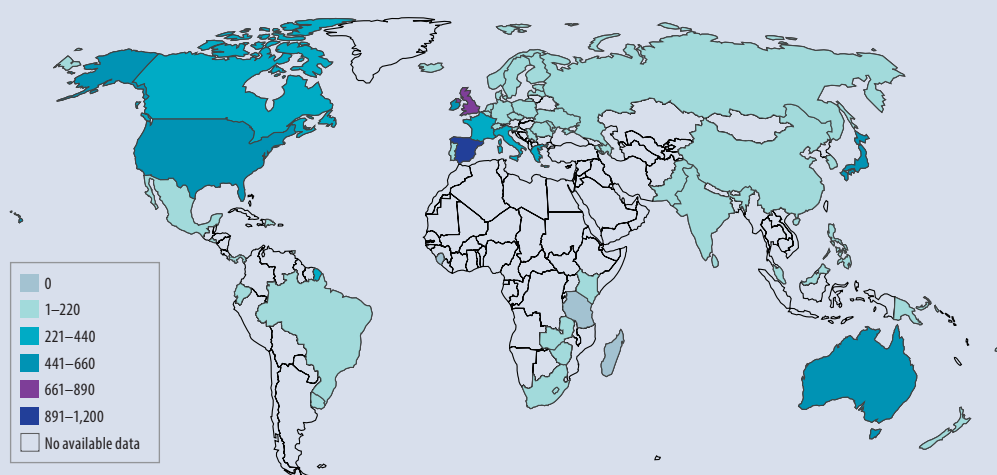
FIGURE 2.3

AI MENTIONS IN THE LEGISLATIVE PROCEEDINGS OF 75 JURISDICTIONS, 2016–24



Source: Stanford (2025).

At the national level, AI capabilities interact with innovation capacity, industrial capability, and resilience. Economies that can deploy AI at scale may see rapid improvements in manufacturing efficiency, supply chain management, and product quality, and may also develop advantages in emerging sectors, including AI-enabled services, digital manufacturing, and advanced analytics for energy, healthcare, and transportation (OECD et al., 2025). In parallel, AI has rapidly risen on national policy agendas: across 75 major countries, mentions of AI in legislative proceedings increased by 21.3% in 2024 (to 1,889 from 1,557 in 2023), and the total volume of such mentions has grown more than ninefold since 2016, underscoring the growing strategic salience of AI at the national level (Stanford, 2025). Conversely, economies with weaker readiness may become more dependent on imported digital capabilities, reinforcing technological dependency, and limiting domestic value capture (UNCTAD, 2021).

FIGURE 2.4**AI IN NATIONAL LEGISLATIVE PROCEEDINGS, 2016–24 (SUM)**

Source: Stanford (2025).

At the sectoral level, AI is transforming the competitive dynamics of both the manufacturing and service industries (OECD et al., 2025). In manufacturing, AI can support predictive maintenance, process optimization, quality inspection, and adaptive control (i.e., capabilities that can reduce downtime and defect rates) as well as increase flexibility. These advancements not only boost productivity but also help firms meet increasingly stringent supply chain requirements, where reliability and traceability are critical. In the service industry, AI enables more bespoke personalization, faster decision-making, better fraud detection, and increased operational automation, reshaping business models in finance, logistics, retail, healthcare, education, and public services.

AI can also interact with platform dynamics to generate network effects. Firms and countries that achieve scale in data and deployment may benefit from reinforcing advantages as improved models attract more users and generate more data. This can accelerate the concentration of market power and widen gaps between leaders and followers (UNCTAD, 2021). For APO member economies, this dynamic makes readiness assessment particularly important as it suggests that policy should focus not only on adoption but on diffusion pathways that enable small and medium-sized enterprises (SMEs), lagging regions, and public agencies to benefit from AI.

From this perspective, AI readiness should be understood as a national and systemic capability to convert AI opportunities into productivity gains and competitive edge. It encompasses hard infrastructure (connectivity and computing), soft infrastructure (data governance and standards), human capital (skills and training systems), and institutional coordination (regulatory frameworks and innovation policy instruments). AI readiness can therefore be understood as a key bridge between technological potential and realized economic outcomes (International Monetary Fund [IMF], 2024).

Structural Transformation Driven by AI Innovation

As discussed earlier, AI has emerged as a broadly applicable, rapidly diffusing capability with the potential to reshape productivity and competitiveness across sectors. However, the realization of these potential gains is not guaranteed. AI's impact depends on complementary innovation in organizations and institutions, and without deliberate efforts to support diffusion, skills upgrading, and better governance, it may lead to uneven outcomes.

This leads to the next question: how does AI translate into economy-wide change? The central mechanism is one of structural transformation. AI changes the essential composition of tasks, the organization of production, the nature of innovation, and the allocation of labor and capital across industries. This segment therefore focuses on the channels through which AI drives structural transformation across firms, sectors, and labor markets.

From Industrial Upgrading to the Knowledge Economy

Structural transformation is often described as a shift in the composition of output and employment across sectors. In the AI era, however, the concept of structural change now includes shifts in how value is created within and across sectors. Structural transformation therefore reflects a broader transition toward a knowledge-intensive economy in which data, intangible assets, and analytical capabilities increasingly shape productivity and competitiveness (Castells, 1996; Powell & Snellman, 2004). This perspective is particularly relevant for AI because it relies on and reinforces the centrality of knowledge: it learns from data, generates new informational outputs, and reshapes decision-making processes that govern production, innovation, and coordination.

In knowledge-based economies, the mechanisms of innovation are evolving as well. Rather than a simple, linear pipeline from research to commercialization, innovation has become a networked process of iterative feedback among research organizations, firms, users, and institutions (OECD, 1996). The development and widespread adoption of AI has accelerated this trend. AI models are developed through continuous cycles of training and deployment, in which user interactions and operational data serve as direct learning inputs. In this environment, innovation depends on the strategic management of data flows, computing resources, and governance. Consequently, AI-driven structural transformation should be viewed as a systemic reconfiguration spanning (i) firm-level organization; (ii) sectoral value chains; and (iii) skill formation in the labor market.

Channel 1: Firm-level and Organizational Transformation

Structural transformation driven by AI begins within firms and is reflected in operational processes and managerial decision-making. By enhancing prediction and control under uncertainty, AI fundamentally alters how organizations function.

In the manufacturing sector, this shift is immediately visible through predictive maintenance, quality inspection, and process optimization. These capabilities do more than reduce downtime and defect rates; they provide the flexibility necessary for enhanced competitiveness. However, the deeper structural impact is organizational. Beyond the adoption of specific tools, firms must undergo a systemic redesign, integrating AI outputs into accountability structures and developing routines to monitor model safety. Ultimately, this represents a transition from simply using AI to operating as a data-driven organization in which decisions are informed by model outputs (OECD et al., 2025).

This transformation extends equally into services and knowledge-intensive functions. Here, AI automates routine cognitive work, such as drafting, coding, and analytical support. This allows firms to reallocate resources and attention toward higher-value strategic tasks, such as client interaction and product design (OECD et al., 2025). Over time, this can alter firm boundaries and outsourcing decisions as AI enables new ways to coordinate and standardize tasks that previously required specialized human judgment (OECD, 2024a).

From a broader perspective, AI reshapes the very nature of innovation. By drastically lowering the marginal cost of search, analysis, and experimentation, particularly in data-rich environments, AI can accelerate innovation cycles and expand the range of feasible solutions. These mechanisms can be particularly relevant for APO economies looking to upgrade their industries as AI-enhanced capabilities can support the kind of product quality, compliance, and reliability that are increasingly required in global markets (OECD et al., 2025).

TABLE 2.2

AI-BASED TRANSFORMATION: DIMENSIONS AND MECHANISMS

Dimension	Core Mechanism	Complements	Structural Implication
Operations in manufacturing	AI improves prediction and control in production (e.g., maintenance, inspection, optimization), raising efficiency and flexibility	Data integration, workflow redesign, and routines to monitor model performance and safety	Productivity gains depend on organizational redesign, not tool adoption alone
Decision-making & management	AI supports faster, data-driven decisions under uncertainty	Accountability structures, governance for use in decisions, and risk management	Shifts firms toward “data- and model-informed” management practices
Services & knowledge work	AI automates/augments routine cognitive tasks (targeting, fraud detection, automation, drafting/coding/summarizing)	Policies for safe use, training, and integration with business processes	Reallocates time toward higher-value tasks; can reshape boundaries and outsourcing decisions
Innovation processes	AI lowers the cost of search, analysis, and experimentation, accelerating cycles in data-rich environments	Data foundations, compute access, and cross-functional teams (domain + AI)	Broadens the feasible set of solutions and supports industrial upgrading through quality/compliance/reliability improvements

Source: Compiled by the authors.

Channel 2: Sectoral Restructuring and Value-chain Repositioning

While firm-level adoption serves as the primary entry point, structural transformation manifests at the economy-wide level as AI reshapes sectoral dynamics and reallocates resources across industries. The nature and speed of this shift, however, are not uniform; they are contingent upon sector-specific factors, such as data intensity, process codifiability, regulatory constraints, and the availability of complementary assets.

In the manufacturing sector, AI is a catalyst for both operational efficiency and industrial upgrading (Javaid et al., 2022). As global supply chains increasingly mandate rigorous standards for reliability, traceability, and quality assurance (Harmes-Liedtke et al., 2025; UNIDO, 2024), AI-enabled monitoring and analytics have become a vital source of competitive differentiation. This is especially relevant for APO economies that participate in complex production networks and seek to move into higher-value segments through improved quality control, shorter cycle times, and resilient operations.

In the service sector, AI can reshape business models by enabling personalization, faster decision-making, and automation of back-office processes. In some sectors, such as finance, logistics, retail, and professional services, AI can increase the advantages of scale and data access, reinforcing platform dynamics and concentration. The sectoral consequences are therefore mixed. AI can facilitate new

entry and innovation by lowering costs and increasing accessibility (e.g., via cloud services), but it can also help incumbents that control existing data and distribution networks widen their moats (OECD et al., 2025; UNCTAD, 2021, 2024).

More broadly, these shifts influence how value is captured along value chains. A critical risk emerges when strategic capabilities, such as computing infrastructure and foundational models, concentrate within upstream layers. Downstream adopters, particularly those relying heavily on imported digital technologies, face the risk of dependency and are limited in their ability to capture value domestically. This means AI readiness must be framed as a national capability. Structural transformation is not only about adopting AI tools but also about strategic positioning within the evolving architecture of the new economy (UNCTAD, 2021, 2024).

TABLE 2.3

SECTORAL RESTRUCTURING AND VALUE-CHAIN REPOSITION: DIMENSIONS AND MECHANISMS

Dimension	Core Mechanism	Complements	Structural Implication
Sectoral dynamics & reallocation	AI alters sectoral competitiveness and reallocates resources across industries	Effects differ by data intensity, process codifiability, regulatory constraints, and complementary assets	Structural change becomes economy-wide when adoption shifts investment, capabilities, and market shares across sectors
Manufacturing upgrading	AI supports monitoring and analytics that raise reliability, traceability, and quality assurance	Particularly important, where supply chains demand stringent standards and resilient operations	Enables industrial upgrading and movement into higher-value segments through quality, cycle-time, and resilience improvements
Service-sector business model change	AI enables personalization, faster decisions, and automation of back-office processes	Strong relevance in finance, logistics, retail, and professional services	Reshapes business models and service production; can raise productivity while changing competition patterns
Platform dynamics & concentration	Scale in data and deployment can create reinforcing advantages	Lower barriers via cloud/services can enable entry, but data/platform control can strengthen incumbents	Mixed outcomes: innovation and entry may coexist with higher concentration and widening leader-follower gaps
Value-chain positioning & dependency risk	Value capture may shift upstream (compute, foundation models, platforms)	Downstream adopters risk dependency if they rely mainly on imported digital capabilities	Readiness is strategic: not only adopting AI, but positioning within the evolving AI economy to secure domestic value capture

Source: Compiled by the authors.

Channel 3: Labor Markets, Skills, and Workforce Transition Capacity

At its core, AI-driven structural transformation reflects a fundamental reconfiguration of tasks. Rather than uniformly replacing entire occupations, AI increasingly intervenes at the task level, as firms and organizations deploy it to perform or augment specific cognitive functions, including information processing, pattern recognition, and decision-making. Consequently, the impact on the labor market depends on how workflows and accountability structures are redesigned to foster effective human-AI collaborations.

This task-based mechanism creates two opposing pressures that often coexist: the displacement of routine and some middle-skill tasks on the one hand, and productivity augmentation of higher-skill roles on the other (Acemoglu & Restrepo, 2018, 2019; Autor et al., 2003). While standardized tasks in data-rich environments are prime candidates for replacement or automation, complex analytical and design-oriented tasks are more likely to be enhanced by AI. This divergence creates a heterogeneous landscape in which the effects of AI vary significantly across sectors and worker groups, depending on their exposure to automation and capacity for organizational adaptation (OECD, 2024b; 2024c).

For APO member economies, this heterogeneity presents unique challenges, particularly due to the prominent role of SMEs. Although cloud-based AI services have lowered technical barriers to entry, many SMEs still grapple with practical bottlenecks. These include the need to overhaul legacy workflows, reskill and upskill workers, and establish robust data governance regimes. Without targeted support, these constraints risk widening the innovation gap between frontier firms and followers, and between digitally advanced and lagging regions.

Ultimately, AI readiness requires strengthening the ability of workers to transition to an AI-based paradigm, supported by measures that help firms and employees reconfigure tasks and jobs. Such support must include scalable reskilling and upskilling systems, credible certification or micro-credential pathways that facilitate mobility, and institutional mechanisms that help workers transition between jobs and regions. Without this capacity, adjustment frictions could hinder the diffusion of AI, limiting productivity gains and exacerbating uneven outcomes.

TABLE 2.4**EFFECTS OF AI ON LABOR: DIMENSIONS AND MECHANISMS**

Dimension	Core Mechanism	Complements	Structural Implication
Task reorganization	AI automates/augments tasks within occupations, especially cognitive tasks	Main impact is redesign of tasks and workflows to incorporate AI; not wholesale replacement of workers or vocations	Readiness should capture firms' and institutions' capacity to redesign work and workflows
Uneven displacement vs. augmentation	Routine/middle-skill tasks face higher displacement risk; high-skill roles are often augmented	Heterogeneous outcomes across sectors, worker groups, and firms (SMEs often constrained)	Target diffusion support and training toward SMEs and exposed worker groups
Workforce transition capacity	Training systems enable reskilling/upskilling and mobility across jobs/regions	Faster adjustment reduces friction and supports broader diffusion	Readiness should include reskilling/upskilling programs, certification pathways, and mobility-support mechanisms
Diffusion feasibility under social constraints	Without transition capacity, social frictions can slow adoption even when technology is available	Adoption may become contested and uneven	Pair AI adoption strategies with transition policies to sustain diffusion

Source: Compiled by the authors.

Essential Enabling Prerequisites: Inclusion, Trust, and Governance

The significance of AI extends beyond productivity and competitiveness, and any discussion of AI must also address issues of inclusion, trust, and governance. These dimensions are not secondary concerns but are the very factors that determine whether AI diffusion is socially sustainable and politically feasible.

At the heart of the challenge lies the issue of equitable distribution. There is a real risk that the gains from AI may accrue disproportionately to large firms, highly skilled workers, and regions with robust digital infrastructure while SMEs in lagging regions, often staffed by workers with weaker digital skills, grapple with high adoption costs, a scarcity of data, and a lack of specialized talent. This divergence means that the concept of “AI readiness” should be assessed not only by the availability of technology but by the strength of the institutions that support inclusive adjustment and fair diffusion (OECD, 2024b; 2024c; UNCTAD, 2021).

Trust and safety are also key pillars of any AI-enhanced economy. AI systems that embed bias, generate misinformation, or lack accountability pose significant risks in high-stakes decision-making. Furthermore, cybersecurity vulnerabilities and data leaks can abruptly stall adoption as trust collapses. Therefore, governance frameworks that clearly spell out privacy, transparency, and safety rules cannot be seen or treated as ethical ornamentation. Such regulations are essential enablers of AI diffusion. A

technology perceived as unreliable or untrustworthy is unlikely to produce economic gains, regardless of its availability or potential (OECD, 2024b; 2024c).

Finally, the rise of AI necessitates a coordinated approach to cross-border governance. Issues, such as international standards, cross-border data flows, and interoperability, require a global perspective. For APO member economies, whose mission is rooted in productivity through cooperation, this creates a compelling rationale for collective action. By prioritizing shared learning, harmonizing standards, and building regional capacity, the APO can ensure that AI serves as a driver for inclusive, sustainable, and shared productivity growth.

AI Readiness as a Systemic Capability

For APO members, the implications of AI-driven structural transformation are profound. Many APO economies feature a sophisticated mix of advanced manufacturing and rapidly expanding services, yet they also contend with wide variations in firm size and the critical, often constrained, role of SMEs.

Given this uneven developmental landscape, the outcomes of widespread AI adoption are unlikely to be uniform. Success will hinge on a combination of factors already discussed, including tailored diffusion pathways, strategic complementary investments, robust workforce transition capacity, and governance arrangements that foster trust.

This underscores why readiness should be understood as a systemic capability rather than a narrow set of digital indicators. It is not merely about having the technology, but about the institutional and structural ability to absorb and scale it. Building on this perspective, the following segment explores the necessity of policies that address the many uncertainties at play.

The Need for a Policy Response: Uncertainty, AI Utilization, and Economic Outcomes

AI diffusion has reached a critical juncture where it can no longer be managed as a narrow technological niche. It is now inextricably linked to productivity growth, industrial upgrading, and the quality of public services. However, the economy-wide impacts of AI remain uncertain in both magnitude and direction. This uncertainty is not a justification for policy inaction. On the contrary, it underscores the urgent need for a proactive policy response. While the pace of capability improvements is breathtaking, performance remains uneven across different tasks and contexts. Furthermore, realizing the full benefits of AI requires substantial investments in both time and resources. These include investments in data foundations, organizational redesigns, and skills development programs, which take time to materialize and often concentrate initially among digitally advantaged firms. Without early intervention, emerging risks, such as cyber vulnerabilities and erosion of trust could hinder AI diffusion before it fully takes hold.

A critical distinction for productivity researchers is the difference between AI adoption and AI utilization. Many organizations can now access AI tools through cloud services, APIs, and packaged applications, but the economic gains of AI are realized only when it is integrated into core processes and decision routines. In practice, the binding constraints are rarely the availability of tools; rather, they include barriers, such as fragmented or low-quality data, limited process ownership, insufficient monitoring and validation, and a lack of managerial capacity to redesign workflows. Consequently, many early efforts remain superficial pilots that fail to scale. To bridge this utilization gap, especially within the SME-heavy landscapes of APO member economies, policy must focus on helping organizations become genuinely "data- and model-informed" in their daily operations.

Policy also plays a decisive role because AI's economic outcomes are highly sensitive to distributional dynamics. While AI utilization can enhance productivity by improving efficiency, quality, and reliability, these gains often emerge unevenly and sometimes with time lags. AI can also support

competitive upgrading by enabling higher standards of traceability, compliance, and responsiveness that increasingly shape participation in global value chains. Yet these same forces can widen gaps: scale advantages in data and deployment can reinforce leader-follower dynamics while task reorganization can generate displacement pressures in some roles and augment others. If diffusion proceeds without building transition capacity, which includes training systems, reskilling and upskilling programs, credible certification pathways, and mechanisms that support mobility across jobs and regions, social frictions can become a binding constraint on diffusion, limiting the realization of AI's productivity potential and increasing the risk of uneven outcomes.

These considerations suggest that effective AI policy should prioritize the development of systemic capabilities over the selection of specific applications, focusing on converting AI-driven opportunities into sustained and inclusive growth under conditions of uncertainty. This requires reinforcing the foundations of effective diffusion, namely connectivity, computing access, and secure, interoperable data systems. It also requires support for AI adoption and utilization among SMEs and firms in lagging regions that might otherwise be left behind. Simultaneously, establishing responsible AI governance with clear rules for privacy, security, transparency, and accountability is essential to ensuring that adoption remains both socially and politically feasible. Furthermore, as the AI economy becomes increasingly global and multilayered, strategic attention must be directed toward international standards, interoperability, and the mitigation of dependency risks. Ultimately, these multifaceted challenges underscore the importance of AI readiness, viewed not as a narrow digital indicator, but as a critical bridge connecting technological potential and practical utilization to real-world economic outcomes. Accordingly, the following parts and chapters transition from this conceptual framing to a comprehensive readiness assessment across APO member economies, identifying key bottlenecks and priorities to inform actionable policy strategies.

PART II

**ANALYTICAL FRAME AND DIAGNOSTIC
ASSESSMENT OF AI POLICIES**

CHAPTER 3

ANALYTICAL FRAMEWORK AND METHODOLOGY

Part II Chapter 3 sets out the analytical framework and methodology used to assess AI readiness across Asian Productivity Organization (APO) member economies in a consistent and comparable way. It explains the expert survey-based diagnostic approach adopted to address uneven data availability while capturing member-specific institutional and ecosystem nuances. By introducing the report's integrated assessment architecture, covering statistics, policies, stakeholders, and strategic positioning, this chapter establishes the organizing logic for the APO member profiles presented in Chapters 4 to 15.

Framework Overview

According to APO (2025), substantial disparities exist among APO member economies in terms of AI readiness and utilization capacity. These gaps risk widening technological divides across the region and may hinder the inclusive diffusion of AI-driven transformation and productivity gains. Such divergence reflects not only differences in technological infrastructure but also variations in human capital, institutional capacity, and policy frameworks.

Addressing these gaps requires a nuanced understanding of the diverse conditions, capabilities, and constraints faced by individual member economies. In particular, policy-relevant analysis must go beyond aggregate indicators to capture member-specific institutional settings and ecosystem characteristics in order to design effective strategies for promoting AI adoption and ensuring that the benefits of AI-led growth are broadly shared across the region.

Against this backdrop, this project aims to support the diffusion of AI technologies across APO members and identify strategic pathways for maximizing productivity and inclusiveness. To this end, the project pursues three interrelated objectives.

First, it assesses the current level of AI readiness in each member, with a focus on technological infrastructure, human capital, and institutional and policy support. Second, it analyzes the strengths, weaknesses, opportunities, and threats (SWOT) associated with AI adoption, identifying common regional patterns and member-specific characteristics. Third, it seeks to identify economy-specific needs for capacity building, institutional development, and regional collaboration within the APO framework, in order to facilitate the productive and inclusive use of AI technologies.

Methodological Rationale

To achieve these objectives, this chapter develops a structured analytical framework and presents the methodology for conducting member-level assessments based on a national expert survey. The use of an expert-based survey reflects the uneven availability and limited comparability of AI-related data across APO member economies.

AI readiness, institutional capacity, and policy effectiveness are inherently multidimensional and context-dependent. As such, they cannot be fully captured by quantitative indicators alone, particularly in economies where official statistics on AI adoption, usage, and outcomes are fragmented or

underdeveloped. Expert-based assessments provide a systematic means of incorporating contextual knowledge, institutional insights, and forward-looking perspectives that are critical for understanding member-specific realities.

The survey instrument is designed to leverage the expertise of national experts with in-depth knowledge of domestic AI ecosystems, policy environments, and innovation systems. Its standardized structure ensures internal consistency and cross-member comparability while the expert-based format allows sufficient flexibility to reflect heterogeneity in institutional development, market maturity, and technological capabilities. Through triangulating available quantitative evidence and informed qualitative judgment, the survey enhances the validity and policy relevance of the assessment.

Overall, this methodological design enables the expert survey to function not only as a diagnostic tool for evaluating current AI readiness and adoption but also as a forward-looking mechanism for identifying capacity-building needs and opportunities for regional collaboration. It is therefore well suited to informing policy-relevant analysis aimed at fostering inclusive and productivity-enhancing diffusion of AI technologies across APO member economies.

Analytical Framework

The analytical framework is operationalized through a structured survey administered to national experts in each member economy. The survey is organized around five interrelated components that together capture the current status and future needs related to AI adoption.

Specifically, the survey covers: (i) AI-related statistics and indicators, which provide a quantitative baseline for assessing AI readiness and utilization; (ii) national AI strategies and policy frameworks, including regulatory environments and public support mechanisms; (iii) key stakeholders in the AI ecosystem, encompassing government bodies, research institutions, private firms, and intermediary organizations; (iv) a SWOT analysis that systematically evaluates strengths, weaknesses, opportunities, and threats associated with AI adoption; and (v) future needs and potential areas for regional collaboration, aimed at identifying capacity gaps and cooperative opportunities within the APO.

By integrating these components, the framework links current conditions with strategic priorities, enabling a coherent assessment of both the structural foundations and the dynamic challenges of AI diffusion across member economies.

Methodology

Given the varying levels of data availability and accessibility across APO member economies, national experts are expected to adopt a flexible and multisource research approach. The methodology should ensure both accuracy of information and credibility of findings through the following components:

i) Desk research and secondary data analysis

Experts are required to utilize the most recent and reliable national and international data sources, including but not limited to, national statistical offices, government ministries, public databases, and reports by research institutions, think tanks, and international organizations (e.g., UNESCO, WIPO, OECD). Where official statistics are unavailable, experts may conduct their own data collection and analysis using credible third-party datasets or institutional reports. All data sources must be clearly cited, including publication year and issuing organization.

ii) Key informant interviews (optional)

Where necessary, key informant interviews may be conducted to complement secondary data, particularly in areas where official statistics are lacking or where qualitative insights are essential. To ensure objectivity and transparency, experts should select credible and relevant stakeholders (e.g., policymakers, researchers, industry leaders), clearly state interviewees' affiliations and positions, and minimize potential bias in presenting interview findings.

iii) Application of the analytical framework

Member reports should be structured around the five core components of the analytical framework. These components are AI statistics and indicators, national AI strategies and policies, key stakeholders, a SWOT analysis, and future needs and collaboration directions. Experts may adjust the internal organization of each section to improve national relevance or clarity, but all five elements should be addressed in every report to ensure consistency and comparability across APO member economies.

Scope of Work

Based on the analytical framework and methodology outlined above, the scope of work is structured into five tasks. The first task is to collect and analyze basic AI statistics, including AI adoption rates, AI-related patents, AI workforce indicators, and public and private research and development (R&D) investment, using the most recent official or otherwise credible data sources available. The second task is to analyze national AI strategies and policies, with attention to strategic objectives, implementation measures, budgets, and the responsible institutions across relevant ministries. The third task is to map key AI stakeholders in both the private and public sectors, describing their roles, activities, and patterns of collaboration. The fourth task is to develop a strategic position through a SWOT analysis that assesses the national AI ecosystem's internal capabilities alongside external challenges. The fifth task is to identify future needs and collaboration directions by proposing capacity-building priorities and outlining potential avenues for regional and international cooperation within the APO framework.

Annex A. Summary of the Provided Scope of Work

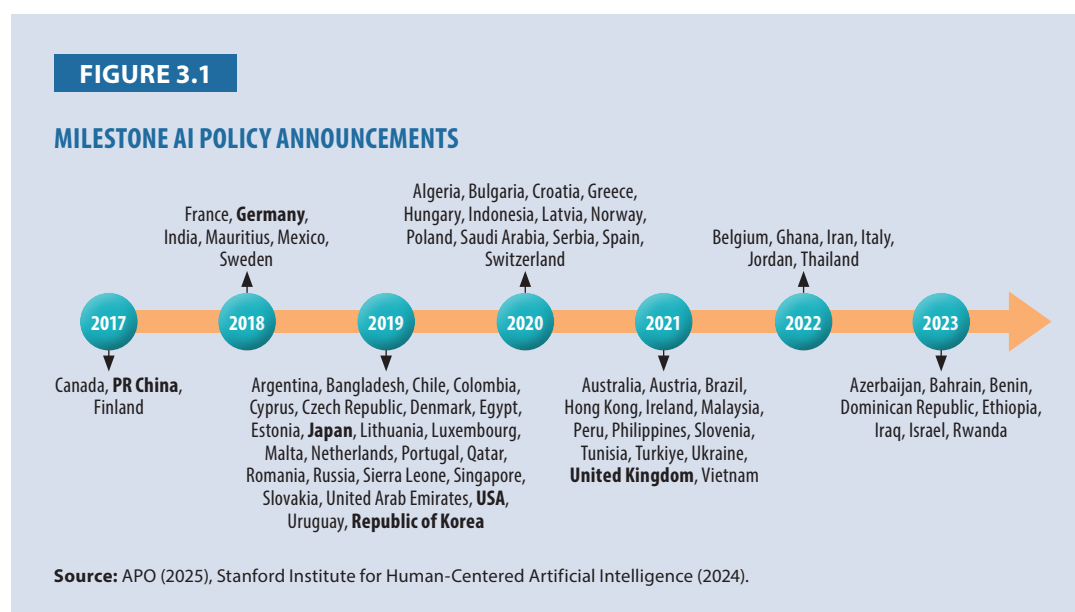
- **Collection and Analysis of Basic AI Statistics**
 - Provide key indicators to assess the level and recent trends of AI development in each economy, including but not limited to:
 - AI adoption rate (industry-specific if possible)
 - Number and trends of AI-related patent applications
 - Number of AI researchers and related workforce
 - Government and private R&D investment in AI
 - Use the latest official data sources, such as national statistical offices, research institutes, or international organizations
 - Clearly specify data sources and reporting years
- **Analysis of National AI Strategies and Policies**
 - Identify whether a National AI Strategy exists and summarize its key contents:
 - Vision, goals, and priority areas
 - Publication year, milestones, and achievements
 - Describe detailed AI-related policies by ministries/departments, including science & technology, industry, education, labor, etc.

- Organize the policy analysis based on:
 - Policy name
 - Policy objectives
 - Implementation measures and programs
 - Budget and funding sources
- Responsible agencies or ministries
- **Mapping of Key AI Stakeholders**
 - Private sector:
 - Key organizations leading AI-related businesses (companies, start-ups)
 - Core AI business fields and products/services
 - Future plans and market trends
 - Public and quasi-public sector:
 - Government research institutes, associations, hubs, etc., responsible for AI R&D, policy planning, or industrial promotion
 - For each stakeholder, provide the following:
 - Name and year established
 - Primary roles and recent activities
 - Examples of collaborations with other entities (if any)
- **Strategic Positioning Recommendations (SWOT Analysis)**
 - Analyze internal and external environment factors of the AI ecosystem, focusing on:
 - **Strengths:** including technological capabilities, talent pool, infrastructure, etc.
 - **Weaknesses:** regulatory gaps, skills shortages, digital divide, etc.
 - **Opportunities:** global partnerships, industrial linkage potential, etc.
 - **Threats:** regulatory challenges, ethical issues, technology gaps, etc.
 - Incorporate recent policy or industrial trends where applicable
- **Future Needs and Collaboration Directions for AI Development**
 - Propose key areas for capacity building and institutional improvements necessary for AI advancement
 - Analyze potential cooperation avenues from:
 - **Local perspective:** key needs for AI development among domestic industry, academia, and government
 - **Global perspective:** collaboration opportunities with other countries and international organizations
- **Suggest possible joint projects or shared training programs among APO member countries, where applicable**

AI Policy Landscape

Global Trends in AI Policy

Drawing on the APO (2025), national approaches to AI have expanded rapidly over the past decade, with an increasing number of governments articulating dedicated AI strategies. Canada was among the earliest adopters, launching its national AI strategy in 2017. As documented in APO (2025) and illustrated in Figure 3.1, this initiative was followed by a broad range of countries, including the United States of America (USA), PR China, Germany, Japan, the Republic of Korea (ROK), the United Kingdom, as well as several APO member economies, which have introduced comprehensive national AI policy frameworks. This widespread uptake reflects a shared recognition that AI is expected to play a central role in shaping future economic growth, industrial transformation, and social development. In response, governments worldwide have increasingly sought to establish policy frameworks that not only promote AI R&D but also support its diffusion and effective integration across the broader economy.



Within this global context, APO member economies have also made substantial progress in developing national AI policy agendas. As reported in APO (2025), many member economies have aligned their AI strategies with global policy trends while adapting them to domestic development priorities and institutional conditions. India, Japan, the ROK, and Singapore were among the earliest adopters in the APO region, announcing their national AI strategies between 2017 and 2019. These early initiatives helped catalyze a broader regional momentum toward AI policy formulation. At present, the majority of APO member economies have national AI strategies or policy frameworks in place. In many cases, these strategies build upon earlier digitalization or ICT policies while expanding their scope to address broader objectives, such as productivity enhancement, industrial upgrading, human capital development, and inclusive growth through AI.

FIGURE 3.2

AI POLICIES IN APO MEMBER ECONOMIES



Source: Extracted from APO (2025).

AI Policies in APO Member Economies

Comparative Insights

A comparative review of the AI strategies reveals substantial heterogeneity in policy orientation, institutional maturity, and implementation depth across APO members. These differences reflect not only variations in income levels and technological capabilities, but also divergent policy priorities shaped by economic structure, demographic pressures, and stages of digital development.

At one end of the spectrum, advanced and technology-intensive economies, notably Japan and the ROK, frame AI as a core engine of industrial competitiveness and national resilience. Their strategies emphasize large-scale investment in AI R&D, advanced data infrastructure, AI-specific hardware (such as semiconductors), and the integration of AI into existing industrial systems. These countries also place strong weight on ethical AI governance, data protection, and public trust, reflecting both their high AI adoption levels and greater societal exposure to AI-related risks.

A second group comprises upper-middle-income and industrializing economies, including India and Malaysia, which adopt a more developmental and opportunity-driven approach to AI policy. In these cases, AI strategies are closely aligned with broader national development agendas, such as inclusive growth, productivity enhancement, and digital transformation, rather than narrowly defined technological leadership. These countries tend to prioritize sectoral applications with high social or economic returns (e.g., healthcare, agriculture, smart cities, and manufacturing), alongside policies to nurture domestic AI ecosystems through public–private partnerships, start-up support, and workforce reskilling.

In contrast, lower-income and early-stage adopters, such as Nepal, Pakistan, and Sri Lanka, primarily frame AI within a foundational capacity-building and governance perspective. Their policy documents focus on establishing basic AI governance frameworks, improving digital and data infrastructure, developing human capital, and ensuring ethical and responsible AI use. Rather than pursuing immediate technological leadership, these countries emphasize gradual adoption of AI in public services, education, healthcare, and agriculture, where AI is viewed as a tool for improving service delivery, inclusivity, and economic resilience.

Across all groups, several common policy themes emerge. These include widespread recognition of the importance of human capital development, the growing role of public–private partnerships in AI diffusion, and increasing attention to ethical AI principles, such as transparency, accountability, and data protection. At the same time, the diversity of policy approaches highlights the importance of context-sensitive AI strategies within the APO region. This diversity underscores the value of regional knowledge sharing, peer learning, and targeted capacity-building initiatives that reflect differences in development stage and institutional readiness, rather than a one-size-fits-all policy model.

Survey Results and Capability Gaps

As discussed in the “Scope of Work” segment, while the APO (2025) provides a comprehensive overview of global and regional trends in national AI strategies, the present study extends this analysis by leveraging survey evidence and national expert inputs to identify capability gaps across APO member economies.

Member-level AI Readiness Assessment Results¹

This section describes the results of a cluster-based comparative analysis of AI readiness undertaken across the APO member economies. Drawing on survey evidence from national experts and a comparative assessment of strengths, capability gaps, and policy priorities, the 11 members are grouped into three AI readiness clusters: (i) advanced and scaling economies; (ii) emerging and accelerating adopters; and (iii) early-stage or foundational economies.

These clusters reflect differences not only in the level of AI adoption but also in the maturity of institutional and governance frameworks, the depth of talent and skills ecosystems, and the strength of innovation and commercialization capacity. This approach provides a structured basis for identifying differentiated policy challenges and sequencing priorities across economies at varying stages of AI development.

Scalers: India, Japan, ROK, Turkiye

India, Japan, ROK, and Turkiye form a cluster of countries where AI development has moved beyond experimentation into systemic deployment and scaling, albeit with differing national characteristics.

India

India's AI ecosystem is characterized by an ambitious state-led strategy and the #AIforAll philosophy of inclusive growth. India is building sovereign compute, resolving data scarcity, and ensuring multilingual accessibility. Despite leading in global AI skill penetration and developer volume, India faces a possible deficit of professionals, a low patent grant ratio, and lagging private R&D investment. Consequently, the government has established a risk-based governance framework and launched schemes to accelerate commercialization. Leveraging its unique Digital Public Infrastructure (DPI) and multi-ministerial coordination, India is positioning itself as a global hub for responsible AI, targeting social interventions in health, agriculture, and education.

Japan

Japan is characterized by a research-intensive and manufacturing-anchored AI economy, where world-class R&D investment, advanced industrial automation, and pioneering regulatory frameworks have

¹ It should be noted that this clustering is primarily based on evidence derived from the national expert survey, which captures country-specific assessments of AI capabilities, implementation constraints, and policy readiness as perceived by practitioners and policymakers. As such, the resulting classification may differ from rankings produced by other composite indices that focus more narrowly on government AI readiness or digital government capacity, such as the Government AI Readiness Index (e.g., Oxford Insights, 2025). In addition, the cluster grouping does not necessarily correspond to overall economic size or income-level rankings, as AI readiness assessments are inherently influenced by the scope of AI technologies considered, their depth of deployment, and the extent to which AI is applied to real-world use cases and institutional processes, which may vary across evaluation frameworks.

established a robust foundation for AI integration. Japan benefits from exceptional strength in robotics and applied AI, progressive governance innovation, including adaptive regulatory pathways and an AI Safety Institute, and a coordinated ecosystem of public–private partnerships spanning infrastructure, chips, and international collaborations. Leading enterprises demonstrate adoption rates that surpass international benchmarks, providing replicable operational templates for large-scale AI deployment.

At the same time, Japan's AI ecosystem exhibits a pronounced "strong upstream, uneven downstream" dynamic. SME AI utilization remains critically low despite SMEs employing the majority of the workforce, creating a severe bimodal distribution in which productivity gains concentrate among a small set of leading corporations. Teachers' AI literacy ranks near the bottom among OECD countries, in sharp contrast to high student adoption, creating a "generational expertise inversion" that constrains future workforce readiness. The AI talent pool trails major competitors, and workforce reskilling participation remains far below international levels, reflecting cultural barriers rooted in lifetime employment norms and hierarchical organizational structures. Following a September 2025 strategic recalibration, Japan adopted a "utilization-first" doctrine, a pragmatic pivot that addresses immediate adoption gaps but also carries risks of institutionalizing dependence on foreign platforms. Policy priorities for Japan therefore center on closing the SME adoption gap, leveraging Physical AI and robotics strengths anchored by unique testbed infrastructure and a national humanoid robotics moonshot, scaling regional AI education through established university platforms, and positioning Japan as a responsible AI governance model and capacity-building partner for APO member economies.

ROK

The ROK is characterized by a policy-driven and infrastructure-strong AI economy, where substantial public investment, advanced digital infrastructure, and a robust innovation policy framework have supported rapid progress in AI development and early-stage deployment. The ROK benefits from high-quality broadband and data infrastructure, strong government leadership in AI strategy, and concentrated capabilities in sectors, such as ICT, finance, manufacturing, and public administration. These strengths have enabled steady growth in AI adoption, expanding AI-related employment, and rising public-sector use cases, particularly in e-government, public safety, and intelligent transport systems.

At the same time, the ROK's AI ecosystem exhibits notable structural imbalances. Firm-level adoption remains uneven and relatively low overall, with AI use concentrated in large firms and knowledge-intensive industries while diffusion across traditional sectors and SMEs lags behind. Despite growing volumes of AI patents and academic publications, the ROK's global visibility and impact in frontier AI research remain limited, and private AI investment is modest in scale compared to leading AI economies. In addition, government R&D funding is heavily concentrated in infrastructure- and learning-oriented projects, with comparatively less emphasis on field-oriented, demand-driven industrial applications. Policy priorities for the ROK therefore center on: (i) accelerating broad-based diffusion of AI across industries and firm sizes; (ii) strengthening translational research and commercialization pathways; (iii) expanding private-sector investment at scale; and (iv) deepening application-oriented AI innovation, to translate technological capability into sustained productivity and competitiveness gains.

Turkiye

Turkiye occupies an intermediate position within this advanced cluster of economies. It has demonstrated strong momentum in AI adoption, particularly in industrial and defense-related applications, supported by targeted public investments and a growing domestic technology ecosystem. However, limitations in advanced research capacity, continued dependence on imported core technologies, and a relatively small pool of highly specialized AI researchers constrain Türkiye's transition to frontier and general-purpose AI innovation. Consequently, policy priorities emphasize reinforcing domestic AI R&D capabilities, strengthening university–industry linkages, and reducing structural reliance on foreign AI technologies.

Overall, member economies in this cluster are no longer constrained by awareness or basic AI adoption. Instead, their shared challenge lies in: (i) deepening technological sophistication; (ii) improving the efficiency and breadth of diffusion across firms and sectors; and (iii) moving up the AI value chain, from application and deployment toward higher value-added innovation, system integration, and globally competitive AI capabilities.

Emerging Adopters: Malaysia, Vietnam

Malaysia and Vietnam form a second cluster of rapidly emerging AI adopters, where enthusiasm, market growth, and policy commitment are strong, but structural gaps remain.

Malaysia

Malaysia's AI trajectory is characterized by strong market momentum, high user enthusiasm, and success in attracting large-scale digital infrastructure investment. The AI market is projected to grow rapidly, with AI expected to contribute significantly to GDP by 2030. Workforce and consumer indicators point to widespread acceptance: Malaysian professionals and consumers display above-global-average usage of generative AI tools, and business leaders express high confidence in AI's potential to expand organizational capacity.

Despite this enthusiasm, Malaysia faces a pronounced adoption-implementation gap. While individual employees and consumers actively use AI, often through bottom-up "bring-your-own-AI" practices, strategic firm-wide integration at the corporate level remains limited, particularly in traditional sectors, such as logistics, legal services, and hospitality. This ad hoc adoption raises concerns around data security, governance, and alignment with business strategy, and highlights weaknesses in organizational readiness rather than technological availability.

Human capital constraints represent Malaysia's most significant structural challenge. The country faces a large projected shortage of skilled workers, and although awareness of AI-driven change is high, overall preparedness remains low. A substantial share of the workforce has never used AI tools professionally, with especially wide gaps among older cohorts. The government has responded with large-scale reskilling initiatives, national AI talent councils, and sustained funding for education and training. However, mismatches persist between training supply and evolving industry demand, suggesting that improving the quality, relevance, and responsiveness of skills development is now as critical as expanding its scale.

Malaysia's investment profile reveals a sharp dichotomy. On the one hand, the country has emerged as a regional hub for data centers and cloud infrastructure, attracting massive foreign investment that provides world-class compute capacity. On the other hand, domestic R&D investment, and particularly private investment, has declined over time, sapping the potential of homegrown AI innovation. The absence of systematic data on AI-related patents and researchers further constrains evidence-based policymaking. As a result, Malaysia risks becoming primarily an AI infrastructure host and consumer rather than a producer of proprietary AI technologies, unless it makes concerted efforts to revitalize private-sector R&D and innovation.

Vietnam

Vietnam's AI development path is defined by exceptionally rapid adoption, a vibrant start-up ecosystem, and steadily improving innovation indicators. AI uptake among businesses has accelerated sharply in recent years, with a growing share of firms adopting AI solutions and experimenting with data-driven tools. Consumer adoption is already mainstream, reflecting a digitally receptive population and a strong demand base for AI-enabled services.

Market projections underscore AI's growing economic significance. Vietnam's AI market is expanding quickly, and AI is expected to make a substantial contribution to GDP by 2030. Firm-level evidence suggests that AI adoption is already yielding revenue gains and cost savings. However, as in Malaysia,

most current applications remain focused on basic automation and efficiency improvements rather than advanced analytics or frontier innovation, indicating untapped potential for higher-value use.

Compared with many peers, Vietnam demonstrates relatively strong AI research and innovation capacity. Academic publication output and AI-related patent activity place the country among Association of Southeast Asian Nations' (ASEAN) leading performers, and its global AI readiness ranking has improved steadily. The country has also built a sizable pipeline of AI-related education programs and research institutions. Nevertheless, the pool of advanced AI experts remains limited, constraining the scaling of sophisticated R&D and the transition toward cutting-edge AI development.

A defining strength of Vietnam's ecosystem is its fast-growing AI start-up sector. The number of AI start-ups has increased dramatically in a short period, making Vietnam one of Southeast Asia's most dynamic AI entrepreneurial hubs. Start-ups are active across multiple application domains, including finance, healthcare, education, and language technologies, and several have achieved international reach. This domestic dynamism is reinforced by growing engagement from global technology firms establishing AI hubs, R&D centers, and partnership programs in the country.

AI diffusion in Vietnam is broad-based across multiple sectors. Public administration, finance, healthcare, transportation, education, and agriculture have all begun to integrate AI tools, with notable progress in healthcare diagnostics and digital government services. This cross-sectoral spread provides a strong foundation for productivity gains, although governance frameworks, advanced talent development, and sustained R&D investment will be critical to ensuring long-term impact.

The key challenge for this group is transitioning from adoption-driven growth to capability-driven development. While momentum is strong, sustaining progress requires coordinated investments in talent, R&D, and institutional capacity.

Early-stage Economies: Lao PDR, Mongolia, Nepal, Pakistan, Sri Lanka

The early-stage economies comprise countries where AI readiness remains at an early or foundational stage. Across Lao PDR, Mongolia, Nepal, Pakistan, and Sri Lanka, AI is increasingly recognized as a strategic technology, with initial policy actions, pilot applications, and capacity-building efforts are emerging. However, these economies are still constrained by structural bottlenecks in digital infrastructure, limited AI-specific human capital, weak research and innovation ecosystems, and uneven institutional capacity.

Rather than pursuing frontier innovation or large-scale diffusion, the central challenge for this group is to establish the minimum enabling conditions for sustainable AI adoption. While the countries differ in size, income levels, and sectoral structures, common policy priorities include strengthening digital and data infrastructure, expanding basic and intermediate AI-relevant skills, formalizing governance and regulatory frameworks, and fostering early public-private collaboration. Within this shared trajectory, important country-specific differences shape both constraints and opportunities.

Lao PDR

Lao PDR represents the earliest stage of AI readiness within this cluster. AI adoption is minimal, with labor-market indicators suggesting that only a very small share of workers would even benefit from using AI. The country's economy is dominated by small-scale agriculture and informal services. This economic structure greatly limits immediate opportunities for AI-driven productivity gains. Digital connectivity has improved, but advanced computing infrastructure, cloud services, and AI-relevant skills remain highly concentrated in urban centers. AI-related education is scarce, and both students and instructors report limited familiarity with AI tools. Innovation indicators confirm the depth of these constraints: AI-related patenting is effectively absent, R&D intensity is extremely low, and institutional support for advanced innovation remains weak.

Public-sector readiness is also limited. Lao PDR lacks a stand-alone national AI strategy, and international assessments place it in the lower tier of AI readiness in ASEAN. Recent diagnostic

exercises, including UNESCO's AI Readiness Assessment, provide an important analytical foundation while improvements in digital payments and connectivity, along with early discussions on AI infrastructure and innovation zones, indicate growing policy awareness. Overall, Lao PDR's immediate objective is foundational capacity-building. Priority areas include (i) expanding digital infrastructure beyond major cities; (ii) strengthening basic digital and AI-relevant skills; (iii) developing institutional and regulatory frameworks; and (iv) mobilizing initial public and private investment to enable future AI adoption.

Mongolia

Mongolia exhibits early but measurable progress in AI readiness, underpinned by strong digital public infrastructure, expanding data governance frameworks, and improving institutional indicators. Overall readiness has advanced steadily in recent years, driven primarily by improvements in data systems and connectivity rather than by innovation capacity or private-sector dynamism. AI adoption remains fragmented and largely limited to pilot or externally supported applications in finance, public administration, healthcare, and traffic management, with limited institutionalization across government. The absence of a formal national AI strategy has constrained coordination and accountability, although plans to adopt a Big Data and AI policy framework in the next development cycle signal growing strategic intent. AI-specific innovation remains marginal, reflecting weak R&D ecosystems, limited funding mechanisms, and minimal patent or commercialization activity.

Human capital constraints represent a critical bottleneck: while the ICT workforce has expanded and gender participation has improved, advanced AI expertise remains scarce, and higher education institutions face significant capacity pressures. Government- and donor-supported digital initiatives demonstrate commitment, but AI-specific R&D investment, ethical oversight mechanisms, and sustained private-sector engagement are not yet institutionalized. The central policy challenge for Mongolia is therefore to translate its improving digital foundations into a coherent, inclusive, and accountable AI ecosystem. This requires formalizing strategy, strengthening human capital pathways, incentivizing innovation, and ensuring investments in data and infrastructure support sustained and responsible AI adoption. These findings are consistent with the Artificial Intelligence Landscape Assessment (AILA) of Mongolia, led by the Ministry of Digital Development, Innovation and Communications and UNDP. The assessment characterizes the country as being at a systematic stage of AI readiness, with strong digital public infrastructure and governance foundations. However, persistent gaps remain in innovation capacity, advanced skills, ethical AI frameworks, and coordinated implementation across government and the private sector.

Nepal

Nepal is at an early stage of AI readiness but has recently taken important institutional steps. The adoption of a National AI Policy and the establishment of a National AI Center signal growing government commitment, which is reflected in gradual improvements in government-related readiness indicators. The country has seen a rapid expansion of digital public infrastructure (and especially digital identity systems, e-government platforms, and digital payments) in recent years, and this growth represents one of Nepal's relative strengths within this cluster. Nonetheless, international benchmarks consistently highlight Nepal's limited technological and human capital foundations. Scores in the Government AI Readiness Index, the IMF AI Preparedness Index, and the Network Readiness Index reveal persistent weaknesses in digital infrastructure coverage, innovation capacity, AI-specific skills, and regulatory maturity. Broadband access and advanced connectivity remain uneven, especially in rural areas, and AI-related R&D activity is minimal.

Nepal's innovation ecosystem is nascent. AI research output, patenting, and private investment remain limited while the IP framework is still evolving. Higher education institutions have begun introducing AI-related programs, and a small but growing talent pipeline is emerging, but scale and depth remain insufficient to support broad AI diffusion. Nepal's policy challenge lies in consolidating recent progress into a coherent foundation. Priorities include expanding infrastructure access, strengthening

AI-relevant education and skills, operationalizing governance and regulatory institutions, and linking digital public infrastructure to early AI applications that deliver tangible development benefits.

Pakistan

Pakistan represents a large, fast-moving but uneven AI ecosystem. Government commitment has increased significantly through initiatives, such as the National AI Policy 2025, the Digital Nation Pakistan Act, and substantial public investment via the Public Sector Development Programme. These efforts have supported growing AI activity in public services, healthcare, agriculture, education, and selected private-sector applications, particularly in urban centers. At the same time, Pakistan's AI readiness remains constrained by infrastructure gaps, skills mismatches, and underinvestment in R&D. International indices place the country in the developing ecosystem tier, with relatively balanced but modest scores across government, technology, and data pillars. Awareness of AI tools (particularly generative AI) is exceptionally high, and the AI market is projected to grow rapidly. However, enterprise-level adoption remains concentrated among large organizations while SMEs and rural areas lag behind due to connectivity, computing, and skills constraints.

Pakistan's innovation indicators reveal a sharp gap between research output and commercialization. While AI-related academic publications and applied projects have expanded, AI-specific patenting remains extremely limited, and domestic retention of highly skilled talent is weak. The AI workforce is growing quickly, supported by universities, training initiatives, and a large freelance base, but only a small share of graduates have industry-ready AI skills. Overall, Pakistan's policy priorities focus on translating scale and awareness into depth: (i) upgrading infrastructure; (ii) strengthening industry–academia linkages; (iii) incentivizing private R&D investment; (iv) improving skill quality rather than quantity; and (v) narrowing the rural–urban divide as well as gaps between large firms and SMEs divides in AI adoption.

Sri Lanka

Sri Lanka occupies the upper end of the early-stage cluster, benefiting from relatively strong human development outcomes, a mature ICT-BPM sector, and a long history of digital government initiatives. Programs, such as the World Bank-supported e-Sri Lanka initiative, laid early foundations for digital infrastructure and e-government services, positioning the country ahead of many peers in terms of basic digital capability. As a result, AI adoption has moved beyond pure experimentation in selected sectors, including finance, apparel manufacturing, retail, healthcare, agriculture, and education. Despite these strengths, national and international indicators place Sri Lanka in the lower-middle tier of global AI readiness. Rankings in the Oxford Insights Government AI Readiness Index, the IMF AI Preparedness Index, and the Tortoise Global AI Index reflect gaps in advanced infrastructure, AI-specific R&D, and institutional coordination.

AI adoption remains concentrated among a small number of large firms, often with international exposure while diffusion among SMEs and the public sector is limited. AI research output, patenting activity, and private investment remain modest relative to the country's human capital base. Sri Lanka's policy challenge is therefore not awareness, but depth. While a capable ICT workforce and expanding AI education pipeline provide a solid foundation, the ecosystem is still oriented toward applied, short-term use cases rather than sustained innovation. Policy priorities center on strengthening AI research capacity, improving coordination across public institutions, scaling AI adoption beyond leading firms, and aligning governance frameworks with responsible and trustworthy AI deployment.

The cluster-based comparison highlights that AI readiness is not a linear process but a multidimensional transition shaped by talent, institutions, and industrial structure. Advanced economies must focus on deepening and governing AI use; emerging adopters must consolidate capabilities and avoid fragmentation; and early-stage economies must prioritize foundational capacity building. Recognizing these differentiated trajectories is critical for designing tailored, stage-appropriate AI policies, rather than one-size-fits-all solutions.

TABLE 3.1

SUMMARY OF AI READINESS AMONG APO MEMBERS

	Member	Strengths	Gaps	Policy Priorities
Scalers	India	• Large AI talent pool • Strong digital public infrastructure • Vibrant start-up ecosystem	• Uneven adoption across states/SMEs • Fragmented data governance • Shortage of advanced researchers	• Strengthen data governance • Support SME AI adoption • Deepen advanced research and industry-academia links
	Japan	• World-class R&D • Advanced manufacturing and robotics • Trusted AI governance	• Slow SME/service diffusion • Cutting-edge talent shortages • Risk-averse corporate culture	• Accelerate SME diffusion • Attract global talent • Promote regulatory agility
Emerging Adopters	ROK	• Advanced digital infrastructure • Strong government-led AI strategy • Growing AI workforce • Expanding public-sector applications	• Uneven firm-level adoption • Limited SME diffusion • Modest private investment scale • Limited global visibility in frontier research	• Promote broad-based diffusion across firms and sectors • Strengthen translational research and commercialization • Crowd in private AI investment
	Turkiye	• Strong manufacturing base • Growing start-ups • Active public strategy	• Limited global-scale innovation • Skills mismatch • Regional disparities	• Strengthen commercialization • Align skills with industry • Support SME/regional adoption
	Malaysia	• Rapid AI market growth • Strong FDI in data centers • High user adoption	• Weak strategic firm-level integration • Talent shortages • Low business-led R&D	• Promote enterprise-wide adoption • Demand-driven skills • Revitalize private AI R&D
Early-stage Economies	Vietnam	• Rapid firm and consumer adoption • Fast-growing start-ups • Rising readiness	• Predominantly basic AI use • Shortage of top experts • Uneven sector diffusion	• Deepen innovation-oriented use • Expand advanced talent • Support sector-specific AI diffusion
	Lao PDR	• Growing political commitment • Early digital government tools	• Very limited infrastructure, skills, and R&D • High foreign dependence	• Build digital/data foundations • Develop basic AI skills • Focus on applied public-sector use case
	Mongolia	• Digital government momentum • AI interest in mining and environmental sector	• Small talent pool • Limited private adoption • Urban-rural gaps	• Target resource/public-sector AI use • Strengthen skills pipeline • Establish AI governance and ethical oversight • Improve nationwide connectivity
	Nepal	• Rising awareness • Young digitally literate population	• Minimal AI infrastructure and research • Nascent private adoption	• Invest in digital foundations • Integrate AI into skills strategies • Focus on public/agricultural uses

	Member	Strengths	Gaps	Policy Priorities
	Pakistan	• Large youth population • Expanding IT sector • Emerging AI programs	• Fragmented policy coordination • Limited compute • Brain drain	• Improve AI governance • Invest in compute and advanced skills • Broaden sectoral diffusion
	Sri Lanka	• Relatively strong human capital base • Established ICT services sector	• Limited investment capacity • Small domestic AI market • Brain drain risks	• Retain and upgrade AI talent • Promote applied AI in services • Mobilize private and international investment

PART III

**NATIONAL AI ECOSYSTEMS –
ASSESSMENT, POSITIONING,
AND ROADMAP**

CHAPTER 4

STRUCTURE AND ANALYTICAL APPROACH TO MEMBER ECONOMIES' PROFILES

Chapter 4 translates the analytical framework established in the preceding chapters into a structured and comparable assessment of AI ecosystems across APO member economies. Building on the conceptual foundations and diagnostic approach outlined earlier, this chapter introduces a standardized framework for examining how AI readiness, policy direction, institutional capacity, and ecosystem dynamics interact at the national level.

The purpose of this chapter is twofold. First, it provides a consistent structure through which each member economy can be assessed, ensuring comparability while accommodating differences in development stage, institutional maturity, and economic structure. Second, it connects data, policy, and stakeholder perspectives into an integrated view of national AI ecosystems, allowing for a more comprehensive understanding of both capabilities and constraints.

Rather than treating AI development as a purely technological phenomenon, this chapter adopts a systemic perspective that places AI within broader economic, institutional, and governance contexts. This approach enables the identification of current levels of readiness and the underlying drivers of performance, the sources of structural gaps, and the pathways through which member economies can strengthen their position in the evolving AI landscape.

The sections that follow apply this framework across five analytical dimensions, beginning with a baseline assessment of AI ecosystem conditions, followed by an examination of national policies, stakeholder structures, strategic positioning, and future development priorities. Together, these elements provide a coherent foundation for member-level analysis and actionable policy insights.

AI Ecosystem Baseline Assessment

This section establishes a quantitative baseline for evaluating AI readiness and recent trajectories across APO member economies by synthesizing core AI-related statistics. Building on the framework from the previous chapter, it presents current evidence across key dimensions, including AI adoption, patenting activity, workforce talent, and R&D investment. This empirical overview provides a snapshot of each economy's current standing, grounding the subsequent analysis of national strategies and stakeholder ecosystems.

National AI Policies and Strategies

This section examines how APO member economies translate AI ambitions into actionable national strategies and policy instruments. Building on the profiles developed in the previous section (AI Ecosystem Baseline Assessment), it identifies the core elements of national AI strategies, including vision, priority areas, and key milestones. By clarifying both strategic intent and operational

instruments, this section provides important institutional context for the stakeholder mapping in Section 6 and the strategic recommendations that follow.

Key Stakeholder Mapping

This segment maps the key stakeholders within each member economy's AI ecosystem and examines how their roles and interactions shape AI development and diffusion. For each APO member economy, it identifies major actors across core groups, including government agencies, the private sector (leading firms and start-ups), and academia, summarizing their primary functions, recent activities, and collaborative linkages. By making the ecosystem structure explicit, this section provides a bridge between the policy intentions outlined in “National AI Policies and Strategies” and the strategic positioning and recommendations developed in subsequent sections.

Strategic Positioning and Recommendations

This section synthesizes the evidence assembled in the preceding sections into a structured set of strategic positioning recommendations for each APO member economy. Using a consistent SWOT framework, it evaluates internal capabilities and constraints alongside external opportunities and risks, translating empirical and institutional findings into targeted, actionable priorities. These SWOT-based assessments are designed not only to guide country-level policy focus but also to highlight practical avenues for cross-economy learning and collaboration within the APO, ensuring that recommendations remain grounded in the multidimensional analysis presented earlier.

Future Needs and Collaboration Pathways

This section consolidates future needs and cooperation opportunities for AI development across 11 APO member economies. It focuses on near-term institutional and capacity-building priorities that can accelerate safe, productivity-enhancing AI adoption while also identifying practical collaboration pathways that reduce duplication, lower costs, and expand access to expertise and infrastructure. The section emphasizes implementable measures suited to economies at different stages of AI readiness, including those building foundational capabilities and those scaling advanced applications.

To support comparability across economies, each member profile is organized under three dimensions: domestic priorities, collaboration opportunities, and APO joint initiatives. Where necessary, additional elements such as implementation frameworks or performance indicators are incorporated to reflect member-specific contexts.

Cross-cutting Needs

Several recurring priorities emerge across member economies.

- i) **Human capital** remains a central constraint, requiring expanded job-ready training pathways, faculty development, applied upskilling for the existing workforce, and broader AI literacy across public institutions and the education system.
- ii) **Data readiness and compute access** present ongoing challenges, including the need for high-quality datasets, clear governance frameworks, and infrastructure that enables experimentation beyond large firms and technology hubs.
- iii) **Governance and security capacity** must continue to evolve, particularly in areas, such as risk-based regulation, audit and evaluation mechanisms, cybersecurity, and privacy protection. Strengthening these capabilities is essential to support responsible AI adoption and maintain public trust.

- iv) **Diffusion and deployment mechanisms** remain uneven, particularly among SMEs and public agencies. Structured support systems, including toolkits, advisory services, procurement templates, and sector-specific demonstration projects, are needed to move from pilot initiatives to scaled implementation. Stronger commercialization pathways are also required to connect research outputs with real-world applications.
- v) **Inclusive adoption** is a persistent concern, with risks of widening gaps across regions, firm sizes, and workforce segments if enabling infrastructure and targeted support are not developed in parallel with technological advancement.

Collaboration Pathways

Collaboration across APO member economies presents clear opportunities to accelerate progress.

- i) **Talent and training exchanges** can pool curricula, certification models, and instructional capacity, strengthening regional human capital development.
- ii) **Shared infrastructure initiatives** can improve access to compute resources and support the development of regionally relevant datasets, including multilingual data and common evaluation benchmarks.
- iii) **Governance collaboration** can focus on interoperable standards, shared safety and ethics frameworks, and joint capabilities for testing and auditing AI systems.
- iv) **Sectoral testbeds and joint demonstration projects** can generate practical implementation knowledge while producing reusable models for procurement, deployment, and service delivery.

Taken together, these pathways support a shift from isolated national efforts toward more coordinated, cost-efficient regional programs that enhance adoption outcomes and reduce time to impact.

CHAPTER 5

INDIA

Each member economy is assessed through a common analytical framework covering five core dimensions: (i) ecosystem baseline; (ii) policy and strategy; (iii) stakeholder landscape; (iv) strategic positioning; and (v) future pathways. This structure enables consistent cross-economy comparison while allowing for context-specific insights into how AI capabilities are developed, governed, and applied in practice.

AI Ecosystem Baseline Assessment

This section provides a detailed assessment of India's current AI landscape, drawing on the latest reports and official data to highlight key indicators of development and trends.

Global Benchmarking and Adoption Metrics

India's AI readiness is assessed through major international indices, confirming high adoption rate while highlighting foundational investment and innovation gaps. India is positioned as a leading emerging market in AI preparedness, although its overall score reflects significant resource constraints compared to advanced Western and East Asian economies.

According to the 2023 IMF AI Preparedness Index, which assesses readiness for AI adoption based on macro-structural indicators across digital infrastructure, human capital, technological innovation, and legal frameworks, India leads most emerging market economies (Cazzaniga et al., 2024; Suri, 2025). This performance is underpinned by the nation's rapidly expanding digital public infrastructure (DPI), which provides a foundation for mass-scale AI application deployment (Cazzaniga et al., 2024; Suri, 2025).

AI Adoption in India

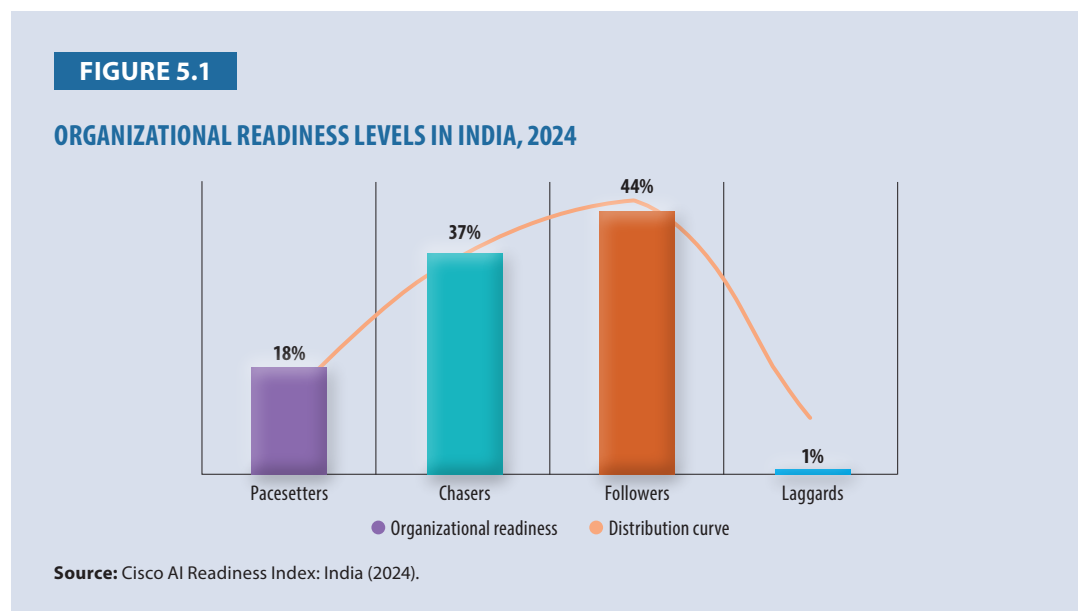
India is transitioning from an "adoption accelerator" to an "ecosystem builder," with rapid and widespread adoption of AI across its industries and workforce, positioning itself as a leader in AI integration. This trend is driven by a forward-looking business mindset and a tech-savvy population.

Overall Adoption and Growth

As of late 2024, approximately 86% of Indian firms were exploring or deploying AI. By early 2026, the scale of engagement had reached new heights, with the India AI Impact Summit attracting over 500,000 participants, including thousands of farmers and grassroots workers, reflecting efforts to connect AI with real-world development. India currently generates nearly 20% of the world's data and has over 700 million internet users, providing a strong foundation for further adoption. In the fiscal year 2024 (FY24), the rate of AI adoption in key Indian industries was approximately 48% (Teamlease Digital, 2024). According to the same source, this figure is projected to increase by an additional 5%–7% in FY25. A report by OpenText and Ponemon Institute (2024) states that 48% of Indian enterprises have already embedded AI into their IT and business strategies, marking one of the highest adoption rates globally.

A 2024 Cisco Systems, Inc. (Cisco) report found that while 96% of Indian organizations have or are developing an AI strategy, their overall readiness stands at 49%, still above the Asia-Pacific-Japan (APJC) average of 33%. The National Association of Software and Service Companies (NASSCOM) AI Adoption Index 2.0 (2024) places India at the "Enthusiast" stage of maturity with a score of 2.47,

noting a twofold increase in companies reaching the “Expert” stage of AI adoption (National Association of Software and Service Companies [NASSCOMM], 2024). A significant 80% of Indian companies consider AI a core strategic priority, which is a higher percentage than the global average of 75% (Press Information Bureau [PIB], 2024). A 2025 National Institution for Transforming India (NITI Aayog) report describes the rapidly accelerating pace of AI adoption as one of two “major AI unlocks” for India's economic growth.



Workforce Integration

India leads globally in generative AI (GenAI) training enrollment. A 2024 Microsoft and LinkedIn study found that 92% of knowledge workers in India are using AI at work, compared to a 75% global average (Microsoft & LinkedIn, 2024). Google announced initiatives to roll out GenAI assistants for approximately 11 million students through the Atal Tinkering Labs.

The adoption of AI is not limited to the C-suite. The report (Microsoft & LinkedIn, 2024) also highlights that 93% of business leaders in India expect to use AI agents to support employees within the next 12 to 18 months, pointing to a future of human-AI collaboration (Microsoft, 2025). The Economic Survey 2024–25 also notes that India's tech-savvy population is uniquely positioned to harness AI for workforce augmentation, fostering productivity, innovation, and inclusive economic growth (Economic Survey of India, 2025). The nonprofit sector in India appears generally positive toward AI, although concerns about job displacement, skill gaps, and data privacy remain (GivingTuesday, 2024). In addition, the Cisco report notes that a portion of the existing workforce is resistant to change, with 20% of middle management and 24% of employees exhibiting limited or no receptiveness to AI (Cisco Systems, Inc. [Cisco], 2024).

Enterprise Adoption

India demonstrates high deployment rates for AI solutions, driven by both large-scale necessity and democratized access. Approximately 59% of enterprise-scale organizations (over 1,000 employees) in India have actively deployed AI in their businesses, representing the highest deployment rate among countries surveyed globally (International Business Machines Corporation [IBM], 2024). This high rate is spurred by the accessibility of easier-to-use AI tools and the sustained corporate pressure to reduce costs and automate processes (IBM, 2024). Small and medium-sized enterprises (SMEs) have embraced AI with equal enthusiasm, with an adoption rate of 59% (Salesforce, 2025). This unusual bottom-up adoption pattern reflects a highly democratized AI market in which productivity gains are prioritized across the economy.

AI Adoption by Sector

However, the benefits of AI adoption are disproportionately concentrated in digitally mature and data-rich service sectors, creating a dual economy characterized by high adoption rates in finance and low rates in heavy industry. Adoption rates vary significantly from sector to sector, with some industries leading by integrating AI into their core operations.

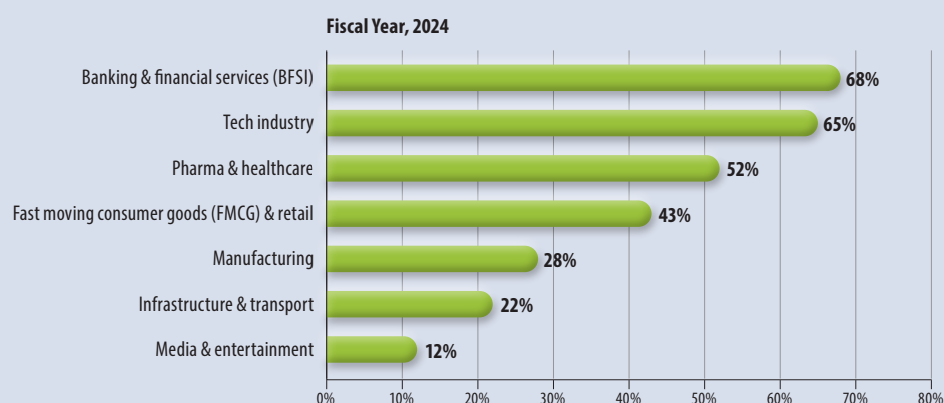
In India, the banking and financial services (BFS) sector is at the vanguard of the AI revolution, with a 68% AI adoption rate in FY24 (Teamlease Digital, 2024). The technology sector is close behind, with an adoption rate of 60%–65%. The same report also finds that in BFS and other high-adoption sectors, 78% of adopters focus on customer service and engagement, often via chatbots while 71% utilize AI for real-time transaction monitoring and anomaly detection in fraud and risk management. BFS executives anticipate that AI agents will autonomously manage over 75% of routine processes within three years.

AI adoption is also increasing in other industries as well. As of FY24, notably high adoption rates were observed in the pharmaceutical and healthcare sectors (52%) and the consumer goods and retail sectors (43%). However, the manufacturing sector (28%) and the infrastructure and transportation sector (20%–22%) lag behind (Teamlease Digital, 2024). These figures reflect the specific challenges of intense regulatory oversight, an orientation toward public service, and the complexities of integrating AI into physical supply chains. These are areas where government support could help drive broader economic transformation (Teamlease Digital, n.d.).

- **Infrastructure and Public Services:** In finance, the Unified Payments Interface (UPI) processed over 20 billion transactions in a single month in 2025, powering AI-driven credit scoring and fraud detection
- **Health and Agriculture:** The eSanjeevani platform has enabled 350 million teleconsultations, piloting AI-enabled diagnostics while AgriStack and Kisan Drones are optimizing yield forecasting in agriculture
- **Local Governance:** In Kerala, the K-SMART platform has transformed local governance by enabling seamless access to permits, certificates, and grievance services via AI

FIGURE 5.2

AI ADOPTION RATE BY SECTOR IN INDIA, 2025



Source: NASSCOM AI Adoption Index 2.0 (2024); Teamlease Digital (2024).

Maturity and Barriers to Adoption

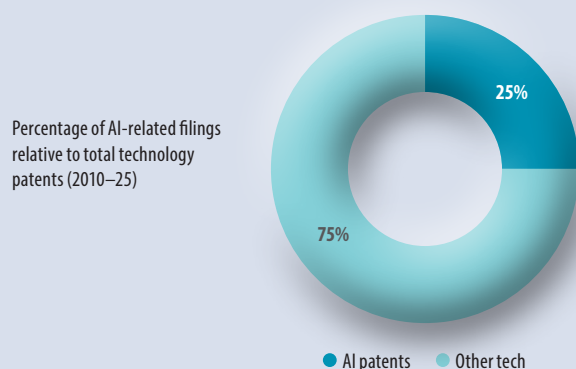
While India is an early adopter, the overall AI ecosystem remains dominated by enthusiasts and is still at an early stage of development, with several challenges to address (NASSCOMM, 2022). A Deloitte report from April 2025 highlights that while many businesses are experimenting with AI, only 29% are able to fully scale their proofs of concept. Concerns about errors with real-world consequences (36%), bias and hallucinations (30%), and data quality (30%) continue to constrain widespread deployment. A 2024 report from OpenText and the Ponemon Institute found that while adoption rates are high, only 15% of enterprises feel confident in measuring the return on investment (ROI) from their AI initiatives. This is compounded by the fact that 28% of Indian firms expect their current AI solutions to become outdated within two years due to the rapid pace of change (Deloitte, 2025).

AI R&D in India

In FY24, India crossed a major milestone by granting over 100,000 patents and having over 90,000 patent applications filed (GreyB, 2024; NASSCOMM, 2025). The number of patent applications increased by 24.64% from 66,440 in 2021–22 to 80,211 in 2022–23 (Intellectual Property India, 2023). According to NASSCOMM (2025), between 2010 and 2025, over 86,000 AI-related patents were filed

FIGURE 5.3

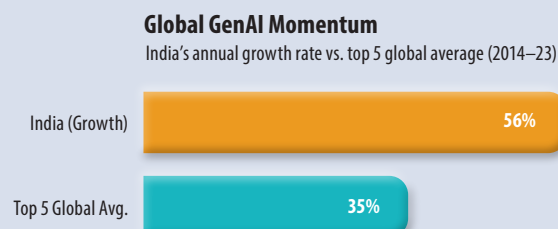
AI SHARE IN TECH PATENTS



Source: Nasscom (April 2025) / GreyB Innovation Rankings.

FIGURE 5.4

INDIA'S GenAI MOMENTUM GROWTH RATE VS. TOP FIVE GLOBAL AVERAGE, 2014–23



Source: World Intellectual Property Organization (WIPO) Global Indices.

in India, accounting for more than 25% of all technology patents in the country. NASSCOMM also notes that a significant majority of these, approximately 63%, originated within India. Globally, India holds the fifth position in global patent filings (NASSCOMM, 2025).

Trends in AI-specific Patenting

The focus of AI-related patents in India is shifting toward key subdomains, with GenAI and machine learning (ML) leading the way. NASSCOMM 2025 reports ML remains the most widely used technique in AI patents, accounting for over 55% of the total AI filings. GenAI is rapidly becoming a major driver of innovation. GenAI accounts for 50% of all ML-related patents in India. While GenAI makes up only 6% of total AI patents globally, it represents 28% of India's AI patent filings (NASSCOMM, 2025). This positions the country as the fifth-largest location for GenAI inventions globally, with Indian inventors filing 1,350 patents between 2014 and 2023 (WIPO, 2024). WIPO (2024) further noted that India has also recorded the highest average annual growth rate for GenAI inventions among the top five countries at 56% over the same period. Functional applications, such as computer vision (CV) and natural language processing (NLP) are dominant, contributing to over 90% of India's AI patent portfolio (NASSCOMM, 2025). From a sectoral perspective, the same report explained that the transportation industry leads AI innovation, accounting for more than 70% of all AI-related filings (NASSCOMM, 2025).

According to NASSCOM (2025), despite the high volume of filings, India faces a significant challenge in converting these applications into granted, high-quality patents. The country's AI patent grant ratio stood at a remarkably low 0.37% from 2010 to 2025. This is a stark contrast to the 40% grant ratio observed for corporations. While educational institutions are increasingly active in AI patenting, their grant ratio remains low at just 1%. This disparity highlights the need for better institutional support and a greater focus on building robust, high-quality intellectual property (IP).

Patent Activity and Innovation Output

Domestic IP creation has seen exponential growth in recent years, demonstrating a shift toward higher-value AI innovation. NASSCOM (2024b) notes that the proportion of patents filed by Indian residents crossed the 55% mark in FY24, up from 52.3% in FY23, underscoring a rapid shift toward greater domestic IP creation (NASSCOMM, 2024b). The same source reports that the volume of AI-specific patents filed in India grew significantly, with the period of 2021–25 recording seven times more filings compared to 2010–15. NASSCOM also explains that within the AI patent landscape, GenAI has emerged as the leading subtechnology, accounting for 28% of all AI patents filed from 2010 to 2025.

These time-series data demonstrate that India is not only scaling up adoption but also accelerating domestic IP generation and beginning to improve the retention of its most valuable research talent, setting the stage for future innovation.

AI Workforce in India

India has one of the world's largest AI workforces and a rapidly expanding talent pipeline, anchored by a broad base of technology employment and fast-improving skills indicators. More than 6 million people are employed in the country's broader tech and AI ecosystem, and the AI talent pool is projected to exceed 1.25 million by 2027. Skills measures place India at the top globally in AI skill penetration, with a score of 2.8 in the 2024 Stanford AI Index and a relative AI skill penetration rate of 2.51 in the 2025 edition (Stanford Institute for Human-Centered Artificial Intelligence [Stanford HAI], 2024; 2025), while the 2024 index also reports leading AI skill penetration for women at 1.7 (Stanford HAI, 2024). Beyond private-sector hiring, India is pursuing large-scale public capacity building through a partnership with Karmayogi Bharat that aims to train 20 million public servants across more than 800 districts in AI, reinforcing diffusion through government and public-service channels.

At the same time, India's talent strength is paired with a widening demand-supply gap and persistent constraints in advanced capability depth, even as investment and retention indicators improve. India has approximately 420,000 AI professionals, yet current demand is estimated at around 600,000 workers with AI skills (Teamlease Digital, 2024). It is projected to reach 1 million by 2026 (PIB,

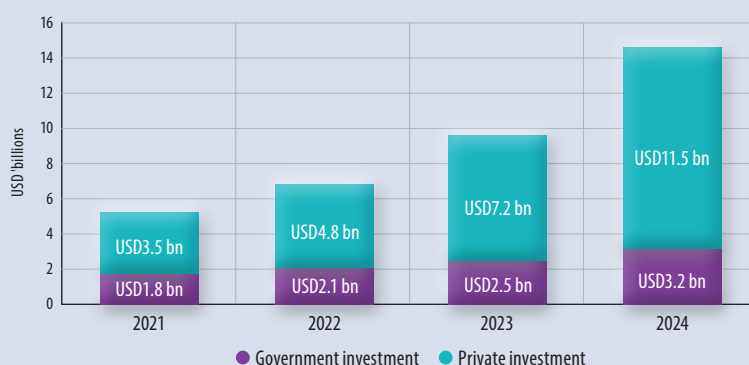
2024). A ServiceNow-commissioned study conducted by Pearson estimates that India’s AI sector could create 2.3 million job openings by 2027 while the talent pool may reach only about 1.2 million, implying a shortfall of more than 1 million professionals (ServiceNow, 2024). A Cisco survey similarly reports that 45% of respondents cite talent shortages as a challenge and that 67% of organizations use contractors to fill AI talent gaps (Cisco, 2024).

India’s broader software base remains large, with an estimated 13 million software developers (India Brand Equity Foundation [IBEF], 2025). Indian nonprofit organizations are more likely to employ technology or data staff (42%) than non-Indian counterparts (15%) (GivingTuesday, 2024) while overall AI employment reportedly rose 14-fold from 2016 to 2023 (PIB, 2024). Retention outcomes for elite researchers have historically been weaker, but recent indicators suggest improvement, with the share of top-tier AI researchers remaining in India after graduate or postgraduate training, rising from nearly zero in 2019 to almost 20% by 2022, alongside growth in domestic start-ups and research labs that may be slowing brain drain (Suri, 2025). The same source indicates that this implementation capacity is reinforced by India’s developer community, which is described as the world’s second-largest and fastest-growing contributor to nonacademic AI/ML projects on GitHub. It is projected to overtake the United States of America (US) by 2028, providing a large mid- and low-tier workforce aligned with an “AI for All” diffusion strategy.

India is also scaling AI R&D and infrastructure through expanding public–private investment, although a structural gap in domestic compute capacity remains a binding constraint. On the public side, the government has launched major initiatives, including the IndiaAI program, which was allocated INR103 billion (~USD1.3 billion) in 2024 for spending over five years and is intended to strengthen national AI capabilities (PIB, 2024). As part of this push, the government aims to procure 10,000 graphics processing unit (GPUs) to support AI start-ups and researchers, alongside efforts to build public AI computing infrastructure and a subsidized compute marketplace (PIB, 2024). Digital backbone expansion is central to the diffusion agenda, with BharatNet extending high-speed internet and 5G connectivity to over 250,000 village councils, thereby strengthening the enabling conditions for rural AI adoption. Complementing these initiatives, a Research, Development, and Innovation (RDI) scheme has been presented with a total outlay of roughly USD11 million over six years and targets strategic technology domains, including AI (IBEF, 2025).

FIGURE 5.5

INDIAN GOVERNMENT AND PRIVATE-SECTOR INVESTMENTS IN AI R&D, 2021–24



Source: IBEF (2025); PIB (2024); UNCTAD (April 2025).

Private Investment

India received USD1.4 billion in private AI investment in 2023, ranking 10th globally (IBEF, 2025; UNCTAD, 2025). A separate 2024 report indicates that private AI investment stood at USD1.16 billion, ranking 12th globally (The Secretariat, 2024). This figure is considerably lower than that of the US, which led with USD67 billion in 2023 (or 70% of global private AI investment), and PR China, which received USD7.8 billion (IBEF, 2025; UNCTAD, 2025). Private funding for Indian GenAI start-ups surged more than sixfold quarter-on-quarter to reach USD51 million in Q2 FY2025 (PIB, 2024). This growth signals a vibrant start-up ecosystem in the country. A 2025 Deloitte report notes that 28% of Indian firms expect their current AI solutions to become outdated within two years due to the rapid pace of change. Cisco (2024) noted that over 40% of organizations reported limited or below-expected gains from their AI investments.

National AI Policies and Strategies

India's approach to AI development is comprehensive and coordinated, with a national strategy implemented through policies and programs across multiple government bodies. This strategic direction has evolved from foundational policy documents into more concrete, mission-driven initiatives intended to build a self-reliant and globally competitive AI ecosystem. Within this framing, India's AI ecosystem is characterized by a broad and rapidly expanding network of stakeholders across both the public and private sectors, with each group contributing to national readiness and capacity.

A central theme of the strategy is ethical, human-centric AI, coupled with efforts to advance "strategic interdependence" and the "Viksit Bharat" vision for 2047 by combining localized investment with global alliances. In 2026, Prime Minister Modi articulated the M.A.N.A.V. Vision as a human-centric roadmap focused on Moral and Ethical Systems, Accountable Governance, National Sovereignty, Accessible and Inclusive AI, and Valid and Legitimate Systems. The national strategy is also presented as being anchored in the "Three Sutras" — People, Planet, Progress — and driven by "Seven Chakras" (pillars) that include priorities, such as the democratization of AI resources, AI for science, and secure and trusted AI.

India's National AI Strategy

India's foundational approach to AI is primarily articulated through its National Strategy for Artificial Intelligence, developed by NITI Aayog in 2021. This strategy provides a comprehensive framework aimed at positioning the country as a global leader in AI, with an emphasis on inclusive growth and societal transformation.

Vision, Goals, and Priority Areas

The core vision of India's AI strategy is to establish the nation as a global leader in AI, underpinned by the "#AIforAll" philosophy. This vision is not merely about technological advancement but is deeply rooted in leveraging AI to drive economic growth, enhance social outcomes, and address critical national challenges across diverse sectors. A key overarching goal is for India to develop scalable AI solutions that can be applied in other emerging and developing economies, demonstrating a commitment to global public good (National Institution for Transforming India [NITI Aayog], 2021). From an applications perspective, the strategy identifies several priority areas characterized by their potential for the "greatest externalities" and a requirement for a leading government role in implementation. These include healthcare, agriculture, education, smart cities, and infrastructure.

The "AI for All" philosophy emphasizes inclusive growth and societal transformation, particularly in critical sectors, such as healthcare and agriculture. This distinguishes it from purely economic or technological AI strategies. The strategy points to agriculture and healthcare as priority areas, and in doing so, reveals a strategic intent to use AI as a tool for national development and poverty alleviation, rather than solely for economic competitiveness. This approach is particularly relevant for APO member economies facing similar developmental challenges.

The philosophy is not merely a rhetorical statement but a foundational principle guiding India's AI strategy. By prioritizing AI applications in sectors like agriculture and healthcare, where the government plays a leading role, India aims to address its unique socioeconomic challenges, such as issues of access, affordability, and shortages of skilled expertise in critical areas. This approach positions India as a testing ground for developing scalable, inclusive AI solutions that can improve the quality of life for its vast population. This focus makes India's AI strategy relevant and potentially replicable for other developing countries and APO members facing similar challenges. It suggests a model where AI is leveraged as a public good, contributing to sustainable development goals rather than solely driving corporate profits.

Publication Year, Milestones, and Achievements

The groundwork for the National Strategy for Artificial Intelligence was laid in 2018. NITI Aayog adopted a three-pronged approach from the outset, encompassing exploratory proof-of-concept AI projects, crafting a national strategy for a vibrant AI ecosystem, and fostering collaborations with various experts and stakeholders. Significant milestones include the implementation of AI projects in critical areas, particularly agriculture and health, often in partnership with leading AI technology players. The organization's 2021 Responsible AI Approach report outlined key principles, such as safety, reliability, inclusivity, and accountability, which have since been integrated into more recent policy developments.

Key Challenges

The strategy identifies several significant challenges to AI adoption and development in India. First, it highlights persistent constraints related to data availability and the broader data ecosystem, noting the critical need for robust data infrastructures and improved access to high-quality, well-annotated datasets to effectively support AI research, development, and deployment. In addition, the strategy underscores challenges associated with AI expertise and workforce development, recognizing both the shortage of qualified AI professionals and the limitations of existing skilling and reskilling efforts.

Implementation Measures

To address these challenges and achieve its objectives, the strategy proposes several key implementation measures. It emphasizes promoting AI research through the establishment of Centers of Research Excellence (COREs) for fundamental research and International Centres for Transformational AI (ICTAIs) for application-oriented research, with the aim of fostering collaboration with the private sector and international institutions. In addition, the strategy highlights large-scale skilling and reskilling initiatives, including the integration of AI education across different levels of the education system and the promotion of interdisciplinary research to prepare the workforce for AI-driven changes. It also underscores the importance of data democratization through the development of large foundational datasets and multi-stakeholder marketplaces for data and AI models to lower entry barriers for start-ups. Finally, the strategy calls for robust frameworks to ensure ethical and responsible AI development, with a focus on data privacy, transparency, and accountability.

The explicit acknowledgement of data availability and AI expertise as key challenges within the national strategy indicates a pragmatic approach to policy formulation. This direct identification of bottlenecks allows for targeted interventions and resource allocation, making the strategy more actionable and effective. This self-awareness allows for the formulation of targeted and pragmatic implementation measures, such as promoting data democratization, establishing COREs/ICTAIs, and launching large-scale skilling programs (NITI Aayog, 2021).

This linkage between identified challenges and proposed solutions indicates a mature policymaking process that addresses fundamental infrastructure and human capital requirements. This approach increases the likelihood of successful policy implementation and resource optimization, as efforts are directed precisely where they are most needed to unlock AI's potential. It also provides a clear roadmap for stakeholders, including government, industry, and academia, to align their efforts effectively.

India's AI Policies

India's multifaceted approach to AI development is evident in coordinated efforts and policies implemented by various government ministries and departments.

Ministry of Electronics & Information Technology (MeitY)

The MeitY plays a central role in shaping India's digital future, including its AI landscape, through a comprehensive set of policies and initiatives. Key policies include the IndiaAI Mission, the IT Act 2000, the *Bharatiya Nyay Sanhita* (BNS) 2023 (India's new substantive criminal law enacted to replace the colonial-era Indian Penal Code (IPC), effective from 1 July 2024), the Digital Personal Data Protection Act (DPDPA) 2023, and the Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules (IT Rules) 2021.

The primary objectives of MeitY's AI strategy are to democratize AI technology, address India-centric challenges, generate employment opportunities, and position India as a global AI leader. A specific focus of the IndiaAI Mission is to build indigenous governance tools and safeguards, particularly to address India's vast linguistic diversity (NITI Aayog, 2021). Furthermore, MeitY is committed to strengthening digital governance through legal provisions and AI tools to combat misinformation, deepfakes, and identity theft.

The ministry's most important project is the IndiaAI strategic initiative, first launched in April 2024, which aims to establish a robust and inclusive AI ecosystem through its seven key pillars (Prime Minister's Office/Principal Scientific Advisor, 2024). The MeitY is also actively hosting open-source AI models on the AIRAWAT compute infrastructure, which is managed by Centre for Development of Advanced Computing (C-DAC) Pune. Currently, three open-source models from the Llama family have been deployed and are accessible to the developer community via API on a paid basis (Centre for Development of Advanced Computing, 2025).

The legal basis for MeitY's regulatory authority is the IT Act 2000. It contains provisions, such as Section 66C (punishment for identity theft, misinformation, deepfakes, cheating by personation), Section 66D (criminalizing the use of computer resources for cheating by personation), Section 66E (prescribing punishment for capturing, publishing, or transmitting images of a private area without consent), and Sections 67A and 67B (making publishing or transmitting obscene material, including that generated by deepfake technology, a punishable offense).

Key Measures and Programs

Section 111 of *Bharatiya Nyay Sanhita* (BNS) (2023) punishes continuing unlawful activity, including economic offenses and cybercrimes, committed by individuals or organized crime syndicates. Other sections (318, 319, 353, 356) also address cybercrimes, such as cheating or cheating by personation.

The DPDPA of 2023 places obligations on Data Fiduciaries to safeguard digital personal data, holding them accountable while also ensuring the rights and duties of Data Principals.

The IT Rules, promulgated in 2021 after extensive public consultations, impose obligations on intermediaries (including social media platforms) to ensure a safe and trusted internet, including the expeditious removal of prohibited misinformation, false information, and deepfakes. They also include a grievance redressal mechanism with a 24-hour timeline for complaints related to morphed or artificially generated images affecting victims. In addition, the Ministry of Home Affairs (MHA) has launched a dedicated cybercrime reporting portal and a toll-free number to facilitate reporting of cybercrimes, and the Indian Computer Emergency Response Team (CERT-In) has issued various advisories, including on safety measures to minimize adversarial threats from AI-based applications (May 2023) and GenAI best practices (March 2025). The Certified Security Professional in Artificial Intelligence (CSPAI) program was launched in September 2024. Technical guidelines for Bill of Materials (BOM) for software, hardware, AI, and quantum and cryptography requirements to enhance security and transparency of supply chains were also issued in July 2025 (Indian Computer Emergency Response Team, 2025).

The MeitY has also constituted an advisory group on AI chaired by the Principal Scientific Advisor (PSA) to the Prime Minister, and staffed by representatives from academia, industry, and government. This group is tasked with developing an India-specific AI regulatory framework. It has recommended a principles-based approach covering transparency, accountability, safety, reliability, robustness, privacy, security, fairness, nondiscrimination, human-centered values, inclusive and sustainable innovation, and digital-by-design governance. The group suggested a combination of voluntary commitments from AI developers/deployers and sectoral/risk-based regulations.

In addition, India has an Inter-Ministerial AI Coordination Committee/Governance Group and Technical Secretariat tasked with ensuring that the central government takes a whole-of-government approach to the comprehensive oversight of AI development and deployment.

The MeitY's policies demonstrate a comprehensive and multifaceted approach to AI governance, blending strategic investment in infrastructure and indigenous development with robust legal and ethical frameworks, particularly focusing on combating misuse and ensuring data protection. The rapid development of legal provisions (IT Act, BNS, DPDPA, IT Rules) and CERT-In advisories specifically targeting AI-related harms (deepfakes, misinformation, identity theft) indicates a proactive stance by the Indian government to address the societal risks of AI concurrently with its promotion. This safety-by-design approach in governance aims to build public trust and ensure responsible deployment.

The IndiaAI Mission's explicit objective is to build indigenous governance tools and safeguards that take into account the country's vast diversity of languages and dialects, and this is a highly strategic move. This aligns perfectly with the AI for All vision by ensuring that AI benefits are accessible across India's linguistic landscape. Furthermore, by tackling the complex challenges of AI ethics and safety in a multilingual context, India is positioned to develop innovative solutions for issues like bias detection, content moderation, and misinformation spread in low-resource languages. These solutions could have significant global applicability, especially in other linguistically diverse APO member economies and developing nations. This focus transforms a unique national challenge into a global opportunity, allowing India to lead in developing inclusive and robust AI governance frameworks that are relevant far beyond its borders. The IndiaAI Mission has been allocated USD1.24 billion to be spent over a period of five years (Prime Minister's Office/Principal Scientific Advisor, 2024).

The MeitY is one of several primary executor agencies, in addition to C-DAC Pune (which manages the AIRAWAT infrastructure), the MHA for cybercrime initiatives, the CERT-In for advisories and security programs, and the Principal Scientific Advisor (PSA) to the Prime Minister, who chairs the Advisory Group on AI. In this implementation landscape, the Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Amendment Rules, 2026 formally define and regulate synthetically generated content (deepfakes) to strengthen accountability while AIKosha serves as a national repository of curated datasets and foundation models designed to enable innovation for start-ups and researchers.

Department of Science & Technology (DST)

The Department of Science & Technology (DST) plays a crucial role in fostering deep-tech AI research and development (R&D) and innovation through significant investments in national missions, a network of specialized technology hubs, and support for translational research and entrepreneurship.

Key initiatives under DST include the National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS), the National Initiative for Developing and Harnessing Innovations (NIDHI) program, and the recently introduced RDI scheme. The DST's overarching objectives are to support the establishment of science and technology parks and innovation centers focused on AI and other emerging technologies. They also aim to promote R&D, innovation, and the creation of products and intellectual property. DST also oversees the Anusandhan National Research Foundation (ANRF), which has partnered with Google DeepMind to provide researchers access to advanced models like AlphaGenome.

Key Measures and Programs

One key measure is the National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS), which has an outlay of INR36.6 billion, or about USD400 million. Another project under the NM-ICPS is the Bharat-Gen: a suite of Generative AI Technologies for India program, which is being implemented with INR2.35 billion in funding support (~USD25.7 million) from the TIH Foundation for IoT and IoE, Indian Institute of Technology (IIT) Bombay. This is a multimodal, multilingual large language model (LLM) initiative focused on developing efficient and inclusive AI solutions in 22 Indian languages (Department of Science & Technology [DST], 2024).

In addition, a network of 25 Technology and Innovation Hubs (TIHs) has been established in reputed academic institutions across India under NM-ICPS. Each Technology and Innovation Hub (TIH) is assigned a specific technology vertical, including AI/ML, robotics, IoT, cybersecurity, data analytics, fintech, computer vision, speech/video/text analytics, human-computer interaction, cobotics, agriculture, water, mining, digital healthcare, and quantum technologies. Four of the 25 TIHs have been designated Technology and Translation Research Parks (TTRPs): IIT Indore, Indian Institute of Science (IISc) Bangalore, IIT Kanpur, and IIT Dhanbad. These parks aim to significantly scale translational research, commercialization, and industry engagement.

Under the National Initiative for Developing and Harnessing Innovations (NIDHI) program, DST has established Inclusive Technology Business Incubators (iTBI) across Karnataka to promote S&T-based entrepreneurship in AI and related technologies. An example is the BLDE Foundation for Innovation, which focuses on AI/ML in Healthcare.

One other important program is the Research Science Initiative (RSI) scheme. This scheme has a total outlay of roughly INR1 trillion (~USD12 billion) to be spent over six years with INR200 billion (~USD2.15) specifically allocated for FY25–26. These funds are designed to finance Research, Development, and Innovation (RDI) projects with transformative potential at Technology Readiness Levels (TRLs) 4 and above, focusing on strategic technology sectors, including AI.

The widespread establishment of 25 TIHs across various academic institutions, each with a specialized technology vertical, indicates a deliberate strategy to decentralize AI R&D and foster specialized expertise across the country. This hub-and-spoke model aims to create localized centers of excellence, potentially leveraging regional strengths and addressing specific sectoral needs (e.g., AI in Agriculture at IIT Ropar, Digital Healthcare at IIT Indore).

The upgrading of some TIHs to Technology Translation Research Parks signifies a strategic shift from pure research to a greater emphasis on commercialization and industry engagement. This focus on "translational research" is vital for ensuring that public investments in AI R&D yield tangible economic and societal benefits.

The NM-ICPS Mission has an allocated budget of INR36.6 billion (~USD400 million). The Bharat-Gen Project specifically received INR2.35 billion (~USD25.7 million) in funding. As mentioned earlier, the new RDI Scheme has a substantial budget of INR1 trillion (~USD12 billion) to be spent over six years, INR200 billion (~USD2.16 billion) allocated for FY25–26 (DST, 2024).

The primary executing agencies include the Department of Science & Technology (DST), the various TIHs, and the Technology Translation Research Parks.

Ministry of Education (MoE)

The MoE is proactively integrating AI into the national curriculum, from primary school to higher education, with a strong emphasis on practical applications and ethical considerations, and with the ultimate aim of building a future-ready workforce.

Key policies include the National Education Policy (NEP) 2020 and various initiatives for AI Curriculum Integration. The MoE's objectives are to integrate AI comprehensively into education,

emphasizing curriculum reform, the adoption of adaptive learning technologies, and the use of predictive analytics to enhance student outcomes. The overarching goal is to prepare students for the digital age and a rapidly evolving technological landscape.

Key Measures and Programs

The NEP 2020 proposes the development of AI-based software for holistic student progress tracking, enhancing learning and assessment through AI tools, like adaptive computer testing, and supporting gifted students via AI-driven online applications. It also stresses the importance of addressing ethical and privacy concerns associated with AI technologies.

The Central Board of Secondary Education (CBSE) introduced AI as an optional subject in its affiliated schools beginning in the academic year 2019–20. It is offered as a 12-hour module for Class VIII (the highest level of primary school) and as a skill subject for students in Classes IX to XII (secondary school). The curriculum aims to prepare learners to understand AI, its applications, and its three core domains (data, computer vision, and natural language processing) while also fostering an understanding of AI's impact on the SDGs. In the academic year 2022–23, over 386,000 students opted to study AI at the secondary level, and approximately 12,000 did so at the highest levels of secondary school (Ministry of Education, 2024).

State-level Initiatives

Odisha plans to introduce AI curriculum in 35% of schools by 2029, expanding to 90% by 2036. The state aims to train 8,000 citizens annually in AI skills by 2029 (increasing to 18,000 by 2036), establish seven AI innovation centers and 30 incubation centers, and train 75% of government officials in AI by 2029 (all these by 2036).

Madhya Pradesh became the first state to introduce an AI course for students of Class VIII and above in 2022–23, in partnership with Microsoft.

Uttar Pradesh plans to introduce AI as a subject in Classes VII–VIII in approximately 45,000 state-run schools in the 2024–25 academic year.

Kerala will integrate AI into Class VII ICT textbooks in 2024–25 and plans to expand the AI curriculum for Classes VIII–X in 2025–26 for more in-depth exploration.

In addition, the MoE has established three Centers of Excellence (COEs) in AI, focusing on healthcare (IIT Kanpur), agriculture (IIT Ropar), and sustainable cities (IISc Bangalore), with a total budget outlay of INR9.9 billion (~USD106.3 million). Another state-level program is the Centre of Excellence in AI for Education, announced in the Union Budget 2025–26 and supported with a financial outlay of INR5 billion (~USD53.7 million) (Ministry of Education, 2024).

The integration of AI curriculum from primary levels (e.g., Odisha's plan and CBSE's Class VIII module) signifies a long-term human capital development strategy. This early exposure aims to cultivate computational thinking and AI literacy from a young age, ensuring a continuous pipeline of AI-ready talent for the future, rather than just reskilling the existing workforce.

Key executory agencies include the MoE, the CBSE, various state boards, and premier academic institutions, such as IITs and IISc.

Ministry of Labour and Employment (MoLE) and Ministry of Skill Development and Entrepreneurship (MSDE)

The MoLE and MSDE are actively engaged in preparing India's workforce for the AI era, focusing on skill development, reskilling, and upskilling initiatives.

Key initiatives include the Skill India Mission (SIM), *Pradhan Mantri Kaushal Vikas Yojana* (PMKVY) 4.0, the National Apprenticeship Promotion Scheme (NAPS), the Craftsman Training Scheme (CTS),

and the Skill India Digital Hub (SIDH). The overarching objective of these schemes is to equip India's youth with industry-relevant skills, including new-age "future skills" in AI and robotics to ensure they are ready to work in the industries of the future. The ministries aim to harmonize education and employment, foster innovation, enhance productivity, and address global workforce shortages through initiatives like the Mutual Recognition of Skills and Standards.

Key Measures and Programs

The Skill India Mission (SIM) delivers skill training through an extensive network of skill development centers under various schemes while the Pradhan Mantri Kaushal Vikas Yojana (PMKVY) 4.0 program has introduced dedicated job roles under the Future Skills category, specifically preparing youth for opportunities in emerging technologies like AI, ML, and digital marketing. Over the last three years, 409,905 candidates have been trained under 98 different job roles (Ministry of Skill Development and Entrepreneurship [MSDE], 2024).

The National Apprenticeship Promotion Scheme (NAPS) provides apprenticeship training in over 750 optional trades, including AI and Robotics. During the last three years, 4,207 apprentices have been engaged in eight AI and robotics-related trades across the country (MSDE, 2024).

The Directorate General of Training (DGT) under MSDE has introduced 31 new-age/future skills courses as part of a larger program called the Craftsman Training Scheme (CTS). Courses cover a range of fields, including AI, mechatronics, IoT, cybersecurity, and semiconductor technologies, with 59,327 enrollments at industrial training institutes (ITIs) over the last three years. A course on AI programming has been introduced, along with a 7.5-hour micro-credential course introducing AI to CTS trainees (MSDE, 2024).

Another program is the Skill India Digital Hub (SIDH), a unified digital platform providing access to industry-relevant courses, job opportunities, and entrepreneurship support. It offers a diverse selection of AI and ML courses, from introductory programs to advanced modules on Google Cloud Generative AI and AI strategy.

Importantly, the DGT has signed MoUs with leading technology companies, such as International Business Machines Corporation (IBM), Cisco, Amazon Web Services (AWS), and Microsoft to facilitate technical and professional skills training in modern technologies, including AI, big data analytics, blockchain, and cloud computing (MSDE, 2024). The National Skill Development Corporation (NSDC) has also partnered with Intel and Redhat in digital course delivery.

Initiatives are underway to modernize ITIs and training centers, focusing on emerging sectors, such as semiconductors, solar energy, drones, electric vehicles, and automation. This includes aligning Special Projects and Short-term Training programs with the SIDH platform and collaborating with MeitY and other ministries to upgrade training infrastructure in line with Industry 4.0.

An additional cabinet-approved scheme is the National Scheme for Upgrading ITIs and establishment of National Centers of Excellence, which is meant to upgrade 1,000 ITIs through a hub-and-spoke model, introducing industry-aligned curricula and new courses in emerging fields, like AI and robotics.

Launched by MSDE, the national-level SOAR (Skilling for AI Readiness) initiative focuses on building AI literacy among primary and secondary school students (Classes VI–XII) and teachers. It offers progressive modules for students and a dedicated course for educators, covering core AI concepts, GenAI, ethical AI, and basic programming (MSDE, 2024).

While a single, consolidated budget for all AI initiatives across MoLE and MSDE is not publicly available, the focus remains on substantial investments in specialized training and infrastructure.

The primary executing agencies are MSDE, DGT, and NSDC.

Summary of AI-related Policies and National Strategies

India's AI strategy is defined by a unique philosophical framework articulated by the government think tank NITI Aayog: "AI for All." This human-centric approach aims to use AI for inclusive growth, address societal challenges, and foster equitable development, operationalized through the triad of *Samaj* (Society), *Sarkar* (Government), and *Bazaar* (Market) (Suri, 2025). The nation's policy roadmap is rapidly evolving from high-level vision to a financially backed, mission-centric strategy focused on securing foundational AI capability while ensuring ethical, responsible deployment.

Main AI-related National Strategies and Budgetary Commitments

The current policy structure is anchored by the comprehensive IndiaAI Mission (National AI Mission - NAIM), which acts as an umbrella program to foster inclusion, innovation, and adoption (INDIAai, n.d.; PIB, 2024a). This mission is the largest financial commitment to date, signaling a serious strategic intent to move India toward AI competitiveness.

TABLE 5.1

INDIA'S NATIONAL AI POLICY MATRIX

Policy/Strategy Name	Year Initiated	Key Goals & Mechanism	Budget & Executive Agency
IndiaAI Mission	2024	- Comprehensive mission across seven pillars (Compute, Data, Talent, R&D, Capital, Algorithms, Applications) - Focus on public-private partnership (PPP) model (PIB, 2024a)	Approximately USD1.3 billion over five years (PIB, 2024a)
IndiaAI Compute Capacity	2024	- Establish cutting-edge, scalable AI computing infrastructure via PPP - Deploy 10,000+ high-end GPUs (Suri, 2025)	Approximately USD515 million allocated under the Mission (Suri, 2025)
Private Sector R&D and Innovation	2025	Fund allocated in the Union Budget to encourage private sector-led research, development, and innovation across technology sectors (PIB, 2025)	Approximately USD2.3 billion allocated (PIB, 2025)
Centre of Excellence for AI Education	2025	Establishment of a CoE, specifically focused on integrating AI into the education curriculum and building high-quality talent (PIB, 2025)	Approximately USD57 million outlay (PIB, 2025)
Digital Personal Data Protection (DPDP) Act	2023	Provides a legal framework for processing digital personal data, recognizing individual rights and enabling lawful data usage (Suri, 2025)	N/A (Legislative Act).
The Bhashini Initiative	2022	National Language Translation Mission using AI to transcend language barriers and ensure digital inclusion by building multilingual data repositories (Suri, 2025)	Funded under Digital India Corporation, MeitY

Key Pillars of the IndiaAI Mission

The IndiaAI Mission is structured around seven interconnected pillars, with a clear focus and budgetary backing for compute, talent, and R&D.

IndiaAI Compute Capacity

This pillar addresses the critical shortage of high-end computing resources. The Mission has facilitated the procurement of over 10,000 GPUs, with plans to scale capacity to over 18,000 GPUs (Suri, 2025). This massive deployment, achieved through a strategic public-private partnership, is intended to democratize access to the computational power needed by start-ups, academics, and researchers (PIB, 2024a). Additionally, the AIRAWAT supercomputer, ranked 75th globally (ISC 2023), further highlights the government's commitment to advanced computational research.

IndiaAI Datasets Platform

This platform aims to address the data dilemma, referring to the lack of accessible, standardized, India-specific, nonpersonal data for training indigenous AI models (Suri, 2025). The platform will streamline access to high-quality public sector datasets while the complementary Bhashini Initiative focuses specifically on building vast multilingual data repositories to ensure digital services are available in over 22 Indian languages.

IndiaAI FutureSkills

This pillar tackles the talent shortage and reduces regional gaps by focusing on mass skilling. To ensure inclusive access, the Mission has established 27 state-of-the-art AI and Data Labs across National Institute of Electronics & Information Technology (NIELIT) Centres in Tier 2 and Tier 3 cities. These labs offer National Council of Vocational Education and Training (NCVET)-recognized foundational certification courses in areas, such as Fundamentals of Data Annotation using Python and Foundation of Artificial Intelligence Technology. This decentralization is crucial for expanding the AI talent pipeline beyond metropolitan hubs and addressing employability across the country (PIB, 2024b).

IndiaAI Safe & Trusted AI

This governance-focused pillar establishes robust regulatory guardrails for responsible AI development. This includes launching the IndiaAI Safety Institute for Responsible AI Innovation and developing comprehensive tools, checklists, and governance frameworks. This strategic focus reflects global trends, where only a minority of organizations (31% globally) report having comprehensive AI policies and protocols in place.

Future Plans and Adaptive Governance

India's governance model is designed to be adaptive and dynamic, with the stated aim of keeping policy aligned with technological development, particularly the rise of agentic AI. Under the Time-Bound Action Plan, the short-term phase prioritizes establishing foundations for responsible AI governance by setting up core institutions, developing India-specific risk frameworks, and expanding initial access to computational infrastructure, with the creation of the IndiaAI Safety Institute as a key deliverable. The medium-term phase shifts toward scaling and piloting by operationalizing AI incident systems, expanding the integration of digital public infrastructure (DPI) with AI, and launching regulatory sandboxes to allow innovators to test new technologies in controlled environments while reducing compliance friction and maintaining safeguards (Salesforce, 2025). The long-term phase emphasizes periodic review and sustainability by requiring regular updates to governance frameworks to support the durability of the digital ecosystem and enabling the drafting of new laws as risks and capabilities evolve.

Beyond sequencing, the plan is reinforced by strategic R&D funding and an implementation architecture intended to coordinate delivery at scale. A major forward-looking commitment is the allocation of INR200 billion (~USD2.3 billion) in the Union Budget for private sector-driven Research, Development, and Innovation initiatives (PIB, 2025), aimed at mobilizing private capital to help close the national R&D spending gap (Suri, 2025) and incentivize breakthroughs in foundational AI that complement government efforts. Implementation depends on a multi-stakeholder institutional framework that includes a high-level AI Governance Group, government agencies (MeitY, MHA, Ministry of External Affairs, Department of Telecommunications), sectoral regulators (RBI, Securities and Exchange Board of India (SEBI)), and advisory bodies (NITI Aayog), and is intended to support policy coherence, regulatory agility, and coordination between central and state levels. This approach is supported by mature data infrastructure, including the Ayushman Bharat Digital Mission, which has created a health data backbone with 830 million digital health IDs and 780 million-linked medical records, and the RBI Account Aggregator (AA) Framework, which enables secure, consent-based sharing of financial data across 2.2 billion bank accounts. It also incorporates AI-facing public data

assets, such as AIKosha, launched in 2025 by MeitY as a national repository of curated datasets and foundation models for researchers. On the regulated infrastructure side, India's Unified Payments Interface (UPI) is presented as a regulator-built open infrastructure processing around 16 billion transactions per month and operating as a “platform steward” model for digital payments while the Safe and Trusted AI initiative supports responsible deployment through the use of regulatory sandboxes.

Key Stakeholder Mapping

The Indian private sector is a dynamic force in AI development, encompassing established IT service giants, a burgeoning start-up landscape, and a growing focus on AI-first business models.

Private Sector

Major Players

India's AI business landscape combines established IT services firms with a fast-growing start-up ecosystem.

Infosys Limited (Infosys)

Among established companies, Infosys, founded in 1981, is a global IT services firm with a substantial AI footprint. It works across system integration, application development, cloud services, IT consulting, and data analytics in sectors, such as retail, financial services, manufacturing, energy, and healthcare. Infosys has pursued broad collaborations to advance AI adoption and digital transformation, including partnerships with Select Portfolio Servicing, Inc. to scale AI across business functions, AIB for digital transformation, E.ON and RWE for AI-powered and automated digital workplace transformation, DNB Bank ASA for IT infrastructure modernization and AI and machine learning enablement, and Yorkshire Building Society for digital transformation. Infosys has also worked with AGCO Corporation, Telstra International, Melbourne Archdiocese Catholic Schools, Prashanthi Balamandira Trust, and Mental Health Foundation Australia, including the launch of the Supportive Mind app as well as with Zoetis and Adobe to accelerate AI-enabled marketing transformation. Additional collaborations include the French Tennis Federation for AI-first fan experiences at Roland-Garros 2025, LogicMonitor, the International Tennis Hall of Fame, and Linux Foundation Networking to advance responsible AI principles, along with Citizens for AI-led transformation, Lufthansa Group, and Meta on open-source initiatives for generative AI. One of its core strategic relationships is with Microsoft, which supports customer adoption of generative AI and Microsoft Azure globally. Implementing "AI factories" as flexible loads for power systems can enable data centers to optimize power use based on grid conditions (up to 40% peak demand reduction).

Tata Consultancy Services (TCS)

TCS, founded in 1968, is a major player in IT services, consulting, and business solutions and is actively engaged in AI-led digital transformation. TCS is conducting a research project with MIT Sloan Management Review on human–AI collaboration in large enterprises, with a focus on intelligent choice architectures in which AI functions as a designer or architect of decisions. TCS has upgraded its GenAI aggregator platform, TCS AI WisdomNext 2.0, by adding agentic capabilities and collaborates with roughly 50 academic institutions to curate collective intelligence for enterprise use. Recent partnerships include Eaton on power infrastructure for AI data centers and Salling Group on digital transformation and AI-enabled cloud migration. AI-optimized data centers are being developed starting at 100 MW and scaling toward 1GW, with OpenAI named as the first anchor tenant.

Others

Other established firms active in AI-adjacent digital services include Persistent Systems, founded in 2007, which provides data and analytics, cloud and infrastructure services, data and product engineering, intelligent automation, and client experience transformation. Zensar Technologies, founded in 2001 and headquartered in Pune, builds and manages digital products for large global

clients across banking, financial services, and insurance as well as technology and high-tech engineering services, and it maintains an ecosystem of more than 60 technology partners, including Salesforce, SAP, and Oracle. Saksoft provides digital transformation solutions for sectors, such as financial services, healthcare, and banking. Kellton, founded in 2009, delivers digital and IoT solutions globally. Fractal Analytics provides analytical solutions for consumer-facing companies, especially in high-volume transaction settings. Cyient, founded in 1991, focuses on data analytics, networks, operations, and engineering and manufacturing services, including engineering design, manufacturing support, and aftermarket services. Wipro, founded in 1945, is a major IT company with a global presence and provides AI development services.

Reliance Industries and Jio have detailed a multi-gigawatt AI data center and edge compute expansion program to support indigenous AI workloads while Larsen & Toubro is developing a gigawatt-scale “AI factory” across facilities in Chennai and Mumbai using NVIDIA GPU infrastructure. In parallel, Tech Mahindra has developed a sovereign multilingual AI framework that reportedly achieves 92% conversational accuracy in Hindi and *Bahasa Indonesia* (Indonesian language) and supports 3.8 million monthly queries across citizen services and healthcare. HCLTech has established a GenAI Lab for global pharmaceutical research aimed at accelerating drug discovery and pilot testing.

Other Core Products and Services

Indian private sector activity spans multiple AI domains. GenAI is a major focus, with start-ups, such as Sarvam AI and Krutrim AI developing LLMs in Indian languages. Conversational AI is another prominent area, with companies, such as Haptik and Yellow.ai building customer service automation systems, including chatbots and voice agents operating across multiple languages and channels. Firms also pursue AI-driven automation to streamline core business tasks and improve productivity across banking and financial services, IT and IT-enabled services, and manufacturing sectors. Data analytics and machine learning remain central offerings, including analytics solutions, dashboard development, and data visualization. Computer vision and robotics support applications in automation, security, and other specialized use cases. Healthcare AI is represented by firms, such as Qure AI, which develops tools for medical diagnosis and patient care while agriculture-oriented solutions include KissanAI, which develops AI copilots and language models optimized for Indian agricultural practices. Many firms also provide custom AI development and consulting tailored to specific industries.

Start-ups

Haptik

Within the start-up ecosystem, Haptik, founded in August 2013 and acquired by Reliance Industries Limited in 2019, operates as an enterprise conversational AI platform. Haptik positions itself as a pioneer in conversational AI and generative AI, enabling enterprises to develop conversational systems that support natural language interaction with applications and digital services. In 2023–24, Haptik celebrated its 10th anniversary, launched a generative-AI-first product stack, including Kontakt with integrated LLMs such as GPT, expanded its customer portfolio across the Middle East and Africa and the Asia-Pacific. It also supported Reliance Jio’s 5G launch through a WhatsApp assistant serving more than 500 million users. Haptik received a Tech Startup of the Year in AI award at the 13th Annual Entrepreneur India Awards, launched GenAI Talks in partnership with Google, and presented AI solutions at the GPAI Summit 2023, including the GPAI Smart Info Bot. Its collaborations include Reliance Jio, the government of Maharashtra for a chatbot supporting the *Aaple Sarkar* platform, Tata Mutual Fund for the Prof. Simply Simple chatbot, MyGov for a WhatsApp Corona Helpdesk chatbot, RedDoorz for hotel management automation, and integrations or relationships involving Zoho SalesIQ and Innominds, alongside its partnership with Google for GenAI Talks.

Yellow.ai

Yellow.ai, founded in 2016 in Bangalore and previously known as Yellow Messenger, is headquartered in San Mateo, California. Yellow.ai positions itself as an agentic AI platform for service automation,

delivering customer support across chat and voice in more than 135 languages and over 35 channels. The company rebranded to Yellow.ai in 2021, launched DynamicNLP in 2022 to reduce or eliminate the need for traditional natural language processing (NLP) model training, and launched its Dynamic Automation Platform in 2023 alongside a new logo. It was recognized as a Challenger in the 2023 Gartner Magic Quadrant for Enterprise Conversational AI Platforms. Yellow.ai collaborates with Microsoft to transform voice automation using Azure AI Speech Services and NLP tools and has partnerships or deployments involving Tech Mahindra, Unicommerce, Edelweiss General Insurance for an AI voice bot, and BPCL for a virtual assistant named Urja. The company also joined Microsoft's accelerator program and SAP Startup Studio in 2016.

Sarvam AI

Sarvam AI, established in July 2023 and co-founded by Raghavan and Pratyush Kumar, focuses on making generative AI accessible at scale in India by developing indigenous foundational LLMs capable of operating across Indian languages. Sarvam AI was selected by the government of India as the first start-up under the IndiaAI Mission to build an indigenous foundational LLM and received access to 4,096 NVIDIA H100 GPUs. It open-sourced OpenHathi, an Indic Hindi LLM built on Llama 2, and open-sourced Samvaad, a curated dataset containing 100,000 high-quality conversations in English, Hindi, and Hinglish. It has also launched Bulbul, a voice model for the Indian market. Sarvam AI collaborates with the government of India through the IndiaAI Mission, NVIDIA, Microsoft on an Indic voice LLM, UIDAI (Unique Identification Authority of India) to support AI voice and fraud detection for Aadhaar in 10 Indic languages, and NITI Aayog on an enterprise reasoning engine.

Krutrim AI

Krutrim AI, launched by Ola founder Bhavish Aggarwal, specializes in developing LLMs in Indian languages and focuses on accelerating conversational AI and inclusive AI adoption. It launched Kruti, an agentic AI assistant capable of executing tasks, such as cab booking, food ordering, and bill payments, supporting text and voice input in 13 Indian languages. In 2023 and 2024, Krutrim AI raised USD50 million at a USD1 billion valuation and acquired BharatSahAIyak, an AI platform supporting government initiatives in education, agriculture, and citizen services. Kruti runs on Krutrim's V2 LLM and is enhanced with open-source models, and connects to services through Ola's platform as part of task execution. Krutrim AI's collaborations include Ola's platform and Samagra through the acquisition of BharatSahAIyak.

Qure AI

Qure AI is a healthcare-focused AI start-up with more than USD60 million in funding. It develops AI solutions for lung, heart, neuro, and musculoskeletal conditions, using deep learning for automated interpretation of radiology exams to improve diagnosis and patient care. Qure AI's tools are deployed in more than 100 countries, and it has received 18 FDA clearances, including three new approvals in 2024. It was recognized among Time's 100 Most Influential Companies of 2025. Recent product developments include the Lung Cancer Care Continuum portfolio for detection, measurement, and management of lung nodules and Aira, a multidisease clinical AI copilot presented at the World Health Assembly in Geneva.

Public Sector and Parastatals

India's public and quasi-public sectors play a central role in shaping the AI ecosystem through policy leadership, mission funding, research infrastructure, cybersecurity governance, and workforce development.

Major Players

India's AI policy and capacity-building agenda is anchored by a small set of central ministries and national institutions that set strategy, fund research and infrastructure, and coordinate adoption across sectors.

National Institution for Transforming India (NITI Aayog)

Established in 2015 as the National Institution for Transforming India, replacing the Planning Commission, NITI Aayog is the government of India's premier policy think tank and provides strategic direction and policy inputs. It developed the National Strategy for Artificial Intelligence and promoted the "AI for All" vision, emphasizing economic growth, improved social outcomes, and the use of AI to address national development challenges. NITI Aayog has pursued exploratory AI initiatives in areas, such as agriculture and health, articulated principles for responsible AI in 2021, and announced the AIRAWAT cloud platform in 2018 to support big data analytics and AI computing. It partnered with Microsoft in 2018 to advance AI adoption and local language computing and collaborated with Intel and the Tata Institute of Fundamental Research (TIFR) in 2018 to establish the International Center for Transformative Artificial Intelligence (ICTAI). It is also engaged in discussions with Sarvam AI on India's sovereign LLM development efforts.

Ministry of Electronics and Information Technology (MeitY)

Created in 1999 as the Department of Information Technology and upgraded to the Ministry of Electronics and Information Technology in 2016, MeitY is the central ministry responsible for electronics and IT policy, including AI strategy, digital governance, and cybersecurity. It launched the IndiaAI Mission in March 2024 and supports the hosting of open-source AI models on AIRAWAT compute infrastructure. MeitY has worked to operationalize legal and regulatory provisions aimed at countering misinformation, deepfakes, and identity theft, drawing on the Information Technology Act 2000, the *Bharatiya Nyaya Sanhita* (BNS) 2023, the Digital Personal Data Protection Act (DPDPA) 2023, and the Information Technology Rules 2021. It constituted an advisory group on AI to inform regulatory framework development. The MeitY's ecosystem linkages include engagement with C-DAC Pune on AIRAWAT, the MHA on cybercrime reporting mechanisms, and CERT-In on advisories and professional programs, such as the Certified Security Professional in Artificial Intelligence (CSPA). MeitY is also responsible for the IndiaAI Mission, the AIKosha repository, and BharatNet infrastructure. (More on MeitY can be read in earlier sections.)

Department of Science and Technology (DST)

Established in 1971, DST supports national research and development (R&D) across science and technology, including AI and other emerging technologies, by implementing national missions and funding innovation infrastructure. It implements the National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS) and funds the Bharat-Gen project for multilingual LLM development. DST established 25 Technology Innovation Hubs (TIHs) across academic institutions, each aligned with a specific technology vertical, and upgraded four TIHs into Technology Translation Research Parks (TTRPs) to strengthen commercialization pathways. Under the National Initiative for Developing and Harnessing Innovations (NIDHI) program, it supports Inclusive Technology Business Incubators (iTBI). DST launched a Research, Development, and Innovation (RDI) scheme with an outlay of INR1 trillion (~USD12 billion), targeting strategic technologies, including AI. Key institutional partners include IIT Bombay for Bharat-Gen and multiple IITs and IISc for TIHs and TTRPs, as well as BLDE (Deemed to be University) for iTBI initiatives. (More on DST can be read in earlier sections.)

Ministry of Education (MoE)

Formed in 1985 as the Ministry of Human Resource Development and renamed the Ministry of Education (MoE) in 2020, the MoE designs and implements national education policy and drives AI integration into curricula and research capacity-building. Under the National Education Policy (NEP) 2020, it promotes AI integration across education pathways, and the Central Board of Secondary Education (CBSE) introduced AI as an optional subject in the 2019–20 period. The ministry supports state-level AI curriculum initiatives in Odisha, Madhya Pradesh, Uttar Pradesh, and Kerala, and established three Centres of Excellence in AI focusing on healthcare, agriculture, and sustainable cities at IIT Kanpur, IIT Ropar, and IISc Bangalore. It announced a Centre of Excellence in AI for Education in the Union Budget 2025–2026. Its engagement network includes CBSE, state boards, IITs,

IISc, and Microsoft in connection with AI course initiatives in Madhya Pradesh. (More on MoE can be read in earlier sections.)

Others

Beyond central policy and education ministries, India's AI ecosystem is supported by specialized organizations spanning skilling, defense R&D, start-up infrastructure, advanced computing, industry coordination, and cybersecurity.

Ministry of Skill Development and Entrepreneurship (MSDE)

Established in 2014, the MSDE leads the Skill India Mission and runs skill, reskill, and upskill programs, including for emerging technologies, such as AI. It introduced a Future Skills category under PMKVY 4.0, expanded apprenticeship pathways for AI and robotics through NAPS, and implemented AI-oriented training through ITIs and National Skill Training Institutes (NSTIs), including the Artificial Intelligence Programming Assistant (AIPA) track and an introductory AI micro-credential. MSDE launched the Skill India Digital Hub (SIDH), which includes AI and ML coursework, and launched SOAR, or Skilling for AI Readiness, to equip school students and educators with foundational AI skills. Its partnership ecosystem includes IBM, Cisco, AWS, Microsoft, Intel, Red Hat, Pearson VUE, Boston Consulting Group (BCG), NSDC, and coordination with the MeitY and Ministry of New and Renewable Energy (MNRE) for ITI modernization.

Centre for Artificial Intelligence and Robotics (CAIR), DRDO

Established in 1986, the Centre for Artificial Intelligence and Robotics (CAIR) is a laboratory under the Defence Research and Development Organisation (DRDO) that conducts R&D in AI, robotics, and command-and-control systems for defense services. Its mission is to deliver dependable information systems for defense applications and enable battlefield advantage through improved information processing. CAIR has developed systems, such as the Air Defence Control and Reporting System, the Automatic Electronic Switch, autonomous navigation systems, and autonomous search robots. CAIR engages with other labs and institutes as part of its work, although specific partners are not identified here.

Software Technology Parks of India (STPI)

Established in 1991, STPI is an autonomous society under the MeitY that promotes the IT/ITES sector while supporting innovation, R&D, start-ups, and product and IP creation in emerging areas, including IoT, blockchain, and AI. STPI provides infrastructure, skilling, mentoring, and market connectivity for start-ups and operates specialized labs, including AI and data analytics lab as well as a computer vision labs. It launched 23 Centres of Entrepreneurship in emerging technology domains, including AI, supporting more than 1,900 start-ups. Its initiatives include the IMAGE Centre of Entrepreneurship in Hyderabad, focusing on gaming, VFX (visual effects), computer vision, and AI. STPI runs the Leap Ahead Global Connect program, which has taken 25 high-potential Indian start-ups to Silicon Valley. Its ecosystem partnerships span the MeitY, state governments, industry partners, academic institutions, venture capital networks, and TiE50-linked visibility mechanisms.

Centre for Development of Advanced Computing (C-DAC)

Established in 1988, the C-DAC is a premier R&D organization under the MeitY focused on advanced computing and manages the AIRAWAT compute infrastructure on behalf of the ministry. C-DAC promotes participation, community sovereignty, and meaningful consent in AI-enabled solutions and supports AI for humanitarian applications. It received recognition at the AI for Good Global Summit 2025 for an AI-based Virtual Yoga Instructor initiative that uses multimodal datasets and AI models to deliver real-time, posture-aware yoga guidance. Its 2022–27 strategy refresh, with a midpoint noted in July 2024, prioritizes participation and community engagement in safe and ethical AI. C-DAC works with the MeitY on AIRAWAT and engages with the International Telecommunication Union (ITU) and associated UN system entities through the AI for Good Global Summit.

Indian Institutes of Technology (IITs) and Indian Institute of Science (IISc)

The IIT system and the IISc form the backbone of India's academic and applied AI research pipeline. These institutions host Technology Innovation Hubs and Centers of Excellence that support fundamental research, applied research, and translational work across AI and related fields. IIT Kanpur, IIT Ropar, and IISc Bangalore host MoE-established Centres of Excellence in AI focused on healthcare, agriculture, and sustainable cities while other IITs host hubs spanning AI and ML, robotics, computer vision, and data analytics. IIT Bombay hosts the Bharat-Gen project for multilingual LLM development, and IISc Bangalore and IIT Kanpur host Technology Translation Research Parks (TTRP) that support commercialization. These institutions work with DST under NM-ICPS for TIHs and TTRPs, with the MoE for Centres of Excellence, and with private sector firms for research and incubation.

National Association of Software and Service Companies (NASSCOM)

Established in 1988, NASSCOM is the principal industry body for India's IT and business process management (BPM) sector. It produces reports and analysis on AI adoption, talent dynamics, and market trends and advocates for policy and workforce transformation aligned with AI diffusion. NASSCOM publishes the AI Enterprise Adoption Index, tracks GenAI start-up funding, and highlights workforce rationalization pressures linked to AI, alongside the need for continuous skilling. It collaborated with Deloitte on the Advancing India's AI Skills report and works with partners, such as BCG on AI market reporting.

Indian Computer Emergency Response Team (CERT-In)

Established in 2004, the CERT-In is India's national incident response agency and a key actor in cybersecurity advisories and secure AI deployment practices. CERT-In issued advisories on AI safety measures in May 2023 and GenAI best practices in March 2025. It launched the Certified Security Professional in Artificial Intelligence (CSPAI) program in September 2024 and issued technical guidance in July 2025 related to Bills of Materials for AI, software, and hardware. CERT-In partnered with SISA (global forensic-driven cybersecurity company) for the CSPAI program.

Principal Scientific Advisor (PSA) to the Government of India

Established in 1999, the office of the PSA advises the government of India on science and technology priorities and coordinates work related to AI governance. The PSA chaired the advisory group developing India's AI regulatory framework and guided a subcommittee on AI governance and guidelines development. The advisory group draws members from academia, industry, and government, although specific institutional partners are not listed here.

Anusandhan National Research Foundation (ANRF)

The ANRF partners with global research entities, such as Google DeepMind, to enhance AI-driven scientific discovery.

Karmayogi Bharat

Karmayogi Bharat is tasked with large-scale capacity building, aiming to equip 20 million public servants with AI skills.

Reserve Bank of India (RBI)

The RBI is the architect of the Account Aggregator framework and the overseer of the UPI infrastructure.

Directorate General of Training (DGT)

The DGT partners with global firms (IBM, Microsoft) for the FutureSkills Prime initiative.

Kerala IT and Kerala AI Mission

Kerala IT and the Kerala AI Mission are responsible for the Kerala AI Industry Charter 2026, outlining joint actions for investment and innovation in the state.

TABLE 5.2

SUMMARY OF KEY STAKEHOLDERS

Stakeholder Group	Primary Role & Characteristics	Innovation/Adoption Status (Year Established)
Start-ups	Role: High-velocity innovation, applied AI development, and employment generation Characteristics: 2,915 AI-focused start-ups, generating nearly 24,000 jobs (Observer Research Foundation [ORF], n.d.). They specialize in leveraging India's vast consumer data for local applications (Suri, 2025)	Status: Ranks seventh globally in newly funded AI companies (ORF, n.d.) Vulnerability: 83% of Indian start-ups rely on Western or Chinese LLMs, indicating low domestic foundational IP creation (Suri, 2025)
Established Enterprises	Role: Major technology integrators, bulk AI consumers, and workforce upskillers Characteristics: Dominated by IT service providers (60% market share) and Global Capability Centres (GCCs) (8%) (Teamlease Digital, n.d.). These firms drive business-to-business (B2B) adoption and enterprise-wide deployment (IBM, 2024)	Status: 59% of large Indian enterprises (over 1,000 employees) have deployed AI (IBM, 2024). They serve as primary centers for integrating proprietary AI solutions into client operations (Suri, 2025)
Academic/Research Institutions	Role: Top-tier talent generation and deep R&D. Institutions: Indian Institutes of Technology (IITs), Indian Institute of Science (IISc), and Indian Statistical Institute (ISI) (AI Index, 2024) Initiatives: KOTAK-IISc AI-ML Centre (established in 2023) promotes industry-aligned innovation	Status: Host several Centres of Excellence (CoEs) for research Challenge: Concentrate top-tier talent who often migrate abroad for advanced research opportunities (Suri, 2025)

Use Cases and Investment

India's AI adoption is increasingly visible in sector-specific deployments, particularly in digitally mature industries where automation of routine, data-intensive work is delivering measurable productivity gains. Investment indicators also show that capital mobilization has not kept pace with innovation ambition, increasing the importance of public policy and mission-driven funding to close domestic capability gaps.

Priority Sectors

Banking, Financial Services, and Insurance (BFSI)

According to Teamlease Digital (n.d.), BFSI leads AI adoption in India, with a 68% deployment rate, driven by regulatory compliance needs, heightened security requirements, and demand for highly personalized customer engagement. The same source reports that customer service and engagement are primary entry points: AI chatbots and virtual assistants handling routine queries account for 78% of adoption while fraud detection and risk management (through real-time transaction monitoring and anomaly detection) account for 71% adoption. Teamlease Digital also finds that compliance is advancing toward fully predictive, real-time models, with 35% of organizations operating such models or reporting substantial progress toward that goal. Additionally, BFSI leaders expect major operational restructuring as AI matures, and half of surveyed executives expect the traditional back office to disappear within three years while 57% expect AI agents to autonomously manage more than 75% of routine processes.

A major player is Tata Consultancy Services (TCS), founded in 1968, an iconic firm in BFSI AI deployment because it builds enterprise-wide AI foundations that help client institutions operationalize AI at scale. TCS delivers outcomes, such as hyper-personalized services and improved risk management and helps BFSI firms translate AI capabilities into concrete operational and business results. It supports

these deployments through proprietary platforms, such as TCS BANCS and TCS AI WisdomNext, providing end-to-end solutions focused on efficient operations and more accurate decision-making.

Manufacturing and Core Industries

AI adoption in manufacturing and core industries stands at 28%, but the sector remains central to India's industrial ambitions (Teamlease Digital, n.d.). Predictive maintenance is a common use case, with AI models analyzing real-time sensor data to forecast equipment failures, reduce unplanned downtime, and lower operational costs. Supply chain optimization is another core use case, with AI supporting complex logistics and inventory management to improve demand forecasting and operational planning. The sector is also advancing toward physics-informed and explainable AI, which improves reliability and interpretability in safety-critical applications, including vehicles and industrial systems.

Healthcare and Pharma

Healthcare and pharmaceuticals have a 52% AI adoption rate, with applications centered on diagnostic augmentation, accelerated discovery, and development workflows (Teamlease Digital, n.d.). Diagnostics and medical imaging are major use cases, including early cancer screening, image processing, and report generation (NASSCOM, 2024). AI is also used in genomic research, including gene therapy product development and clinical trial processes under national guidelines. India's National Ethical Guidelines for Biomedical and Health Research, established in 2017, provide an ethical foundation for AI use in sensitive health contexts.

Public Sector and Governance

Public-sector AI adoption is driven by a government push to integrate AI into citizen services, leveraging digital public infrastructure to support scale and inclusion. Flagship initiatives combine service delivery with multilingual data development and talent pipeline building.

Bhashini Initiative

Established in 2022, the Bhashini Initiative is an AI-powered translation system that addresses India's language barriers and expands access to digital public services. It enables services and content in more than 22 Indian languages and supports digital inclusion and broad access to AI-enabled services. It uses crowdsourcing and AI to collect and generate large volumes of multilingual data, strengthening the data foundation for Indic language models (Suri, 2025).

IndiaAI FutureSkills Labs

Established in 2024, IndiaAI FutureSkills Labs develops AI and data labs in Tier 2 and Tier 3 cities through 27 centers. It provides foundational certification courses recognized by NCVET, including training in data annotation and foundational AI technology, and builds a pipeline of mid- and entry-level talent. The program addresses geographic and quality gaps in AI talent through inclusive, industry-aligned skilling pathways (Suri, 2025).

Investment and Innovation

India's AI Investment Index score is 1 out of 10, indicating that capital mobilization is a binding constraint even as innovation intent and adoption momentum remain strong (Salesforce, 2025). AI venture investment is concentrated, and a large share of funding flowing to a limited number of foreign-backed enterprises, placing India's investment ranking well below its performance on innovation indicators, as highlighted by the same source. The government is addressing this gap through direct capital allocations, including INR200 billion (~USD2.3 billion) for private sector-driven R&D initiatives and INR5 billion (~USD57 million) for a Centre of Excellence in AI for Education (PIB, 2025). GenAI accounts for 28% of AI patents filed in India from 2010 to 2025, and AI patents increasingly converge with location tracking, big data, IoT, and semiconductors (NASSCOM, 2024b).

Taken together, India's current strengths are concentrated in AI application and integration, supported by a receptive market and targeted public initiatives. India's next-stage priorities include reducing reliance on foreign foundational models and strengthening domestic R&D capacity and investment depth to support indigenous capability development.

Strategic Positioning and Recommendations

India's AI ecosystem is defined by an unusual combination of scale and asymmetry. On the demand side, the country is one of the world's most aggressive adopters and deployers of AI, supported by a vast talent base, a fast-growing developer community, and a large domestic market that can absorb and operationalize new tools quickly. This deployment strength is reinforced by distinctive digital public infrastructure (DPI), most notably the India Stack (e.g., Aadhaar and UPI), which lowers transaction costs and enables population-scale digital services, creating fertile conditions for AI for All applications in priority sectors, such as healthcare, agriculture, and education. AI for All is the theme under which the central government promotes AI initiatives, as discussed in previous sections.

However, India's upstream position in the AI value chain remains comparatively weak. Constraints in deep capital and private R&D investment, shortages of top-tier research talent, brain drain, limited access to high-quality and interoperable datasets, and gaps in compute and operational readiness complicate the shift from AI implementation leadership to foundational innovation. These structural deficits heighten exposure to external dependencies, including reliance on foreign firms for advanced chips and foundation models. They also amplify domestic risks around governance capacity, ethical misuse, and labor-market disruption in a service-heavy, labor-surplus economy.

SWOT Analysis

Strengths

i) Human capital and AI readiness

India's AI ecosystem benefits from a large and rapidly expanding talent base. The country leads globally in AI skill penetration, scoring 2.8 in 2024, and its AI-skilled workforce expanded fourteen-fold between 2016 and 2023 (Stanford HAI, 2024). Readiness indicators also compare favorably with regional benchmarks, with India's overall AI readiness at 49% versus an Asia-Pacific-Japan (APJC) average of 33% (Cisco, 2024).

ii) Enterprise adoption and deployment at scale

India pairs this supply-side strength with unusually strong demand-side momentum. One indicator suggests that 80% of Indian companies consider AI a strategic priority while deployment is already widespread, with 59% of large enterprises and 59% of small and medium-sized businesses (SMBs) actively deploying AI (IBM, 2024; PIB, 2024; Salesforce, 2025). This combination positions India as a leading hub for AI implementation and rapid diffusion across firms.

iii) DPI as an enabling platform

India's distinctive DPI further strengthens its scaling advantage. The India Stack, including frameworks, such as Aadhaar and UPI, provides scalable and trusted digital rails that reduce the cost and complexity of delivering mass-market AI-enabled services (Suri, 2025).

iv) Policy coordination and state-led capacity building

Public policy has become an increasingly direct enabler of AI capacity building. Large-scale initiatives, such as the IndiaAI Mission target core infrastructure needs, including GPU compute facilities, and embed AI within a broader national growth and modernization agenda (PIB, 2024;

NITI Aayog, 2025). In this framing, NITI Aayog identifies AI adoption as one of two “major AI unlocks” for growth and links it to India’s ambition to reach a GDP target of USD8.3 trillion by 2035 (NITI Aayog, 2025).

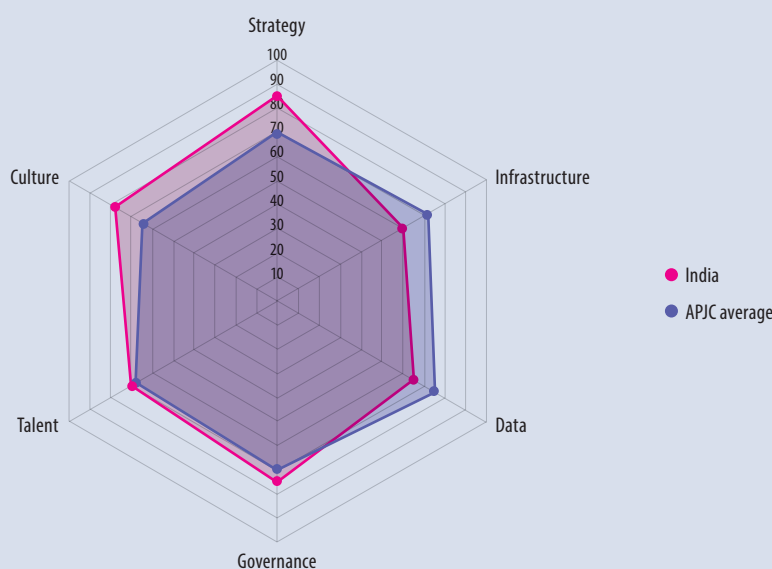
v) Private-sector dynamism and emerging domestic IP formation

India’s private sector is increasingly oriented toward “AI-native” solutions intended to disrupt incumbent industries, reinforcing a market-led implementation advantage (Boston Consulting Group, 2025). While patenting outcomes remain uneven, domestic IP formation shows signs of accelerating, with AI patent filings reportedly increasing sevenfold in 2021–25 relative to 2010–15, and GenAI accounting for 28% of AI patents filed, which suggests growing domestic engagement with frontier technology areas (NASSCOMM, 2024b). India has also strengthened its international convening role, including by successfully hosting what is described as the world’s largest AI summit in 2026, with 88 signatory nations.

These dynamics are reinforced by structural scale factors across infrastructure, data, and human capital. An investment pipeline has been signaled through more than USD250 billion in infrastructure pledges while India’s data position is framed as generating nearly 20% of global data alongside a push for “culturally representative” models. Implementation capacity is further supported by unified data backbones and interoperable datasets built around platforms and frameworks, such as UPI, the Ayushman Bharat Digital Mission, and the RBI Account Aggregator (RBI-AA), combined with a demographic advantage often described as the world’s largest youth population and a globally significant developer base. Finally, expanded digital connectivity through BharatNet, which has reached roughly 250,000 village councils, strengthens the conditions for diffusion beyond major urban centers.

FIGURE 5.6

AI READINESS: INDIA VS. APJC



Source: Cisco AI Readiness Index: India (2024).

Weaknesses

i) Thin deep capital and low R&D intensity

India's upstream AI capacity is constrained by comparatively low research spending and limited private-sector R&D investment. India received only USD1.4 billion in private AI-related R&D investment in 2023, far behind the USA (USD67 billion) and PR China (USD7.8 billion) (UNCTAD, 2025). More broadly, India's overall R&D expenditure is estimated at approximately 0.6% of GDP, and its performance on investment-oriented readiness measures remains weak, including a score of 1 out of 10 in the AI Investment Dimension of the Salesforce Global AI Readiness Index (Salesforce, 2025; Suri, 2025).

ii) Talent shortages, brain drain, and adoption frictions

While the talent base is large, India faces persistent shortages of high-level AI researchers and algorithm experts, compounded by ongoing brain drain to advanced economies that can weaken cutting-edge R&D capacity (Suri, 2025). Workforce constraints also show up in near-term labor-market projections and firm behavior: one estimate anticipates a shortfall of over 1 million AI professionals by 2027 while a Cisco survey reports that 45% of organizations face a talent shortage and 67% rely on contractors to fill gaps (Cisco, 2024; ServiceNow, 2024). At the organizational level, adoption is further slowed by internal resistance, with 20% of middle management and 24% of employees described as having limited or no receptiveness to AI adoption (Cisco, 2024).

iii) Data and operational bottlenecks that impede scaling

Data access and quality remain binding constraints for domestic innovation. A key concern is that large volumes of Indian digital data are controlled by foreign platforms while domestically generated public datasets are often siloed, unstructured, or of poor quality, creating a “data disadvantage” for indigenous model training. In this context, India's National AI Data Marketplace (1 PB) is small compared to much larger state-controlled repositories elsewhere (Suri, 2025). Firms also struggle to translate experimentation into scaled deployment: only 29% of businesses can successfully scale AI proofs of concept, and concerns about errors, bias, and data quality slow wider roll-out (Deloitte, 2025). Infrastructure readiness is uneven as well, with global benchmarking suggesting only 29% of organizations can automatically scale compute resources and only 23% have dedicated power infrastructure for AI workloads while adoption remains relatively low in sectors, such as manufacturing and infrastructure (Arm, 2025; Teamlease Digital, n.d.).

iv) IP conversion and research-quality gaps

Despite increased filing activity, India's AI patent outcomes point to weaknesses in R&D quality and commercialization. India's AI patent grant ratio is reported at 0.37%, and the grant ratio for educational institutions at 1%, underscoring persistent gaps in turning research and invention into granted, defensible IP (NASSCOMM, 2025). Relatedly, while India's volume of AI publications is growing, indicators suggest the global impact of this research lags, including a weaker position in citation-based rankings (Suri, 2025).

Opportunities

i) Global AI services and implementation leadership

India is well positioned to capture a larger share of the global AI services, implementation, and integration market by leveraging its mature IT services industry and large developer base (Suri, 2025). Its leading AI skill penetration also creates scope to export AI talent and applied solutions, particularly to other developing economies seeking deployable, cost-effective systems (Stanford HAI, 2024; The National Bureau of Asian Research [NBR], n.d.).

ii) Scaled “AI for All” solutions in priority sectors

The “AI for All” philosophy provides a framework for building scalable AI applications for social good in sectors, such as healthcare, agriculture, and education, potentially strengthening India’s international influence through replicable deployment models (NBR, n.d.). NITI Aayog also emphasizes AI’s potential to address “institutional voids” and support urban transformation, widening the set of high-impact use cases beyond advanced enterprise deployments (NITI Aayog, 2025).

iii) Productivity gains through augmented intelligence

India can steer adoption toward productivity-enhancing uses that complement labor and create higher-value work. The Economic Survey 2024–25 highlights the potential of “Augmented Intelligence” to boost productivity and support the emergence of new, higher-value job opportunities (Economic Survey of India, 2025).

iv) Multilingual and Indic-language AI niches, backed by capital mobilization

India has a defensible niche in multilingual and Indic-language AI through initiatives, such as *Bhashini*, which aims to strengthen multilingual data repositories and enable India-specific model development (Suri, 2025). India’s status as one of only two developing nations with significant AI funding may also help attract additional investment and partnerships (UNCTAD, 2025). Domestically, the allocation of roughly INR200 billion (~USD2.3 billion) in the Union Budget for private-sector R&D and innovation initiatives creates an opportunity to de-risk investment and crowd in private capital for deep-tech AI projects (PIB, 2025).

Threats**i) Geopolitical compute concentration and hardware dependency**

The concentration of advanced compute capacity in a small number of countries creates strategic vulnerability. Even with planned domestic compute capacity of 18,000 GPUs, India remains far behind leading holders of AI compute, and this dependence is exposed to geopolitical export controls that can delay or restrict access to critical hardware (Suri, 2025). Competition for top-tier AI talent and scarce resources, such as advanced chips, further intensifies this risk environment (PIB, 2024).

ii) Foundational model dependence and constrained technological sovereignty

A major structural risk is the reliance on foreign foundational models. One estimate suggests that 83% of Indian AI start-ups depend on Western or Chinese LLMs, raising the possibility that India remains primarily an AI consumer and integrator rather than a producer of foundational IP (Suri, 2025).

iii) Ethical misuse and governance readiness gaps

Rapid diffusion increases the surface area for misuse and heightens governance demands. Ethical risks have been illustrated by the use of personalized, AI-generated videos in a 2024 political campaign, and a Cisco report notes a decline in governance readiness that could exacerbate trust and accountability challenges as adoption scales (NBR, n.d.; Cisco, 2024).

iv) Labor-market disruption and “pilot fatigue” in a fast-moving technology cycle

India’s labor-surplus context heightens the social stakes of automation. The Economic Survey 2024–25 highlights job-displacement risks for workers in service-sector roles vulnerable to automation, implying that poorly managed transitions could worsen inequality (Economic Survey of India, 2025). At the firm level, many organizations face “pilot fatigue,” with initiatives stalling at the experimentation stage while 28% of Indian firms report concern that their current

AI solutions will become outdated within two years, increasing the risk of misallocated investment and strategic churn (Deloitte, 2025; NITI Aayog, 2025).

v) Regulatory fragmentation and IP-policy uncertainty

Global regulatory divergence creates compliance complexity for Indian firms operating across jurisdictions, potentially diverting resources from R&D toward managing a fragmented regulatory landscape (Cisco, 2024; Suri, 2025). In addition, unresolved policy questions, including unclear guidelines for AI-discovered drugs and global patent norms requiring “significant human contribution”, could weaken IP protection and complicate access to global markets (NITI Aayog, 2025).

These pressures interact with a broader set of risks that could affect diffusion, resilience, and competitiveness. Digital trust risks are rising as deepfakes and misinformation proliferate, challenging democratic discourse and increasing the importance of credible safeguards and accountability mechanisms. Infrastructure constraints may also tighten as demand growth increases the risk of equipment shortages, such as “transformer shortages,” and other bottlenecks that could slow deployment at scale. On the talent side, India faces intense global competition for advanced AI researchers from leading international ecosystems while technological decoupling and geo-economic fragmentation create additional exposure through dependence on foreign GPU supplies, which could become a binding constraint if access is disrupted or costs increase.

Summary

India’s SWOT profile highlights a pronounced asymmetry: the country is a global leader in AI deployment and diffusion but remains constrained in upstream capabilities that determine long-term technological autonomy. On the strengths side, India combines a rapidly deepening talent base and strong enterprise adoption with distinctive DPI that enables population-scale roll-out, reinforced by increasingly coordinated policy initiatives and a private sector oriented toward “AI-native” solutions (Boston Consulting Group, 2025; Cisco, 2024; IBM, 2024; PIB, 2024; Salesforce, 2025; Stanford HAI, 2024; Suri, 2025). However, persistent weaknesses in deep capital and R&D intensity, shortages of top-tier research talent, data accessibility and quality constraints, and operational bottlenecks in scaling proofs of concept limit India’s ability to translate implementation leadership into foundational innovation and defensible IP outcomes (Deloitte, 2025; NASSCOMM, 2025; Salesforce, 2025; ServiceNow, 2024; Suri, 2025; UNCTAD, 2025;).

The opportunity set is correspondingly clear: India can expand its role in global AI services, develop multilingual and Indic-language niches, and leverage “AI for All” to deliver scalable solutions for social good and productivity growth, supported by targeted capital mobilization (Economic Survey of India, 2025; NBR, n.d.; NITI Aayog, 2025; PIB, 2025; UNCTAD, 2025). The principal threats reflect external concentration and domestic adjustment costs, including dependence on foreign compute and foundation models, governance and ethical risks as adoption scales, potential labor-market disruption, and compliance friction arising from fragmented international regulation and evolving IP norms (Cisco, 2024; Economic Survey of India, 2025; NBR, n.d.; NITI Aayog, 2025; Suri, 2025).

FIGURE 5.7

SWOT MATRIX: INDIA

Strengths

- Vast pool of skilled IT professionals and STEM graduates
- Rapidly growing digital infrastructure and data generation
- Vibrant start-up ecosystem with significant venture capital flow
- Strong government support and clear national strategy

Weaknesses

- Shortage of high-end AI research talent and faculty
- Limited domestic high-performance computing infrastructure
- Gaps in data quality, availability, and sharing frameworks
- Uneven AI adoption and digital literacy across industries

Opportunities

- Developing AI solutions for societal challenges in health and agriculture
- Becoming a global hub for AI-based service delivery and BPO
- Leveraging AI for financial inclusion and digital public goods
- Forming global partnerships for R&D

Threats

- Intense global competition for AI talent and investment
- Evolving data privacy and ethical regulations creating uncertainty
- Potential for job displacement and increased social inequality
- Cybersecurity risks associated with widespread AI deployment

Source: Synthesis of data from NITI Aayog (2025), PIB (2024), ServiceNow (2024), and Stanford HAI (2024).

Future Needs and Collaboration Pathways

Domestic Priorities

R&D

India's competitiveness agenda depends on raising the quality of AI research output and improving the conversion of research into defensible IP. Academic R&D quality is a particular bottleneck, given the very low AI patent grant ratio reported for educational institutions (NASSCOMM, 2025). A two-tier research structure can strengthen the pipeline from foundational research to applied development, combining Centres of Research Excellence (COREs) for basic research with International Centres for Transformational AI (ICTAIs) for application-oriented work in collaboration with the private sector (NBR, n.d.). Faster IP protection is also a priority. A fast-track AI patent regime is proposed to reduce patent timelines to under 20 months (NITI Aayog, 2025), with parallel recommendations targeting a reduction from 48-plus months to less than 18 months to close IP protection gaps with competitor economies (Suri, 2025).

Labor

India faces a large mismatch between demand for AI professionals and the supply of job-ready talent. Structured programs and specialized academies that combine theoretical foundations with project-based learning are positioned as the most direct route to a job-ready pipeline (ServiceNow, 2024). In higher-end talent markets, retention and attraction mechanisms are needed to address shortages in qualified faculty and the outward flow of top PhD aspirants. National AI Fellowships are proposed to retain high-potential doctoral candidates and attract international faculty (NBR, n.d.). Workforce transition capacity is also a priority. "Job transformation maps" for 25–30 priority sectors can identify task shifts and emerging roles and can guide reskilling at scale, drawing on models, such as Workforce Singapore (NITI Aayog, 2025). For broad-based skilling, the IndiaAI FutureSkills pillar extends training capacity beyond major metros through AI and data labs in Tier 2 and Tier 3 cities and delivers foundational certification courses aligned with national vocational standards (Suri, 2025).

Governance, Evaluation, and Data

Trust and adoption at scale require stronger AI governance that addresses error risks, bias, and data-quality concerns (Deloitte, 2025). Standardized evaluation capacity remains a priority, including model assessment methods that support responsible deployment (Stanford HAI, 2024). Governance readiness also requires institutional capabilities for oversight, model risk management, and audits in regulated sectors, including financial services (NITI Aayog, 2025). A data foundation for model development is also advancing through AIKosh, which hosts over 350 curated, nonpersonal datasets and is positioned as a trusted, innovation-ready data platform (NITI Aayog, 2025). At the same time, governance capacity constraints appear in readiness indicators, including reported declines in governance readiness in 2024 (Cisco, 2024).

Compute and Infrastructure

Expanded compute access is a practical prerequisite for innovation and for lowering entry barriers for start-ups, researchers, and SMEs. Planned deployment of over 38,000 GPUs under the IndiaAI Mission is a significant step toward widening access to training and experimentation capacity (NITI Aayog, 2025). Sustained investment in compute infrastructure and data platforms remains necessary to ensure that capacity expansion supports both frontier research ambitions and diffusion of applied AI across sectors (NITI Aayog, 2025).

Capital Mobilization, Scaling, and Data Commons

R&D scale-up and commercialization require financial instruments that crowd in private investment and support globally competitive research environments. The Union Budget for FY2025–26 allocated INR200 billion (~USD2.2 billion) for private sector-driven RDI initiatives (PIB, 2025). Complementing this, the IndiaAI Mission allocation of INR9.9 billion (~USD106 million) for three Centres of Excellence (CoEs) established an initial platform that is expected to scale through deeper investment and private partnerships, including globally competitive compensation and infrastructure to attract and retain top research talent (PIB, 2024a; Suri, 2025). Data strategy recommendations also emphasize expanding beyond a single government-managed repository toward a broader data commons that includes multiple market-driven data marketplaces for standardized, nonpersonal datasets, alongside systematic efforts to unlock, standardize, and update siloed government datasets under clear consent and anonymity protocols (Suri, 2025).

Future Outlook

India's future governance trajectory emphasizes phased institutional development that is intended to keep pace with rapidly advancing AI capabilities. In the short term, priorities include establishing core governance institutions, including the IndiaAI Safety Institute for Responsible AI, developing India-specific risk frameworks, and widening access to enabling infrastructure (Suri, 2025). In the medium term, the focus shifts toward operationalizing AI incident systems, piloting regulatory sandboxes for controlled experimentation, and expanding the integration of DPI with AI (Suri, 2025). In the long term, the governance agenda requires continuous review cycles and periodic legal updates as new risks and capabilities emerge (Suri, 2025).

The rise of agentic AI-autonomous systems that can plan, reason, and act to complete complex tasks, often with limited human oversight, intensifies these requirements. Global adoption of agentic AI is projected to increase sharply over the next two years, raising the stakes for safety, security, and accountability in both public and private deployments (Salesforce, 2025). In banking, financial services, and insurance (BFSI), expectations of high levels of process automation by AI agents further amplify the need for mechanisms aligned with the IndiaAI Safe and Trusted AI pillar (Salesforce, 2025). Capacity-building efforts are therefore framed not only in technical terms but also in institutional and leadership terms, including translating human-centric ethics into enforceable practice, strengthening resilient infrastructure through implementation of a “Playbook on Advancing Resilient AI Infrastructure,” and pursuing a “Net-Positive AI Energy” approach built around designing for efficiency, deploying for impact, and shaping demand wisely so that AI-related savings exceed life cycle energy use. This agenda also emphasizes leadership readiness by investing in “Pacesetter”

leadership to guide teams through disruption and normalize responsible AI experimentation. It points to demonstrated public engagement, such as India receiving a Guinness World Record for collecting over 250,000 pledges for AI responsibility, as a signal that collective commitment now needs to be scaled into institutional practice.

Collaboration Opportunities

Local Perspective

i) Industry, academia, and government

Domestic collaboration across government, industry, and academia is positioned as a core mechanism for bridging gaps between research output and real-world application. Government collaboration with private-sector and academic stakeholders in building Centres of Excellence is identified as a proven model that merits expansion as the ecosystem matures (UNCTAD, 2025). Cross-domain collaboration is also emphasized through an AI-plus-X approach that pairs AI researchers with domain experts in areas, such as healthcare, manufacturing, and agriculture, to accelerate translation into applied solutions (NBR, n.d.). Tripartite collaboration is further framed as necessary to ensure that AI benefits are broadly shared and that innovation proceeds with social responsibility (Economic Survey of India, 2025). Capacity-building support for smaller, resource-constrained nonprofits is also identified as a practical collaboration need, particularly to reduce knowledge and infrastructure gaps in adoption (GivingTuesday, 2024).

ii) Data and model marketplaces

Democratizing access to AI resources and reducing the time and cost of data collection and annotation would benefit from new mechanisms. Multi-stakeholder marketplaces for datasets, annotated data, and deployable AI models are recommended as a complementary collaboration channel (NBR, n.d.). For manufacturing, an open Manufacturing Data Grid is proposed to enable the trading of production and supply-chain data, drawing inspiration from Germany's Manufacturing-X model (NITI Aayog, 2025). Local cooperation proposals extend this agenda by calling for regional AI missions that replicate Kerala's model of "AI Industry Charters" across other states to foster localized innovation ecosystems as well as a Wadhvani AI partnership to launch AI professional certificates in English and Hindi to broaden access to specialized training. Collaboration is also framed in operational terms through hybrid workforce models that combine human empathy with autonomous AI agents to handle complex citizen transactions, alongside a resource interdependence approach that coordinates industrial policies to link digital infrastructure investments with R&D and workforce development programs.

Global Perspective

i) R&D, governance, and talent

India's scientific strength in AI supports joint R&D with international partners to accelerate breakthroughs, including proposals for large-scale collaborative research constructs, such as a "CERN for AI" involving governments, industry, academia, and international research communities (UNCTAD, 2025; NBR, n.d.). Governance and standards also provide a high-value collaboration channel, given the global need for robust evaluation approaches and shared responsibility frameworks (Stanford HAI, 2024). A proposed Centre for Studies on Technological Sustainability would support comparative work on governance, ethics, and pricing models, catalyzing international collaborations (NBR, n.d.). India's large pool of AI-skilled professionals and workforce training emphasis also support talent exchange and joint capacity-building programs with other countries.

These collaboration opportunities are reinforced by emerging multilateral frameworks and shared infrastructure concepts intended to support diffusion at scale. The New Delhi Declaration

on AI Impact (2026), endorsed by 88 countries and organizations, is presented as providing an organizing framework grounded in “*Sarvajan Hitaya, Sarvajan Sukhaya*” (Welfare for All, Happiness for All). Practical cooperation mechanisms proposed in this context include a Global AI Impact Commons to encourage the adoption, replication, and scaling of successful AI use cases across APO member regions, and a Trusted AI Commons that would operate as a collaborative repository of tools and benchmarks to support secure AI systems across member economies. This approach frames “strategic interdependence” as a way to balance AI sovereignty with openness by combining localized investment with global alliances rather than pursuing rigid self-sufficiency. Finally, shared AI repositories are positioned as a concrete enabler of this model, including proposals to extend India’s AIKosha approach to APO members to support regional data sharing and multilingual LLM development.

APO Joint Initiatives

Shared AI Skilling and Reskilling Platforms

APO members can collaborate on shared online platforms and joint training programs that pool curricula, certification pathways, and instructional capacity. India’s scale-oriented workforce upskilling efforts provide a foundation for regional programs that address skill gaps and strengthen job-ready training pipelines across member economies.

AI for Social Development

APO members can codevelop and deploy applied AI solutions for shared socioeconomic challenges, with early focus areas aligned with India’s public-purpose approach in agriculture and healthcare. Priority use cases include crop yield optimization and remote diagnostic tools that can be adapted to local languages, data realities, and service delivery contexts.

Harmonized Ethical AI Frameworks

APO members can cooperate on practical ethical guidelines, data privacy frameworks, and governance best practices that support responsible AI adoption. Joint work can prioritize interoperable evaluation approaches and capacity building for audits and oversight in regulated sectors.

TABLE 5.3

KEY FUTURE NEEDS AND COLLABORATION DIRECTIONS FOR INDIA'S AI DEVELOPMENT

Area	Key Recommendations/Initiatives	Supporting Details/Objectives
R&D & IP Creation	Strengthen R&D Quality: Enhance the quality of research in academic institutions to improve the AI patent grant ratio (NASSCOMM, 2025)	Currently, the grant ratio for educational institutions is only 1%, highlighting the need for better R&D quality (NASSCOMM, 2025)
	Two-tier Research Structure: Establish Centres of Research Excellence (COREs) and International Centres for Transformational AI (ICTAIs) (NBR, n.d.)	COREs focus on core research and ICTAIs on application-based development with private-sector collaboration
	Fast-track Patent Regime: Implement a fast-track system for AI innovations (NITI Aayog, 2025)	Reduce the patent grant timeline to under 20 months to bolster innovation and IP creation
Talent & Workforce	Job-ready Talent Pipeline: Create structured programs and specialized academies (ServiceNow, 2024)	Address the talent gap of over 1 million AI professionals projected by 2027 by blending theoretical and project-based learning (ServiceNow, 2024)
	National AI Fellowships: Institute fellowships to attract and retain top AI talent (NBR, n.d.)	Counter the brain drain of top Indian PhD aspirants and attract international faculty
	Job Transformation Maps: Develop maps for 25–30 priority sectors (NITI Aayog, 2025)	Identify task shifts and emerging roles to guide reskilling initiatives, drawing on models like “Workforce Singapore”

Area	Key Recommendations/Initiatives	Supporting Details/Objectives
Governance & Data	Stronger AI Governance: Address concerns about errors, bias, and data quality (Deloitte, 2025)	Implement robust and standardized evaluations for AI models and enhance governance readiness, which fell in 2024 (Cisco, 2024)
	Data Platforms: Develop a trusted, innovation-ready data platform (NITI Aayog, 2025)	Initiatives like "AI Kosha" host over 350 curated, nonpersonal datasets to democratize access and fuel model training
Collaboration	Domestic & International Partnerships: Expand collaborations with industry, academia, and global partners (UNCTAD, 2025)	Bridge the gap between research and application, and codevelop frameworks and policies for responsible AI governance
	AI for Social Good: Codevelop AI solutions with APO member countries	Address shared socioeconomic challenges in agriculture and healthcare using India's "AI for All" philosophy
	Shared Training Platforms: Collaborate with APO members on skilling and reskilling platforms	Leverage India's workforce upskilling efforts to create a unified, AI-ready workforce across the region

CHAPTER 6

JAPAN

Each member economy is assessed through a common analytical framework covering five core dimensions: (i) ecosystem baseline; (ii) policy and strategy; (iii) stakeholder landscape; (iv) strategic positioning; and (v) future pathways. This structure enables consistent cross-economy comparison while allowing for context-specific insights into how AI capabilities are developed, governed, and applied in practice.

AI Ecosystem Baseline Assessment

This section compiles the latest official indicators to describe Japan's AI foundations and diffusion: automation (robot density), innovation inputs (R&D), intellectual property (AI-related patents), enterprise adoption, and public-sector implementation. Each data point is shown with its reporting year and source in line with the Asian Productivity Organization (APO) framework. Table 6.1 summarizes Japan's core AI readiness indicators across multiple dimensions, providing a comprehensive baseline assessment of the country's current position.

Manufacturing Automation

Japan has 419 industrial robots per 10,000 manufacturing employees as of 2023, ranking fifth globally. This reflects about 7% average annual growth over the 2018–23 period (International Federation of Robotics, 2024). This foundation creates favorable conditions for AI deployment through enhanced machine vision, predictive maintenance algorithms, and AI-driven optimization systems.

AI R&D and Investment in Japan

Japan's R&D expenditure reached JPY20.70 trillion (~USD130 billion), or 3.65% of GDP, in FY2022, up from JPY19.24 trillion (~USD121 billion) in FY2020. This is one of the highest levels of R&D spending in the world, ranking alongside Israel, the Republic of Korea (ROK), and the United States of America (US) (Statistics Bureau of Japan, 2023). AI-specific R&D reached JPY272.5 billion (~USD1.7 billion) in FY2022, representing a 56.3% increase over JPY174.4 billion (~USD1.1 billion) in FY2021. This was the fastest expansion across all tracked strategic technology domains (see Figure 6.1 for comparative growth trends).

Patent Activity and Intellectual Property Development

AI-related patent applications reached approximately 11,400 in 2023, more than double the 4,500 figure from 2014. Patent applications accelerated after 2017 as deep learning technologies were widely adopted (Japan Patent Office, 2026). Core AI technology patents (IPC G06N, excluding G06N10 quantum computing) accounted for approximately 2,400 applications in 2023, a figure broadly flat in recent years, with major applicants, including Fujitsu, Hitachi, NEC, Toyota, and Nippon Telegraph and Telephone Corporation (NTT). Figure 6.1 demonstrates this 153.3% growth trajectory from 2014 to 2023, the steepest among all tracked indicators.

TABLE 6.1

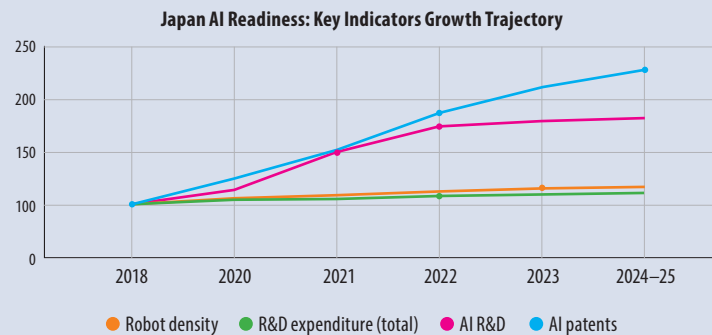
KEY JAPANESE AI READINESS INDICATORS

Indicator	Latest Value	Year	Time-series Trend	Source
Robot density (per 10,000 manufacturing employees)	419	2023	2018: 390 2023: 419 (+7.4% growth)	IFR (2024)
R&D expenditure (total)	JPY20.7 trillion (~USD130 billion)	FY2022	FY2020: JPY19.24 trillion (~USD121 billion) FY2022: JPY20.7 trillion (~USD130 billion) (+7.6% total)	Statistics Bureau of Japan (2023)
R&D/GDP	3.65%	FY2022	Stable at 3.6%–3.65% (FY2020–FY2022)	Statistics Bureau of Japan (2023)
AI intramural R&D	JPY272.5 billion (~USD1.7 billion)	FY2022	FY2021: JPY174.4 billion (~USD1.1 billion) FY2022: JPY272.5 billion (~USD1.71 billion) (+56.3%)	Statistics Bureau of Japan (2023)
AI-related patent applications (domestic)	Approximately 11,400	2023	2014: approximately 4,500 2023: approximately 11,400 (doubled in eight years)	JPO (2026)
Core AI (IPC G06N) applications	Approximately 2,400	2023	Sustained growth since 2014	JPO (2026)
Financial institutions using/ piloting GenAI	Approximately 60%	2024	Rapid adoption from near-zero in 2023	Bank of Japan (2024)
SMEs using AI (overall)	16%	2025	Slow growth from approximately 10% (2023 estimation)	Rakuten (2025)
Municipalities: GenAI introduced	87.2% prefectures, 90.0% designated cities, 29.9% other municipalities (end-FY2024); up from 51.1%, 40.0% and 9.4% (end-FY2023)	2023	Baseline measurement; 2025 estimated 50%–60%	Ministry of Internal Affairs and Communications, [MIC] (2024)
Municipal Google Workspace adoption growth	233% YoY	2025	2024: 40% YoY → 2025: 233% YoY (acceleration)	Itō et al. (2025)
Government Digital Agency AI adoption	80%	2025	Internal deployment starting 2024	Digital Agency (2025)
High school students (used GenAI)	83.1%	2025	Rapid adoption from low base in 2023–24	Recruit (2025)
Teachers (used AI in classroom)	17%	2024	Slow growth; OECD: among the lowest of 55 (teachers' AI use)	OECD (2025a)
AI data center pipeline	2.1+ GW	2025	Major expansion 2025–28 period	Various corporate sources

Source: Bank of Japan (2024); Digital Agency (2025); IFR (2024); Itō et al. (2025); JPO (2026); OECD (2025a); Rakuten (2025); Recruit (2025); Statistics Bureau of Japan (2023); and various corporate sources.

FIGURE 6.1

JAPANESE AI READINESS: TIME-SERIES TRENDS FOR KEY INDICATORS, 2018–25



Source: IFR (2024); JPO (2026); Statistics Bureau of Japan (2023).

Note: All indicators indexed to 2018=100 for comparability.

AI Workforce in Japan

University of Tokyo's Matsuo-Iwasawa Laboratory GCI Global Program (Global Consumer Intelligence) enrolled 7,721 students from 436 universities across 33 countries, offering Foundation (5,000 participants), Advanced (2,000), and Research (700) tracks (University of Tokyo, 2025). Japan's universities have substantially expanded structured AI and data science training. Under the cross-ministerial Mathematics, Data Science and AI Education Program Certification System (MDASH), the Ministry of Education, Culture, Sports, Science and Technology (MEXT) had certified, on a cumulative basis through FY2025, several hundred undergraduate, junior-college, and KOSEN programs at the Literacy and Applied foundational levels (Ministry of Education, Culture, Sports, Science and Technology [MEXT], 2025b). The MDASH system targets undergraduate level AI-literacy diffusion and explicitly excludes graduate schools. At the postgraduate level, the National Institute of Science and Technology Policy's (NISTEP), "Japanese Science and Technology Indicators 2025" reports 79,000 new master's-course entrants and 16,000 new doctoral-course entrants in FY2024 across all fields, of which the natural-sciences subset (engineering, science, health, and agriculture) represents roughly two-thirds of master's-track entry and the majority of doctoral-track entry (National Institute of Science and Technology Policy, 2025). Japan does not publish a discrete AI-program graduate enrollment statistic, and Japan's pipeline for doctoral-level AI researchers is widely regarded as constrained relative to peer economies (OECD, 2025b).

More than 83% of Japanese high school students use GenAI (Recruit, 2025), even as adoption among teachers stands at only 17%. By comparison, an OECD report places Japan among the lowest of the 55 systems surveyed for teachers' use of AI (OECD, 2025a). This "generational expertise inversion" requires urgent policy attention.

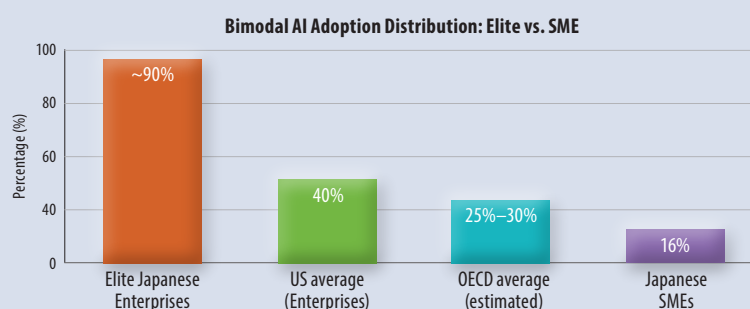
Private-sector adoption follows two divergent trajectories. At one end of the spectrum, elite enterprises have emerged as eager adopters of AI, such as SoftBank Corp. (approximately 90% of 9,207 surveyed employees reporting deepened understanding of generative AI) (SoftBank Corp., 2025c), Mitsubishi UFJ Financial Group (MUFG) (ChatGPT Enterprise deployed to ~35,000 employees, with a 20%–30% workload reduction in specific research tasks) (OpenAI, 2026), and Colopl (90%, surpassing the US average of around 40% of employees regularly using AI tools), ranking among the most enthusiastic corporate users of AI (Colopl, 2025). At the other end, only 16% of small and medium-sized enterprises (SMEs) utilize AI (Rakuten, 2025), creating a bimodal distribution in which a small set of leading firms are far ahead of both Japanese SMEs and the estimated OECD and US averages.

As illustrated in Figure 6.2, Japan's SMEs lag not only behind domestic leaders but also behind international benchmarks. An Indeed Japan (2025) survey found that around 29% of Japanese workers said they did not want to acquire new skills, compared with just 3.7% of US workers, roughly an eightfold difference in the share of workers expressing no interest in reskilling.

The government has begun to address this gap. The Digital Agency has deployed modular training for government officials. Senior leaders receive 3–4 hours of training, middle managers 6–10 hours, and frontline users 2–4 hours. Train-the-trainer kits enable decentralized replication across more than 1,700 municipalities.

FIGURE 6.2

BIMODAL AI ADOPTION DISTRIBUTION IN JAPAN VS. INTERNATIONAL BENCHMARKS (%)



Source: Colopl (2025), Rakuten (2025), OECD estimates.

Note: Elite Japanese: SoftBank ~90%, MUFG/Colopl 90%+. Japanese SMEs from Rakuten survey (2025). These figures are based on internal corporate reporting and should be interpreted as indicative of leading-edge practice rather than economy-wide averages.

National AI Policies and Strategies

Japan first articulated a national AI strategy through AI Strategy 2019, which established cross-ministerial coordination mechanisms and set long-term goals for AI research, utilization, and human capital development. In the years since, the government has pursued a layered policy approach combining top-level strategic coordination, sector-specific regulatory instruments, and operational implementation tools, such as procurement templates, model oversight guidelines, and knowledge hubs. On 19 September 2025, a newly established AI Strategic Headquarters, chaired by the Prime Minister, convened its inaugural meeting and adopted a “counterattack” strategic posture, signaling a major recalibration of national AI priorities (Cabinet Office, 2025).

This recalibration explicitly pivoted Japan toward a “utilization-first” doctrine, prioritizing enterprise adoption and manufacturing integration over direct competition in foundational large language model (LLM) development, where American and Chinese firms dominate. The MEXT requested JPY35.5 billion (~USD237 million) for AI-related programs in its FY2026 budget. Meanwhile, the Ministry of Economy, Trade and Industry (METI) earmarked JPY387.3 billion (~USD2.6 billion) in its FY2026 initial budget for domestic foundation models, AI data infrastructure, and Physical AI. The amount represents the first-year tranche of an approximately JPY1 trillion (~USD6.8 billion), five-year METI commitment (FY2026–FY2030) to sovereign AI and Physical AI. This five-year commitment is nested within the larger ≥JPY10 trillion (~USD68 billion), seven-year AI/Semiconductor Industrial Base Reinforcement Framework (through FY2030), which covers AI and semiconductors. Additionally, METI and NEDO have launched an initial JPY20.5 billion (~USD137 million) project for robot foundation models. The following section provides an overview of Japan's key AI policy initiatives.

National AI Strategy in Japan

The AI Strategic Council released an AI Basic Plan in December 2025, Japan's first unified national AI strategy since the AI Strategy of 2019. Minister of State for Economic and Fiscal Policy Kiuchi Minoru acknowledged that “Japan lagged in [AI] development and investment” and called for a national mobilization toward greater investment in AI (Cabinet Office, 2025). The plan comprises four fundamental pillars: (i) promoting AI adoption and utilization; (ii) strengthening AI development capabilities leveraging data and the country's strong manufacturing base; (iii) leading AI governance and international rule-making efforts; and (iv) integrating AI into Japanese society. The plan formalizes the utilization-first doctrine, positioning Japan as a “strategic adopter and responsible regulator,” and establishes 2027 as a checkpoint year for assessing progress.

AI Policies of Japan

AI for Science Initiative

The AI for Science Initiative, led by MEXT with a budget request of JPY35.5 billion (approximately USD237 million) for FY2026, aims to transform AI from a research object into research infrastructure across scientific domains. The initiative comprises three pillars: (i) development of domain-specific base models (JPY31.7 billion/~USD212 million); (ii) establishment of 24/7 automated experiment systems; and (iii) construction of shared scientific data platforms. It targets the creation of AI tools capable of accelerating discovery in life sciences, materials science, and environmental research (MEXT, 2025a).

Physical AI Strategy

Following the May 2025 enactment of the AI Act (Act No. 53 of 2025), the Cabinet adopted the Artificial Intelligence Basic Plan on 23 December 2025, designating Physical AI (the integration of AI with robotics, manufacturing equipment, and infrastructure) as one of two priority “winning paths” for Japan and assigning lead responsibility to METI (Cabinet Office, 2025). Implementation began in August 2025 with a JPY20.5 billion (~USD137 million) METI/NEDO project to build domestic robot foundation models. The effort was then scaled up in METI's FY2026 initial budget (Cabinet-approved 22 December 2025), which earmarks JPY387.3 billion (~USD2.6 billion) for domestic foundation models, AI data infrastructure, and Physical AI. That amount represents the first-year tranche of an approximately JPY1 trillion (~USD6.8 billion), five-year (FY2026–FY2030) METI commitment to sovereign AI/Physical AI. This five-year commitment is itself nested within the ≥JPY10 trillion (~USD68 billion), seven-year AI/Semiconductor Industrial Base Reinforcement Framework (Ministry of Economy, Trade and Industry [METI], 2025a).

Sovereign AI: Public Data Mobilization

Launched in 2025, this initiative mobilizes government data for domestic LLM training to address the scarcity of high-quality Japanese language datasets. The National Diet Library agreed to digitize 300,000 pre-1995 government publications for AI training while on 18 September 2025, the National Institute of Information and Communications Technology (NICT), Preferred Networks (PFN), and Sakura Internet concluded a three-party basic agreement to jointly develop a sovereign Japanese-language LLM, with NICT contributing curated Japanese-language web text drawn from a proprietary crawl of more than 70 billion Japanese web pages accumulated since 2008. The National Institute of Informatics (NII) contributes additional academic datasets. Funding flows through METI's Generative AI Accelerator Challenge (GENIAC) program, with data curation managed within existing agency budgets (NICT, 2025a; 2025b).

Digital Transformation Action Strategies in Healthcare for Software as a Medical Device (DASH for SaMD)

The DASH for SaMD, originally established by MHLW in November 2020 and updated as DASH for SaMD 2 jointly by MHLW and METI in September 2023, represents Japan's approach to adaptive regulatory innovation for AI medical devices. Administered by the Pharmaceuticals and Medical Devices Agency (PMDA) under MHLW, the framework comprises four pillars: (i) early identification

with tailored guidelines; (ii) unified consultation across regulatory and reimbursement pathways; (iii) priority review for breakthrough AI devices; and (iv) post-market monitoring. DASH enables agile approval pathways that accommodate rapid AI development cycles while maintaining patient safety standards (PMDA, 2020; revised 2023).

Digital Agency AI Strategy

Since its establishment in 2021, the Digital Agency has led government digital transformation and operationalized national AI goals across public administration. The agency reached 80% internal AI adoption by 2025 and formalized a strategic partnership with OpenAI in October 2025. Key instruments include practical guidance documents, procurement templates for municipal AI adoption, and modular training programs for government officials at three tiers: senior leaders (3–4 hours), middle managers (6–10 hours), and frontline users (2–4 hours). The train-the-trainer kits enable independent scaling of the program across more than 1,700 municipalities (Digital Agency, 2025).

AI Safety Institute

Japan's AI Safety Institute (AISI), established in February 2024 within the Information-technology Promotion Agency (IPA) under METI, conducts AI risk assessment, develops safety standards, and coordinates responsible AI governance internationally. AISI participates in the network of AI safety institutes alongside counterparts in the US and United Kingdom (UK), with cooperation channels linked to the Hiroshima AI Process and global AI safety summits. The institute's estimated annual budget is JPY5–JPY10 billion (~USD13.5–USD27 million) (METI, 2025b).

Generative AI Accelerator Challenge (GENIAC)

The GENIAC, established by METI in 2024 with an estimated budget of JPY20–JPY30 billion (~USD126–USD189 million) over 2024–2026, supports enterprise generative AI adoption through financial assistance for dataset compilation, technical consulting, and preferential access to national supercomputing resources, including the AI Bridging Cloud Infrastructure (ABCI). GENIAC serves as a key instrument for bridging the gap between frontier AI capabilities and practical enterprise deployment, particularly for SMEs (METI, 2024).

Municipal AI Implementation Framework

The Municipal AI Implementation Framework, coordinated by the Ministry of Internal Affairs and Communications (MIC) during 2023–25, accelerates local government AI adoption through revised security guidelines. MIC introduced hybrid cloud models (Local Government Wide Area Network (LGWAN) combined with SaaS) that enabled municipalities to deploy commercial AI tools while maintaining data security. Following these revisions, Google Cloud Japan reported that the number of municipalities newly contracting Google Workspace increased by 233% year-on-year between 2024 and 2025, accelerating from approximately 40% growth in the prior period (Itō et al., 2025). The framework targets 80% municipal adoption of AI-enabled administrative tools by 2027, with Akita Prefecture serving as a leading reference model (MIC, 2024).

Stargate Japan Data Center Investment

SoftBank leads the Stargate Japan initiative, a component of the broader USD500 billion-Stargate Project, announced on 21 January 2025 as a joint venture by SoftBank, OpenAI, Oracle, and MGX. The initiative plans three major data center facilities: (i) Tomakomai in Hokkaido (exceeding 300 MW, leveraging cold-climate cooling and renewable energy); (ii) Sakai in Osaka (expanding from 150 MW to 400 MW); and (iii) additional capacity linked to the global Stargate network. The investment is primarily private, led by SoftBank's consortium with international capital participation, and supported by government facilitation through expedited permitting and infrastructure coordination (SoftBank Group Corp. et al., 2025a).

Table 6.2 presents Japan's national AI policy matrix, summarizing the goals, mechanisms, budget, and executive authority for each initiative.

TABLE 6.2

JAPAN'S NATIONAL AI POLICY MATRIX

Policy/Initiative Name	Year	Primary Goals	Key Mechanisms	Budget	Funding Source	Executive Authority
AI Basic Plan	December 2025	- Unified national AI strategy - Utilization-first doctrine - Establish 2027 checkpoint for progress assessment	Cross-ministerial coordination; four policy pillars: (i) Accelerate utilization (ii) Strengthen development capabilities (iii) Lead AI governance (iv) Pursue societal transformation	Not available at the time of this writing	General revenue; special accounts TBD	AI Strategic Headquarters (Prime Minister-led)
AI for Science Initiative	FY2026	- Transform AI from research object to research infrastructure - Develop domain-specific models for life sciences and materials science	Three pillars: (i) Domain-specific base models (JPY31.7 billion/~USD212 million) (ii) 24/7 automated laboratories (JPY2.6 billion/~USD16.4 million) (iii) SINET infrastructure enhancement	JPY35.5 billion (~USD237 million)	MEXT budget request FY2026	MEXT
Physical AI Strategy	2025–30	- Develop general-purpose humanoid robot prototype by 2030 - Leverage manufacturing heritage for Physical AI leadership	Public-private partnerships; three phases: (i) 2025–27 core technologies (ii) 2027–29 prototype integration (iii) 2029–30 demonstration; xIPF consortium; Woven City testbed	- JPY387.3 billion (~USD2.6 bn) FY2026 (1st-year tranche of ~JPY1 trillion/~USD6.8 bn 5-year plan - JPY20.5 billion (~USD137 million) METI/NEDO project	Distributed: METI (industrial competitiveness), MEXT (fundamental research), MHLW (healthcare/caregiving); complemented by private sector R&D	METI (lead), MEXT, MHLW (coordinated)
Sovereign AI: Public Data Mobilization	2025 (launched)	- Mobilize government data for domestic LLM training - Address Japanese-language data scarcity (3% of internet content)	- National Diet Library digitization (300,000 publications) - NICT–PFN–Sakura Internet basic agreement (18 September 2025) for joint sovereign LLM development, drawing on NICT's proprietary Japanese-language web crawl of more than 70 billion pages - GENIAC dataset support program for private developers	- GENIAC funding (specific amounts undisclosed) - Data curation within existing agency budgets	METI (GENIAC), institutional budgets (NDL, NICT, NII)	National Diet Library, NICT, NII

Digital Transformation Action Strategies in Healthcare for Software as a Medical Device (DASH for SaMD)	Ongoing (2023–present)	- Adaptive regulatory innovation for AI medical devices - Agile approval pathways while maintaining safety standards	Four pillars: (i) Early identification with tailored guidelines (ii) Unified consultation services (iii) Specialized agile review systems (iv) Institutional capacity enhancement	- Operational within existing PMDA budget - Specific AI allocation not separately disclosed	MHLW regulatory budget	PMDA, MHLW
Digital Agency AI Strategy	2023–present; major partnership October 2025	- Government digital transformation - Establish leadership by example (80% internal adoption) - Standardize procurement and governance	- Practical guidance documents - Procurement templates; OpenAI partnership (October 2025), including ISMAP certification pursuit - Knowledge-sharing hubs; modular training programs	- Included in Digital Agency operational budget (approximately JPY100 billion (~USD630 million annually) - AI-specific portion undisclosed)	General revenue (Digital Agency budget)	Digital Agency
AI Safety Institute (AISI)	Established 2024	- AI risk assessment - Safety standards development - Responsible AI governance internationally	- Research on AI risks and safety measures - International coordination with UK AISI, US AISI - Standards development; evaluation frameworks	Estimated JPY5–JPY10 billion (~USD13.5–USD27 million) annually (within METI budget)	METI budget	AISI (under METI)
GENIAC (Generative AI Accelerator Challenge)	Established 2024	- Support enterprise GenAI adoption - Dataset creation assistance - Provide technical guidance and computing resources	- Financial support for dataset compilation - Technical consulting - Preferential access to computing infrastructure - Industry working groups	Estimated JPY20–JPY30 billion (~USD126–USD189 million) (2024–26 period)	METI economic stimulus and digital transformation on budget	METI
Municipal AI Implementation Framework	2023–25 (rapid scaling)	- Accelerate local government AI adoption - Standardize governance approaches - Achieve interim 50%–Municipal GenAI adoption: 87.2% prefectures, 90.0% designated cities, 29.9% other municipalities (end-FY2024)	- Revised MIC security guidelines (LGWAN + SaaS hybrid models α' and β') - Procurement templates, knowledge repositories; train-the-trainer kits - Success case dissemination (Yokosuka, Akita, Chiba models)	- Decentralized (individual municipal IT budgets) - Central technical assistance approximately JPY2–JPY5 billion (~USD12.6–USD13.5 million)	Municipal budgets (decentralized); MIC technical assistance budget	MIC - coordination; municipalities - implementation

Policy/Initiative Name	Year	Primary Goals	Key Mechanisms	Budget	Funding Source	Executive Authority
Stargate Japan Data Center Investment	2025–28 (implementation)	- Establish world-class AI computing infrastructure - Position Japan as the Asia-Pacific AI hub - Support domestic AI development with sovereign computing capacity	Three major facilities: - Tomakomai (Hokkaido, 300+ MW) - Sakai (Osaka, 150 → 400 MW expansion), distributed smaller facilities; neutral host model enabling shared access - NVIDIA DGX-B200 systems (13.7 exaflops)	USD500 billion investment (JPY75 trillion approximately) over project life cycle	Private investment (SoftBank-led consortium); includes international capital (Saudi Arabia, UAE participation)	SoftBank Corp (lead investor and operator); government support through expedited permits and infrastructure coordination

Source: Government and corporate announcements.

Key Stakeholder Mapping

Japan's AI ecosystem spans government, industry, academia, and civil society, and it is structured to support cross-country comparison within the APO framework through a consistent mapping of institutions by establishment date, primary role, recent activities, and collaboration patterns. The ecosystem is organized around coordinated national strategy, mission-oriented public implementation, and strong private-sector execution, with stakeholders covering Cabinet-level coordination, sector ministries, research institutes, universities, large corporations, start-ups, financial oversight bodies, and local governments. From September to October 2025, Japan advanced multiple layers of the AI stack in parallel, including large-scale infrastructure investment, sovereign AI development through national corpus mobilization, international partnerships, and physical AI coordination through industry consortia. This synchronized progress is driven by Cabinet-level strategic direction and carried into operational implementation through established institutional channels. Japan's stakeholder landscape offers multiple collaboration entry points for the APO, including education programs through the University of Tokyo Matsuo-Iwasawa Laboratory, small and medium-sized enterprise support frameworks through METI's GENIAC, municipal governance templates through MIC, and physical AI testbed access through Toyota's Woven City.

Private Sector

Japan's private sector AI landscape combines large corporations investing in infrastructure, enterprise adoption, and physical AI pathways with prominent start-ups pursuing domestic large language model (LLM) capabilities, advanced model optimization, and manufacturing-oriented AI deployment. These activities are closely linked to public-sector data and funding channels, producing a relatively integrated ecosystem.

Major Players

SoftBank

SoftBank is a central actor in AI infrastructure investment and large-scale adoption. It is advancing a Stargate data center initiative valued at up to USD500 billion, with planned projects in Tomakomai and Sakai exceeding 300 megawatts and 400 megawatts, respectively, over the 2025–28 period. SoftBank Corp. is deploying high-end NVIDIA systems and reports that approximately 90% of its 9,207 surveyed employees deepened their understanding of generative AI, with over 2.5 million AI agents created internally within 10 weeks (SoftBank Corp., 2025c). SoftBank Group Corp. agreed to acquire ABB's robotics and discrete automation division for USD5.375 billion (announced 8 October 2025; deal expected to close in H1 2026) (SoftBank Group Corp., 2025b), strengthening its robotics integration and physical AI pathway. Its key partnerships include NVIDIA and OpenAI, and it is linked to

international capital channels involving Saudi Arabia and the United Arab Emirates, alongside ABB in robotics.

Toyota / Woven City

Toyota is a leading stakeholder in physical AI through Woven City, which opened on 25 September 2025 as an AI-native residential city. Woven City serves as a real-world testbed for humanoid robot validation across homes, offices, and public spaces, and it integrates autonomous vehicles and sensor-rich data collection. Toyota participates in the xIPF physical AI consortium, works with NVIDIA on simulation platforms, collaborates with research universities, and aligns Woven City with Japan's broader physical AI 2030 initiative.

Fujitsu

Fujitsu is an enterprise AI systems integrator with a focus on energy-efficient computing and government IT delivery, including its ARM-based MONAKA chip program (Fujitsu Limited, 2024). In October 2025, Fujitsu partnered with NVIDIA to develop integrated CPU–GPU chips with FUJITSU-MONAKA targeted for 2027 and FUJITSU-MONAKA-X (integrated NPU, selected for FugakuNEXT) for 2029 (Fujitsu Limited, 2025). Fujitsu also collaborates with Yaskawa Electric on physical AI and supports government digital transformation projects linked to the Digital Agency's public-sector implementation agenda.

Mitsubishi UFJ Financial Group (MUFG)

MUFG, formed through a 2005 merger, is a reference model for enterprise generative AI deployment in financial services. Pursuing an “AI-native” transformation with OpenAI (partnership from October 2024), Mitsubishi UFJ Bank began rolling out ChatGPT Enterprise to approximately 35,000 employees in 2026; mandatory AI e-learning precedes access. Within four months of training, employees created more than 1,800 custom GPTs, and specific research tasks saw a 20–30% reduction in workload (OpenAI, 2026). MUFG's enterprise deployment model relies on external technology talent recruitment, vendor partnerships, industry knowledge sharing, and regulatory coordination with the Bank of Japan.

Others

Preferred Networks (PFN)

Preferred Networks, established in 2014, is a domestic LLM and manufacturing AI developer and a leading sovereign AI actor. On 18 September 2025, it concluded a three-party basic agreement with NICT and Sakura Internet to jointly develop a sovereign Japanese-language LLM, drawing on NICT's proprietary crawl of more than 70 billion Japanese web pages accumulated since 2008, and has been developing a domestic LLM using National Institute of Advanced Industrial Science and Technology's (AIST) ABCI supercomputing environment. Preferred Networks is deploying through Sakura Internet's cloud infrastructure and is targeting a spring 2026 release. It also draws on GENIAC funding support and works with manufacturing partners, such as Toyota and Fanuc.

Sakana AI

Founded in 2023, Sakana AI is a spinoff from the University of Tokyo Matsuo-Iwasawa Laboratory and is one of Japan's leading start-ups in evolutionary AI methods, model optimization, and nature-inspired algorithms. In 2025, it entered a three-year, multibillion yen partnership with Daiwa Securities to develop personalized wealth management AI. Sakana AI also conducts research on evolved architectures and maintains active linkages with the Matsuo-Iwasawa Laboratory ecosystem and venture capital backers.

Core Products and Services

Japan's AI capabilities cluster into four core domains. First, national coordination and public adoption are driven through Cabinet-level strategy and Digital Agency operationalization, including procurement

standardization and municipal training deployment. Second, physical AI is a strategic priority, coordinated through METI and executed through industry consortia and corporate testbeds, such as Woven City, which support robotics and embodied AI validation. Third, sovereign language and data infrastructure is a key domestic capability layer, supported by NICT and the National Diet Library through large Japanese-language corpora and digitized publication datasets for LLM development. Fourth, enterprise-scale adoption models are most advanced in finance and industrial IT, where MUFG, Fujitsu, and SoftBank combine adoption programs with infrastructure investment and strategic partnerships.

Public Sector and Parastatals

Japan's public and quasi-public institutions provide the core governance and implementation channels for AI strategy, including cross-ministerial coordination, digital government execution, sectoral regulation, research funding, and national data and network infrastructure. These institutions deliver operational programs that support government adoption, industrial competitiveness, education and research capacity, telecommunications and municipal governance, and healthcare regulation.

Major Players

AI Strategic Headquarters

Established in September 2025, the AI Strategic Headquarters is a Prime Minister-led, cross-ministerial body responsible for national AI policy coordination and overall strategy direction. At its inaugural meeting on 19 September 2025, it adopted a “counterattack” strategic posture, initiated development of an AI Basic Plan for release in December 2025, and set a 2027 checkpoint for progress assessment. It coordinates AI initiatives across Cabinet ministries, including the Digital Agency, METI, MEXT, MIC, and MHLW.

Digital Agency

Established in 2021, the Digital Agency leads government digital transformation and operationalizes national AI goals across public administration, including procurement and governance standardization. It reached 80% internal AI adoption by 2025 and formalized a strategic partnership with OpenAI on 2 October 2025, including the pursuit of ISMAP (Information System Security Management and Assessment Program) certification. It deployed modular training programs across more than 1,700 municipalities and works closely with MIC on municipal coordination while standardizing procurement across ministries.

Ministry of Economy, Trade and Industry (METI)

Established in its current form in 1949, METI is Japan's central ministry for industrial AI promotion and business competitiveness and leads physical AI strategy, national capability-building, and safety programs. METI leads the physical AI 2030 humanoid robotics goal and launched GENIAC as a JPY20–JPY30 billion (~USD126–USD189 million) program for 2024–26. It established an AI Safety Institute in 2024 and is implementing the Cabinet's December 2025 Artificial Intelligence Basic Plan, with an FY2026 budget allocation of JPY387.3 billion (~USD2.6 billion) for domestic foundation models, AI data infrastructure, and Physical AI (the first-year tranche of an approximately JPY1 trillion (~USD6.8 billion), five-year (FY2026–FY2030) commitment to sovereign AI/Physical AI), alongside an initial JPY20.5 billion (~USD137 million) METI/NEDO project for robot foundation models (August 2025). METI works with NVIDIA, Fujitsu, and Yaskawa Electric on physical AI, participates in an international AI Safety Institute network that includes the UK and the US, and coordinates industry activity through consortia, such as xIPF.

Ministry of Education, Culture, Sports, Science and Technology (MEXT)

Established in its current form in 2001, MEXT anchors national AI capacity building through university research funding, education infrastructure, and scientific AI initiatives. Its FY2026 AI for Science

initiative allocates JPY35.5 billion (~USD237 million), to domain-specific models, automated laboratories, and a Science Information Network (SINET) upgrade. MEXT supports large-scale AI education through the University of Tokyo Matsuo-Iwasawa Laboratory's GCI Global program, which enrolled 7,721 students in 2025. It coordinates with RIKEN's AI research centers, the University of Tokyo, and national institutes, such as National Institute for Materials Science (NIMS), NICT, and NII, and it supports international education pathways through Japan International Cooperation Agency (JICA) scholarship channels.

Ministry of Internal Affairs and Communications (MIC)

Established in its current form in 2001, MIC leads local government digital transformation and telecommunications regulation and oversees key national ICT research channels connected to municipal AI adoption. In 2024–25, MIC revised security guidelines to enable municipal software-as-a-service (SaaS) adoption through updated security models, contributing to a 233% year-on-year increase in the number of municipalities newly contracting Google Workspace between 2024 and 2025 (Itō et al., 2025). According to MIC's annual Status of Generative AI Adoption in Local Public Bodies survey, generative AI adoption among other municipalities rose from 9.4% at end-FY2023 to 29.9% at end-FY2024 while adoption among prefectures and designated cities reached 87.2% and 90.0%, respectively (MIC, 2024; 2025). MIC coordinates implementation across more than 1,700 municipalities. MIC works with Google Japan on workspace deployment, collaborates with NICT on corpus-related enablement, and coordinates adoption models with prefectural governments.

Ministry of Health, Labour and Welfare (MHLW)

Established in its current form in 2001, MHLW regulates healthcare AI, approves medical devices, promotes eldercare robotics, and manages related workforce policy. It operates the DASH framework for software as a medical device and has approved AI-enabled medical devices across imaging, surgical assistance, and monitoring. MHLW coordinates physical AI applications in caregiving and works with PMDA as the regulatory agency, alongside healthcare providers, device manufacturers, and eldercare robotics initiatives within physical AI consortia.

Others

RIKEN Center for Advanced Intelligence Project (AIP)

Established in 2016, RIKEN AIP is a core national research institution conducting foundational AI research in deep learning theory, machine learning algorithms, and AI safety. It published more than 150 research papers between 2024 and 2025 and is an active participant in international AI safety research networks. It trains graduate researchers and cooperates with major universities, such as the University of Tokyo and Kyoto University. It also conducts joint research with industry partners, including Toyota, Fujitsu, and NTT.

University of Tokyo Matsuo-Iwasawa Laboratory

Founded in 2010, the University of Tokyo Matsuo-Iwasawa Laboratory is Japan's flagship platform for AI education at scale and international capacity building and is a central node in the country's start-up pipeline. In 2025, it launched the GCI Global program and enrolled 7,721 students from 436 universities in 33 countries. The program operates three tracks covering foundational, advanced, and research-level training. The Matsuo-Iwasawa Laboratory has spawned start-up activity, including Sakana AI and Spark+, and is supported by JICA scholarship funding and international partnership channels.

National Institute of Information and Communications Technology (NICT)

Established in 2004, NICT is Japan's national ICT research organization and the principal provider of large-scale Japanese-language data resources and related network infrastructure for domestic AI development. On 18 September 2025, NICT concluded a three-party basic agreement with Preferred Networks and Sakura Internet for the joint development of a sovereign Japanese-language LLM,

contributing curated Japanese-language web text drawn from a proprietary crawl of more than 70 billion pages accumulated since 2008 and continues to expand corpus assets while advancing multilingual AI research. NICT works with Preferred Networks, Sakura Internet on cloud infrastructure pathways, and MIC as its parent ministry.

National Diet Library (NDL)

Established in 1948, the National Diet Library is a sovereign AI training-data source through large-scale digitization of archival government publications. On 1 September 2025, it agreed with the National Institute of Informatics (NII) to provide 300,000 digitized pre-1995 government publications for LLM training and continues the optical character recognition digitization of its archives. It works with NII and domestic AI developers and aligns archival data provision with MEXT-linked research coordination.

Bank of Japan

Established in 1882, the Bank of Japan oversees financial-sector AI risk and adoption through surveys, risk management guidance, and macroeconomic impact analysis. In 2024, it conducted a comprehensive AI survey covering 155 institutions with a 100% response rate and found that about 60% are using or trialing generative AI (about 30% already in use). It provides risk management guidance, coordinates fraud prevention measures, and works with major financial institutions, including MUFG, alongside regulatory coordination with the Financial Services Agency.

Akita Prefecture

Established in 1871, Akita Prefecture is Japan's leading local-government model for AI-enabled productivity gains through standardized digital tools and security frameworks. In 2025, Akita became the first prefecture to deploy Google Workspace across its government, covering 5,000 staff, and reduced meeting-minutes preparation time by 95% using NotebookLM (ITmedia, 2025). Akita's model is transferable to other prefectures and is supported by MIC-aligned security frameworks and collaboration with Google Japan.

Potential Entry Points for APO Collaboration

Japan's stakeholder landscape provides several practical entry points for APO collaboration. The University of Tokyo Matsuo-Iwasawa Laboratory supports education and capacity-building programs at scale. METI's GENIAC provides a framework for SME diffusion and industrial adoption support. MIC's municipal governance and security templates offer replicable models for local-government AI adoption. Toyota's Woven City provides a physical AI testbed environment for applied demonstrations and international exchange.

Table 6.3 profiles Japan's principal AI stakeholders, summarizing each institution's primary role, recent activities, and key collaborations.

TABLE 6.3

SUMMARY OF KEY STAKEHOLDERS

Institution	Year Established	Primary Role	Recent Activities (2024–25)	Key Collaborations
AI Strategic Headquarters	September 2025	- National AI policy coordination - Prime Minister-led cross-ministerial body setting overall AI strategy direction	- Inaugural meeting 19 September 2025 adopted "counterattack" strategic posture - Developing AI Basic Plan for December 2025 release - Established 2027 checkpoint for progress assessment	- All Cabinet ministries - Coordinates METI, MEXT, MIC, MHLW, Digital Agency AI initiatives
Digital Agency	2021	- Government digital transformation - Translate national AI goals into practical guidance for government offices - Standardize procurement and governance	- Achieved 80% internal AI adoption (2025) - Formalized OpenAI strategic partnership (2 October 2025), including ISMAP certification pursuit - Deployed modular training programs across 1,700+ municipalities	- OpenAI (October 2025 partnership) - MIC (municipal coordination) - Procurement standardization across ministries
METI (Ministry of Economy, Trade and Industry)	1949 (current form)	- Industrial AI promotion - Business competitiveness - Coordinate physical AI initiative - Operate GENIAC and AI Safety Institute	- Lead agency for physical AI 2030 humanoid robot goal - Launched GENIAC (JPY20–JPY30 billion/~USD126–USD189 million, 2024–26) - Established AI Safety Institute (2024) - FY2026 budget JPY387.3 billion (~USD2.6 billion) (1st-year tranche of ~JPY1 trillion (~USD6.8 billion), 5-year sovereign AI/Physical AI package); JPY20.5 billion (~USD137 million) METI/NEDO project	- NVIDIA-Fujitsu-Yaskawa physical AI collaboration (October 2025) - International AISI network (UK, US) - Industry consortia (xIPF)
MEXT (Ministry of Education, Culture, Sports, Science and Technology)	2001 (current form)	- University research funding - AI education infrastructure - Scientific AI development - Operates major research institutes	- FY2026 budget: JPY35.5 billion (~USD237 million) "AI for Science" initiative (domain-specific models, automated labs, SINET upgrade) - GCI Global program (7,721 students, 2025)	- RIKEN AIP, University of Tokyo, National institutes (NIMS, NICT, NII) - JICA for international education scholarships

Institution	Year Established	Primary Role	Recent Activities (2024-2025)	Key Collaborations
MIC (Ministry of Internal Affairs and Communications)	2001 (current form)	- Local government digital transformation - Telecommunications regulation - NICT oversight - Municipal AI adoption coordination	- Revised security guidelines enabling municipal SaaS adoption (α, β models, 2024–25) - Coordinated 233% YoY growth in municipalities newly contracting Google Workspace municipal adoption growth 50%–60% municipal GenAI utilization target	1,700+ municipalities - Google Japan (workspace deployment) - NICT (70 billion-page Japanese web corpus) - Prefectural governments
MHLW (Ministry of Health, Labour and Welfare)	2001 (current form)	- Healthcare AI regulation - Medical device approval - Eldercare robotics - Workforce policy	- DASH for SaMD framework operational (2023–present) - Approved numerous AI medical devices (imaging, surgical assist, monitoring) - Physical AI caregiving applications coordination	- PMDA (regulatory agency) - Physical AI consortium for eldercare robotics - Healthcare providers and device manufacturers
RIKEN Center for Advanced Intelligence Project (AIP)	2016	- Basic AI research - Deep learning theory - Machine learning algorithms - AI safety research	- Published 150+ research papers (2024–25) - Developed novel deep learning architectures - Participates in international AI safety research networks - Trains graduate researchers	- University of Tokyo, Kyoto University - International research networks - Industry joint research (Toyota, Fujitsu, NTT)
University of Tokyo Matsuo-Iwasawa Laboratory	2010 (lab); 2025 (GCI Global)	- AI education at scale - International capacity building - Deep learning curriculum development - Start-up ecosystem cultivation	- GCI Global inaugural cohort: 7,721 students from 436 universities in 33 countries (2025) - Three-track program (Foundation, Advanced, Research) - Gave rise to Sakana AI (unicorn status)	- JICA (scholarship funding) - APO partnership discussions - Sakana AI, Spark+ (spinoff companies) 33 countries' universities
NICT (National Institute of Information and Communications Technology)	2004	- ICT research 70 billion-page Japanese-language corpus curation - Network infrastructure - AI training data provision	- Three-party basic agreement on a domestic generative-AI ecosystem (NICT, Preferred Networks, Sakura Internet): NICT contributes its 70 billion-page Japanese corpus to Preferred Networks (18 September 2025) for domestic LLM development (NICT, 2025b) - Ongoing corpus expansion - Multilingual AI research	- Preferred Networks (September 2025 data partnership) - Sakura Internet (cloud infrastructure) - MIC (parent ministry)

Institution	Year Established	Primary Role	Recent Activities (2024-2025)	Key Collaborations
National Diet Library (NDL)	1948	- National archive 300,000 government publications digitization - Sovereign AI training data provider	- Agreement with NII (1 September 2025) to provide 300,000 digitized pre-1995 government publications as LLM training data - Ongoing OCR digitization of archives	- NII (September 2025 partnership) - Domestic AI developers - MEXT research coordination
SoftBank Group/ SoftBank Corp	1981/1986	- AI infrastructure investment - Stargate data center (USD500 billion) - Domestic AI adoption leadership - Robotics integration (ABB acquisition)	- Stargate Japan: Tomakomai 300+ MW, Sakai 400 MW data centers (2025–28) 13.7 exaflops DGX-B200 ~90% employee AI adoption - ABB robotics acquisition (USD5.375 billion, announced 8 October 2025)	- NVIDIA (DGX systems, October 2025) - OpenAI (infrastructure partnership) - Saudi Arabia, UAE (Stargate capital) - ABB (robotics, physical AI)
MUFG (Mitsubishi UFJ Financial Group)	2005 (merger)	- Financial services AI adoption at scale - GenAI enterprise deployment model - AI Center of Excellence operation	- ChatGPT Enterprise to ~35,000 employees (from 2026) ~100% training completion; 1,800+ custom GPTs in 4 months; 20%–30% workload reduction in specific research tasks - OpenAI partnership (Oct 2024)	- External tech talent recruitment - AI vendor partnerships - Industry knowledge sharing - Regulatory coordination with Bank of Japan
Toyota/Woven City	1937/ September 2025 (opened)	- Automotive AI; physical AI testbed operation - Humanoid robot real-world validation - Smart city platform	- Woven City opened 25 September 2025 as world's first AI-native residential city - Humanoid robot testing in homes, offices, public spaces - Autonomous vehicle integration - Sensor-rich data collection	- xIPF consortium (physical AI) - NVIDIA (simulation platforms) - Research universities - Government physical AI 2030 initiative
Fujitsu	1935	- AI system integration - Energy-efficient computing (ARM-based MONAKA chip) - Enterprise AI solutions - Government IT provider	- NVIDIA partnership for CPU-GPU integrated chips (MONAKA, 2027/2029 targets, October 2025) - Yaskawa collaboration on physical AI - Government digital transformation projects	- NVIDIA (October 2025 chip development) - Yaskawa Electric (physical AI, October 2025) - Digital Agency (government systems)

Institution	Year Established	Primary Role	Recent Activities (2024-2025)	Key Collaborations
Preferred Networks (PFN)	2014	- Domestic LLM development - Manufacturing AI solutions - Deep learning framework development - Sovereign AI champion	- Received NICT 70 billion-page Japanese corpus (18 September 2025) - Developing domestic LLM using AIST ABCI supercomputer - Sakura Internet cloud deployment - Target: Spring 2026 release	- NICT (data, September 2025) - AIST (ABCI computing) Sakura Internet (cloud) - GENIAC (funding support) - Manufacturing partners (Toyota, Fanuc)
Sakana AI	2023	- Evolutionary AI methods - LLM optimization - Nature-inspired algorithms - Unicorn-status AI start-up (Matsuo-Iwasawa Laboratory spinoff)	- Daiwa Securities partnership (3-year, multibillion yen, 2025) for personalized wealth management AI - Evolved architectures research - International recognition as leading Japanese AI start-up	- Daiwa Securities (October 2025 partnership) - University of Tokyo Matsuo-Iwasawa Laboratory (origin) - Venture capital (Khosla Ventures, others)
Bank of Japan	1882	- Financial sector AI oversight - Risk management guidance - Adoption surveys - Macroeconomic AI impact analysis	- Comprehensive AI survey (155 institutions, 100% response, 2024) - Approximately 60% GenAI adoption finding - Risk management framework guidance - Fraud prevention coordination	- Financial institutions (155 surveyed) - MUFG and major banks - Financial Services Agency (FSA) regulatory coordination
Akita Prefecture	1871 (prefecture)	Municipal AI adoption model; first prefecture-wide Google Workspace deployment; 95% productivity gain demonstration	- First Japanese prefecture Google Workspace deployment (5,000 staff, 2025); α' network security model - NotebookLM 95% meeting-minutes time reduction (ITmedia, 2025); model for other prefectures	- Google Japan (workspace deployment) - MIC (security model coordination) - Other prefectures (knowledge sharing)

Source: Institutional websites and releases.

Strategic Positioning and Recommendations

This section provides a systematic strategic positioning analysis of Japan's AI ecosystem, synthesizing findings from the previous sections into a comprehensive SWOT framework. The analysis examines internal capabilities (strengths and weaknesses) and external environmental factors (opportunities and threats), offering strategic insights to inform policy recommendations and identify collaboration pathways with APO member economies. The assessment reflects Japan's positioning as of November 2025, following the September strategic recalibration toward a utilization-first doctrine and October's unprecedented concentration of public-private AI partnerships.

Table 6.4 presents the SWOT matrix for Japan's AI ecosystem, summarizing strengths, weaknesses, opportunities, and threats identified in this analysis.

FIGURE 6.3

SWOT MATRIX: JAPAN

Strengths (6)

- S1: Manufacturing automation (419 robots/10k)
- S2: R&D investment (JPY20.7 trillion/~USD130 billion), 3.65% GDP)
- S3: Elite enterprise adoption (~90% SoftBank)
- S4: Regulatory innovation (DASH, AISI)
- S5: Public-private partnerships (Stargate)
- S6: Physical AI testbed (Woven City)

Weaknesses (6)

- W1: SME adoption gap (16% vs. ~90% elite)
- W2: Teacher AI literacy (17% vs. 83% students)
- W3: Reskilling barriers (1/8 US rate)
- W4: Limited LLM capacity (foreign dependency)
- W5: AI talent gap (~124k shortage projected by 2030)
- W6: Organizational misalignment (kaizen)

Opportunities (5)

- O1: Physical AI leadership (USD38 billion by 2035)
- O2: Working-age population declining from 74 million (2020) to 45 million (2060)
- O3: APO regional leadership (Matsuo-Iwasawa Laboratory 7,721)
- O4: Sovereign AI alternative model
- O5: Green AI leadership (MONAKA chip)

Threats (5)

- T1: US-PR China competition (binary alignment)
- T2: Platform dependency ("AI rent" payments)
- T3: Tech obsolescence (6–12 month cycles)
- T4: Brain drain (US 2x–3x compensation)
- T5: Energy constraints (USD0.20–0.25/kWh)

Source: The authors.

SWOT Analysis

Strengths

i) **Top-tier manufacturing automation as a foundation for physical AI**

According to the International Federation of Robotics (IFR) (2024), Japan's robot density of 419 units per 10,000 manufacturing employees, ranked fifth globally in 2023, provides a strong base for integrating AI into production environments. The 7.4% increase from 2018 to 2023 points to sustained automation investment, creating clear pathways for AI-enabled defect detection, predictive maintenance, and process optimization. Together, these capabilities position Japan favorably for Physical AI development that combines excellence in robotics hardware with AI software integration (International Federation of Robotics, 2024).

ii) **Exceptional R&D intensity and accelerating AI-specific investment**

Japan's R&D expenditure of JPY20.70 trillion (~USD130 billion), equal to 3.65% of GDP in FY2022, ranks among the world's highest, and AI-specific investment reached JPY272.5 billion (~USD1.7 billion) with 56.3% year-on-year growth from FY2021 (Statistics Bureau of Japan, 2023). MEXT FY2026 budget request of JPY35.5 billion (~USD237 million) for "AI for Science" further signals institutional commitment and strengthens conditions for scientific and industrial breakthroughs (Statistics Bureau of Japan, 2023).

iii) **Elite enterprise adoption models and production-scale operational templates**

Several leading firms report adoption levels that exceed international benchmarks, and they provide practical templates for large-scale deployment. Reported examples include: (i) SoftBank Corp. (approximately 90% of employees reporting deepened understanding of generative AI, with over 2.5 million AI agents created in 10 weeks (SoftBank Corp., 2025c); (ii) MUFG, with ChatGPT Enterprise deployed to ~35,000 employees and 1,800+ custom GPTs created within four months of training (OpenAI, 2026); and (iii) Colopl at 90%, compared with a reported US average of 40% (Colopl, 2025). Common enablers include dedicated centers of excellence,

external talent recruitment, and leadership mindset shifts that support production-grade implementation (Anthropic, 2025).

iv) Regulatory innovation and responsible AI governance leadership

Japan has advanced several governance and regulatory mechanisms that support scaling while maintaining public trust. Examples include DASH pathways for Software as a Medical Device (SaMD) that support adaptive approval approaches for AI medical technologies (PMDA, 2020; revised 2023), and municipal frameworks promoted by MIC that are linked to a reported 233% year-on-year growth in Google Workspace adoption in local government settings (Itō et al., 2025; MIC, 2024). National-level coordination has also strengthened through the AI Strategic Headquarters under prime ministerial leadership in September 2025 and the establishment of an AI Safety Institute in 2024 that participates in international networks (MIC, 2024; PMDA, 2020; revised 2023).

v) Strategic public–private partnerships and ecosystem-level mobilization

Japan has recently pursued multiple large-scale public–private initiatives that, taken together, suggest deliberate ecosystem mobilization across compute, chips, partnerships, and sovereign capabilities. Reported examples clustered in October 2025 include SoftBank’s USD500 billion Stargate initiative, described as a 13.7 exaflops installation based on NVIDIA Blackwell systems (SoftBank Group Corp. et al., 2025a), the Fujitsu-NVIDIA MONAKA chip collaboration with timelines extending into 2027 and 2029, a Digital Agency partnership with OpenAI, and Preferred Networks access to NICT corpora and ABCI computing resources (SoftBank Group Corp. et al., 2025a). The simultaneity of these efforts suggests coordinated movement on infrastructure and strategic dependencies rather than isolated firm-level projects (SoftBank Group Corp. et al., 2025a).

vi) World-class Physical AI testbed infrastructure

Toyota’s Woven City, opened on 25 September 2025, is positioned as an AI-native residential city designed to validate Physical AI systems in real human environments, including humanoid robot testing with resident participation (Toyota, 2025). Combined with xIPF consortium coordination and NVIDIA platform integration, this testbed can accelerate the transition from prototype systems to real-world deployments and offers potential collaboration value for APO members that cannot readily replicate such large-scale validation environments (Toyota, 2025).

Weaknesses

i) Severe SME adoption gap and an increasingly bimodal economy

Japan’s AI adoption profile is highly uneven. While select large enterprises reportedly reach approximately 90% AI understanding adoption levels (SoftBank Corp., 2025c), only 16% of SMEs use AI, even though SMEs employ roughly 70% of Japan’s workforce, and this bimodality is highlighted in the discussion of Figure 6.2 (Rakuten, 2025). Barriers include financial constraints, limited technical expertise, organizational unreadiness, and cultural resistance, and the GENIAC program’s JPY20–JPY30 billion (~USD126–USD189 million) funding for 2024–26 is presented as insufficient to overcome systemic barriers at the scale of hundreds of thousands of SMEs (Rakuten, 2025).

ii) Education-sector gap and a teacher AI literacy crisis

Japan’s education sector shows a sharp mismatch between student adoption and teacher readiness. Japan ranks 54th out of 55 countries for AI classroom integration, and only 17% of teachers use AI compared with an OECD average of about 36% (around one in three) (OECD, 2025a) while reported high school student adoption reaches 83.1% (Recruit, 2025). This “generational expertise inversion” reflects inadequate teacher training, aging workforce dynamics, institutional

conservatism, and unclear guidelines, implying a need for professional development, curriculum modernization, and culture change that prioritizes pedagogical innovation (Recruit, 2025).

iii) **Workforce reskilling constraints driven by organizational culture**

Reskilling participation is reported at one-eighth the US rate, with workplace culture cited as a primary barrier, including lifetime employment expectations, hierarchical structures that resist learning from junior colleagues, limited labor mobility, and an emphasis on firm-specific training (Indeed Japan, 2025). The “Early Supervisor Problem” compounds these constraints because younger employees may have higher AI familiarity but limited authority, while senior leaders may retain analog preferences. With the working-age population projected to decline from 74 million in 2020 to 68 million in 2030, weak reskilling capacity could undermine productivity and economic sustainability (National Institute of Population and Social Security Research, 2023).

iv) **Limited foundational model development capacity and a utilization-first pivot**

Japan acknowledges constraints in competing with American and Chinese dominance in foundational LLM development, contributing to a September 2025 policy pivot toward a “utilization-first” doctrine (Cabinet Office, 2025). Cited constraints include limited compute infrastructure, restricted access to training data with Japanese content estimated at approximately 3% of the internet, a projected AI-specialist shortage of about 124,000 by 2030 under METI’s mid-demand scenario, and fragmented R&D (Cabinet Office, 2025). This increases dependence on foreign platforms and creates exposure to geopolitical access risk, data sovereignty concerns, limited customization control, and ongoing “AI rent” payments (Cabinet Office, 2025).

v) **Acute AI talent shortages and intensifying international competition**

Japan’s projected AI-specialist shortage of about 124,000 by 2030 (METI mid-demand scenario) trails the US and PR China. In IPA’s 2024 survey, 85.1% of Japanese companies reported that DX-promotion personnel, including data scientists, software engineers, and AI-related roles, are “somewhat or significantly lacking,” essentially unchanged from 85.7% in 2023 and far above the US (23.8%) and Germany (44.6%) (IPA, 2025). The “significantly lacking” subset alone rose from 30.6% (2021) to 62.1% (IPA, 2024). Demand pressure has also intensified: AI-related engineer-track job postings on the Recruit Agent panel expanded to approximately 6.6 times the FY2017 baseline by FY2024 (Indeed Recruit Partners, 2025). Contributing factors include constrained immigration pathways, compensation levels that can contribute to outflows, and educational approaches perceived as emphasizing standardized mastery over open-ended problem solving (METI, 2019; OECD, 2025b). The same sources highlighted the University of Tokyo Matsuo-Iwasawa Laboratory enrolled 7,721 students from 33 countries in 2025, but domestic retention mechanisms are described as underdeveloped.

vi) **Organizational structures misaligned with AI integration dynamics**

Organizational practices optimized for manufacturing excellence and continuous “improvement” (*kaizen*) can impede the rapid experimentation cycles typical of AI deployment. The traditional process by which consensus is formed in Japan (called *nemawashi*) typically unfolds informally and over extended timeframes, which conflicts with the need for rapid prototyping. Hierarchical corporate and bureaucratic structures can also slow deployment when models evolve quickly. Finally, Japan’s largely risk-averse culture can discourage necessary experimentation. While the Digital Agency reportedly reached 80% internal adoption, many entities are described as maintaining pre-digital workflows, implying that structural reforms are needed, including flatter hierarchies, dedicated innovation units, leadership rotation that elevates digitally fluent staff, and incentives that value experimentation rather than error avoidance (Digital Agency, 2025).

Opportunities

i) Physical AI leadership in a still-forming global market

Japan’s manufacturing heritage aligns with projections that the humanoid robot market could reach USD38 billion by 2035 (Goldman Sachs, 2024). METI’s Physical AI Strategy, anchored in the Cabinet’s December 2025 Artificial Intelligence Basic Plan and supported by an FY2026 budget allocation of JPY387.3 billion (~USD2.6 billion) as the first-year tranche of an approximately JPY1 trillion (~USD6.8 billion), five-year (FY2026–FY2030) public support package, alongside an initial JPY20.5 billion (~USD137 million) METI/NEDO project, all coordinated through the xIPF consortium, positions Japan to compete in a domain where no single global leader has fully consolidated (METI, 2025b). Woven City adds a distinctive validation environment, and demographic pressures create domestic demand that can support early adopter markets and real-world learning loops (Goldman Sachs, 2024; METI, 2025b).

ii) Demographic pressures as a sustained robotics demand driver

Japan’s demographic trajectory intensifies the economic logic for automation and robotics. The working-age population is projected to decline from 74 million in 2020 to 45 million in 2060 while the population aged 65 and older is projected to reach 35.3% by 2040, creating acute needs in healthcare, eldercare, logistics, retail, and construction (National Institute of Population and Social Security Research, 2023). These conditions can increase political acceptance of automation as augmentation rather than replacement, and successful implementation can generate demonstration effects relevant to other aging APO economies (National Institute of Population and Social Security Research, 2023).

iii) Regional leadership in APO capacity building and governance templates

Japan has assets that can support a regional leadership role, including scalable education capacity and practical governance models. Matsuo-Iwasawa Laboratory enrolled 7,721 students from 436 universities across 33 countries in 2025, suggesting an existing platform for regional human-capital development (University of Tokyo, 2025). Municipal governance templates, DASH pathways for SaMD, and potential access to Woven City testbeds could be packaged into collaboration offerings for APO members seeking implementation capacity alongside credible governance mechanisms (University of Tokyo, 2025; PMDA, 2020; revised 2023).

iv) Sovereign AI as a middle-power model

Japan’s “sovereign AI” approach emphasizes end-to-end domestic control while retaining international partnerships, offering a model for economies that prefer to avoid binary alignment between US and PR China. Concrete steps reported in September 2025 include public data mobilization, with the National Diet Library’s 300,000 publications and NICT’s proprietary Japanese-language web crawl of more than 70 billion pages (NICT, 2025a). Preferred Networks’ “Japan stack” and SoftBank’s Stargate described as a “neutral host” further illustrate a pragmatic sovereignty strategy that balances domestic capability building with international access (NICT, 2025a; SoftBank Group Corp. et al., 2025a).

v) Green AI and energy-efficient computing differentiation

Japan’s emphasis on engineering efficiency positions the country to develop competitive advantage in green AI. Fujitsu’s MONAKA chip, described as ARM-based, targets energy constraints while high domestic electricity costs strengthen incentives for efficiency innovation (Fujitsu Limited, 2025). Stargate’s Hokkaido siting is presented as leveraging natural cooling and renewable integration while MEXT’s “AI for Science” agenda can support advances in energy-efficient hardware and scientific computing (SoftBank Group Corp. et al., 2025a; MEXT, 2025a).

As sustainability requirements tighten globally, particularly in Europe, energy-efficient AI systems and associated standards could become a market differentiator (Fujitsu Limited, 2025; MEXT, 2025a).

Threats

i) Intensifying US–PR China strategic rivalry and technology bifurcation

US–PR China competition creates strategic risk for Japan’s technology positioning. The US export controls affect Japanese firms, including Tokyo Electron, while PR China’s AI investment scale intensifies competitive pressure. PR China attracted approximately USD9.3 billion in private AI investment in 2024, the world’s second-largest national total after the US. Over the period 2013–24, PR China accumulated roughly USD119 billion in private AI investment, compared to approximately USD6 billion cumulatively for Japan over the same period (Maslej et al., 2025; US Department of Commerce, 2022). Japan faces tension between security-aligned technology controls and deep trade exposure to PR China, and technology bifurcation could force costly alignment choices. The Digital Agency–OpenAI partnership signals closer alignment with the US platforms while the “utilization-first” approach reflects recognition of limited capacity to build fully competitive alternatives quickly (Cabinet Office, 2025; OECD, 2025b).

ii) Persistent foreign platform dependency and “AI rent” dynamics

Reliance on foreign platforms, such as OpenAI, Google, and Microsoft, creates structural dependency and can translate into recurring “AI rent” payments, data sovereignty concerns tied to foreign legal regimes, customization limits, and geopolitical access risk. The September 2025 utilization-first doctrine may institutionalize dependency if it channels resources toward adoption rather than development, creating a self-reinforcing path dependence that is difficult to reverse over time (Cabinet Office, 2025).

iii) Rapid technological obsolescence and large-investment risk

AI technology cycles are described as evolving on 6- to 12-month timelines, creating heightened risk for large multiyear investments. SoftBank’s USD500 billion Stargate could face obsolescence if computing paradigms shift before full completion, and METI’s Physical AI Strategy and the approximately JPY1 trillion (~USD6.8 billion) five-year public support package could be exposed if market dynamics change materially before outcomes mature (METI, 2025b; SoftBank Group Corp. et al., 2025a). This volatility also challenges consensus-based policymaking that requires long stakeholder consultation cycles because the technology landscape can shift meaningfully before policy is finalized.

iv) Brain drain to foreign ecosystems and compounding talent scarcity

Japan’s limited talent pool is exposed to competitive recruitment by large technology firms offering higher compensation, more research resources, and access to frontier projects (OECD, 2025b). Outflows can become self-reinforcing if limited talent constrains domestic development and reduces high-impact opportunities, thereby accelerating further departures. Immigration constraints can limit the ability to offset these outflows quickly, implying that mitigation may require compensation reform, world-class research environments, and policy changes that expand inbound recruitment channels (OECD, 2025b).

v) Energy constraints and climate-related infrastructure vulnerability

Japan’s energy profile creates structural constraints for AI infrastructure scaling. Reported electricity costs of USD0.20–USD0.25 per kWh, reliance on imports for roughly 90% of primary energy, and the power demands of large data centers, including Stargate at more than 300 MW, can strain grids and raise operating costs (SoftBank Group Corp. et al., 2025a). Climate change may increase vulnerability through higher temperatures that reduce cooling efficiency and more

frequent extreme events that threaten infrastructure while carbon neutrality commitments by 2050 can intensify trade-offs between AI expansion and emissions reduction (SoftBank Group Corp. et al., 2025a). These constraints may require aggressive efficiency innovation, renewable integration, or strategic acceptance of scale limits with a focus on specialized applications.

Summary

This SWOT analysis, summarized in Table 6.4, reveals Japan’s positioning as a “strong upstream, uneven downstream” AI economy. It has exceptional research capabilities and has invested heavily in infrastructure, but diffusion at SMEs is slow and there remain numerous structural barriers to broad-based adoption. The September 2025 strategic recalibration toward utilization-first doctrine, while pragmatic given constraints, risks institutionalizing foreign platform dependency unless balanced with sustained domestic capability development. For APO collaboration, Japan’s strengths in manufacturing automation, regulatory innovation, and elite enterprise adoption models offer immediately applicable knowledge transfer opportunities. Physical AI testbed infrastructure and educational programs provide tangible partnership pathways. However, shared challenges, particularly SME adoption gaps, education sector weaknesses, and talent constraints, suggest regional collaboration yields mutual benefits rather than one-directional technology transfer. The SWOT framework informs recommendations emphasizing practical, operational collaboration to address common challenges while leveraging Japan’s distinctive capabilities in robotics, governance frameworks, and institutional AI implementation.

Future Needs and Collaboration Pathways

This section translates the SWOT analysis into actionable recommendations and collaboration pathways for Japan and APO member economies. Rather than generic policy aspirations, this analysis identifies specific, near-term initiatives addressing shared challenges while leveraging Japan’s distinctive capabilities. Recommendations prioritize operational feasibility over comprehensiveness, focusing on areas where Japan–APO collaboration generates mutual benefits through complementary strengths, shared challenges, and existing institutional mechanisms. The framework emphasizes practical knowledge transfer, infrastructure sharing, and regulatory harmonization rather than resource-intensive technology development programs requiring decade-long timelines. Each recommendation includes implementation considerations, potential lead institutions, and estimated timeframes, enabling the APO to evaluate proposals against organizational priorities and member economy capabilities.

Domestic Priorities

Labor

Japan faces an acute shortage of AI specialists, with METI projecting a shortfall of approximately 124,000 by 2030 under its mid-demand scenario (METI, 2019), alongside education-sector gaps, including low teacher AI literacy and weak classroom integration of AI. Japan’s ranking of 54th out of 55 countries in classroom AI integration reinforces the need to strengthen AI literacy and expand the talent pipeline at scale.

SME Diffusion and Implementation

A pronounced adoption gap persists between large enterprises and SMEs. Only 16% of SMEs currently use AI, reflecting constraints in financing, in-house expertise, and organizational readiness. Closing this gap is central to inclusive productivity gains and requires practical implementation support, sector-specific tools, and change management capacity.

Governance, Evaluation, and Standards

Responsible adoption at scale requires stronger evaluation capacity, safety testing, and proportionate governance mechanisms. Japan’s AI Safety Institute (AISII), established in February 2024 within the

Information-technology Promotion Agency (IPA), provides a foundation for developing safety evaluation criteria, testing methods, and cooperation with counterpart institutes abroad. Strengthening shared evaluation capacity also supports resilience against fast-moving capability shifts and reduces exposure to alignment pressures stemming from US–PR China competition.

Physical AI, Robotics, and Real-world Testbeds

Japan’s comparative strengths in manufacturing automation, R&D intensity, and real-world testbed infrastructure create opportunities to address labor shortages through robotics and automation solutions. Domestic demand is reinforced by demographic pressures, and the availability of anchor testbed infrastructure, including Toyota’s Woven City, supports iterative development and validation in real environments.

Compute and Infrastructure

Japan’s role in large-scale AI infrastructure is expanding, including SoftBank’s leadership stake in the USD500 billion Stargate initiative, a joint venture with OpenAI, Oracle, and other partners that plan to build up to 10 gigawatts of AI data-center capacity worldwide. At the same time, reliance on a small number of cloud and AI platforms raises data sovereignty concerns and recurring “AI rent” payments, aligning with constraints on domestic model and compute capacity and exposure to external cost pressures. A practical priority is to expand compute access while strengthening governance over sensitive data and model use.

Collaboration Opportunities

Local Perspective

i) Education and talent platforms

Japan has operational capacity for large-scale international AI education through the University of Tokyo Matsuo-Iwasawa Laboratory GCI Global program, which enrolled 7,721 students from 436 universities across 33 countries in 2025. This platform supports rapid scaling of regional talent development through online delivery complemented by workshops, leveraging existing university infrastructure and established scholarship mechanisms.

ii) Applied testbeds and development sites

Physical AI development benefits from distributed validation across diverse use environments. Japan can anchor a regional network through Woven City while enabling complementary test sites in member economies focused on eldercare, manufacturing, and agricultural robotics. This structure supports incremental capability improvement and broad participation beyond passive adoption.

iii) Municipal adoption templates and digital government practices

Japan’s municipal AI adoption offers reusable governance and implementation templates for secure generative AI use, procurement, and organizational change. Following revised security guidelines from the MIC, the year-on-year increase in the number of municipalities newly contracting Google Workspace accelerated from roughly 40% in 2023–24 to 233% in 2024–25 (Itō et al., 2025), illustrating the value of practical templates that accelerate adoption while maintaining security and accountability.

Global Perspective

i) Safety institutes, standards linkages, and international coordination

AISI’s mandate includes cooperation with counterpart institutes abroad, including the US and the UK AI Safety Institutes, and participation in international networks linked to the Hiroshima AI Process and global AI safety summits. Japan’s coordination with International Organization

for Standardization (ISO) and International Electrotechnical Commission (IEC) processes can support regional alignment on baseline safety, interoperability, and ethics practices, particularly for high-risk systems and robotics.

ii) Regional infrastructure partnerships and shared data resources

Many APO member economies cannot justify sovereign-grade AI supercomputing individually. A pooled approach can aggregate demand across economies, reduce per-country capital requirements, and support greater control over sensitive data and model governance. Linking shared compute with a regional data commons also supports regionally relevant datasets that reduce bias arising from overreliance on Western training data.

APO Joint Initiatives

Regional AI Education and Talent Development Network

i) APO AI literacy certification program

Develop a three-tier certification framework (Foundation, Professional, Expert) modeled on the Matsuo-Iwasawa Laboratory structure and delivered through a hybrid online and workshop format.

Target: 10,000 participants annually by Year 3 across APO member economies.

Lead: University of Tokyo Matsuo-Iwasawa Laboratory and the Digital Agency.

ii) Teacher AI readiness program

Regional program focused on AI pedagogy frameworks and teacher training curricula.

Target: 5,000 trainer certifications by 2028, reaching more than 100,000 teachers.

Lead: MEXT with the APO coordination.

Physical AI and Robotics Technology Collaboration

i) APO physical AI testbed network

Establish distributed testing infrastructure with Woven City as an anchor and complementary facilities in member economies for eldercare, manufacturing, and agricultural robotics.

Target: 8–10 testing sites by 2028 and more than 200 evaluations annually.

Lead: Toyota Woven City with METI coordination.

ii) Regional robotics standards harmonization

Develop common safety, interoperability, and ethical standards for physical AI systems, using the DASH for SaMD framework as a reference model.

Target: APO standards framework by 2027 and adoption by at least eight APO member economies by 2028.

Lead: METI with ISO and IEC coordination.

SME AI Adoption Acceleration Program

i) APO SME AI toolkit development

Develop sector-specific AI packages for retail, manufacturing, hospitality, and professional services with low-code interfaces and cloud deployment.

Target: 6–8 toolkits by 2027 and 5,000 SME pilot users.

Lead: METI GENIAC with private sector partnerships.

ii) Regional SME AI implementation support network

Establish a consultant network providing technical assistance and organizational change management, incorporating South-South knowledge sharing.

Target: 500 certified consultants by 2028 supporting 10,000 SME adoptions.

Lead: APO with Japan's regional productivity centers.

Municipal AI Governance and Digital Government Collaboration

i) APO municipal AI governance template

Develop a reference architecture for municipal AI adoption covering technical infrastructure, organizational processes, and governance frameworks adapted from Japanese experience.

Target: Publish template by 2027, pilot in 15 cities, and reach 100 municipal adoptions by 2029.

Lead: APO with MIC.

ii) Cross-border digital public services platform

Develop a shared platform enabling cross-border services (business registration, credential verification, professional licensing) using AI for document processing and compliance checking.

Target: Launch in five APO member economies by 2028 and reach 500,000 annual transactions by 2030.

Lead: APO with member digital government agencies.

Responsible AI Governance and Safety Institute Network

i) APO AI safety and ethics network

Create a distributed network of evaluation facilities coordinated with Japan's AISI, conducting safety testing, bias audits, and impact assessments while developing culturally contextualized ethical guidelines.

Target: 8–10 centers by 2028, more than 100 assessments annually, and an APO AI Ethics Framework by 2027.

Lead: AISI with the APO.

ii) Regional AI policy coordination mechanism

Establish a standing forum for AI policymakers enabling information exchange, regulatory coordination, and collective engagement in international processes through quarterly meetings and annual forums.

Target: Launch in 2026 with participation from regulators across more than 15 APO member economies.

Lead: APO with a rotating secretariat.

Regional Computing Infrastructure and Data Sovereignty Initiative

i) APO shared AI computing infrastructure

Establish a regional facility providing subsidized access, anchored by Japan's Stargate-linked capacity, prioritizing projects with regional benefits (multilingual AI, agriculture, disaster response).

Target: 1 exaflop capacity by 2028, serving more than 200 projects and more than 500 organizations by 2030.

Lead: APO with SoftBank and participating APO member economies.

ii) Regional data commons for AI development

Develop a shared repository of regionally relevant datasets (multilingual corpora, agricultural data, disaster response, cultural heritage) to reduce bias from Western-centric training data.

Target: More than 100 terabytes by 2029, supporting more than 1,000 AI projects by 2030.

Lead: APO with NICT.

Implementation Framework, Timeline, and Success Metrics

The implementation structure includes an APO AI Collaboration Steering Committee (cabinet-level representatives, biannual meetings, with Japan serving as chair for 2026–27, a Technical Coordination Office at the APO Secretariat (10–15 staff managing programs and shared resources), and Domain Working Groups (technical experts aligned to each priority area).

The phased timeline applies a modular approach: Phase 1 (2026–27) establishes mechanisms and launch pilots; Phase 2 (2028–29) scales successful initiatives and begins major infrastructure projects; Phase 3 (2030 onward) institutionalizes programs and develops sustainable revenue models.

Success metrics combine quantitative indicators (participation, adoption rates, computing hours, municipal implementations) with qualitative assessments (organizational transformation, regulatory influence, user satisfaction), alongside economic evaluation of productivity gains and investment leverage.

Strategic Emphasis and Early Momentum

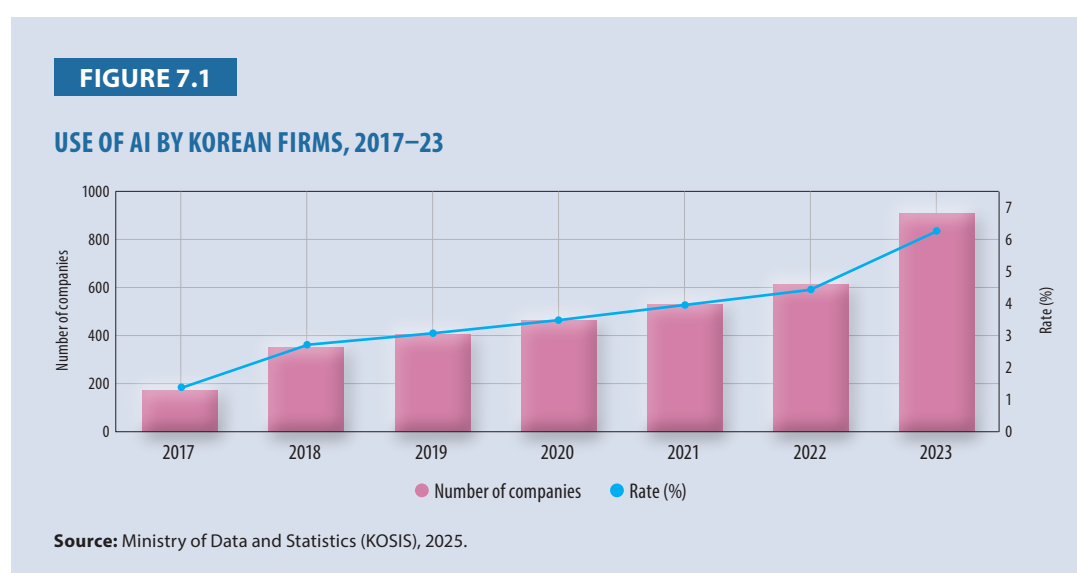
Among the six collaboration areas, the regional AI education network and the SME AI adoption program are positioned as high-impact initiatives that enable early progress by leveraging existing platforms, including the University of Tokyo Matsuo-Iwasawa Laboratory program and the APO training delivery infrastructure. The indicative investment per member economy is approximately USD4–USD5 million over five years, supporting financial realism across economies at different readiness levels. Over time, successful pilots are expected to evolve into public–private partnerships or subscription-based models co-funded by governments and regional enterprises, with performance assessed through productivity-linked outcomes, such as integration depth in business operations, public services, and workforce reskilling.

CHAPTER 7

REPUBLIC OF KOREA

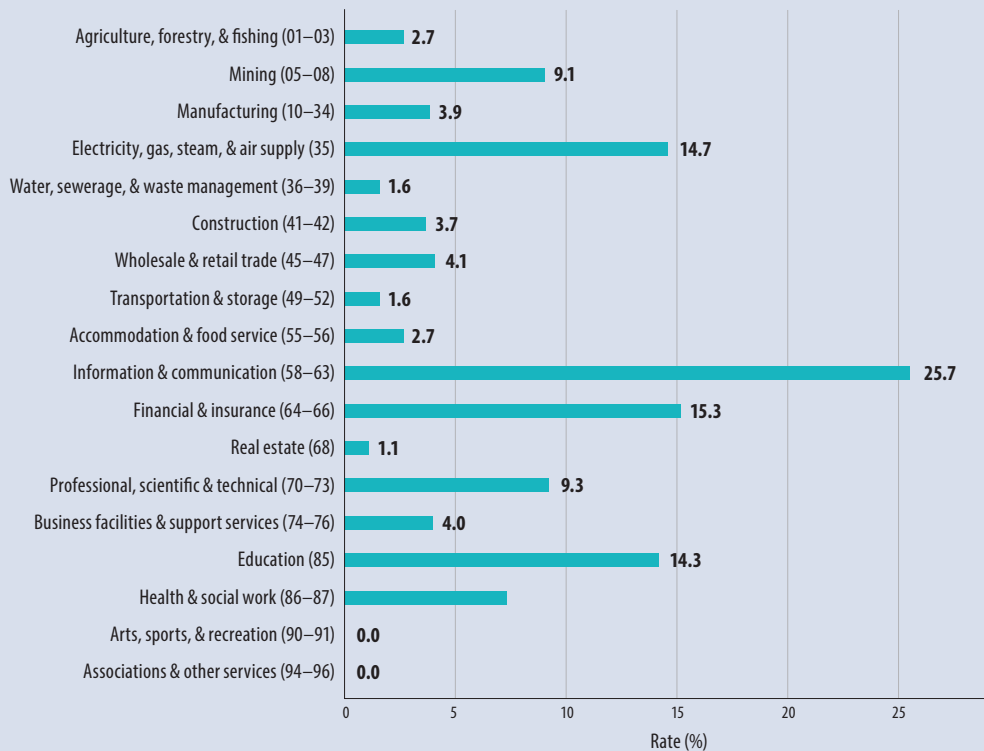
Each member economy is assessed through a common analytical framework covering five core dimensions: (i) ecosystem baseline; (ii) policy and strategy; (iii) stakeholder landscape, (iv) strategic positioning; and (v) future pathways. This structure enables consistent cross-economy comparison while allowing for context-specific insights into how AI capabilities are developed, governed, and applied in practice.

AI Ecosystem Baseline Assessment



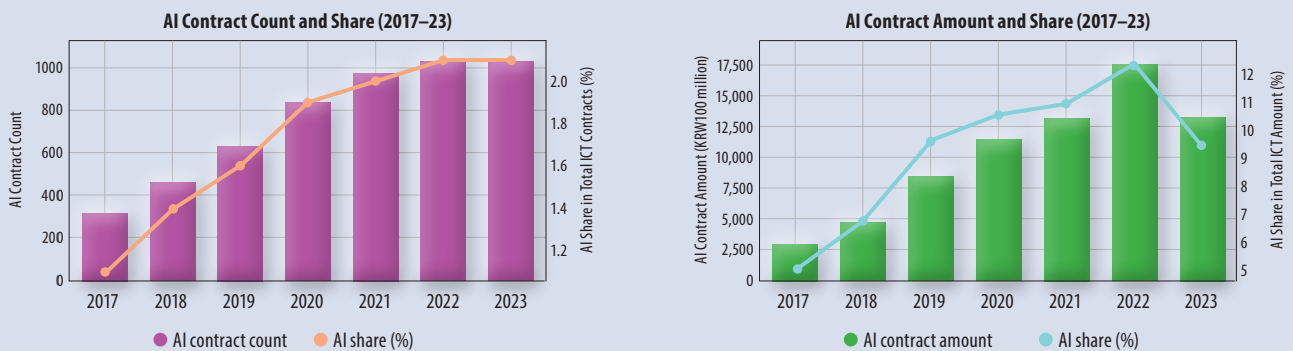
Based on the results of the regular Business Activity Survey (via the Korean Statistics Information Service, or KOSIS), the adoption of AI among Korean firms has increased steadily over time, although it remains at a relatively low level overall. As shown in Figure 7.1, only about 1.4% (174 firms) used AI in 2017. By 2023, this figure had reached 6.4% (924 firms). The 49% spike in adoption from 2022 to 2023 highlights the largest annual increase since data collection began.

Compared to other OECD countries overall, the ROK sits in the middle of the pack. Evidence from a joint 2025 report by the OECD and the Korea Labor Institute indicates that AI adoption among SMEs (defined as firms with fewer than 250 employees) in the ROK stands at 31%, which is higher than the level observed in Japan (27%) but lower than in several other OECD countries, including Austria (42%), Ireland (45%), and Germany (51%).

FIGURE 7.2**AI ADOPTION BY SECTOR, 2023**

Source: Ministry of Data and Statistics (KOSIS), (2025).

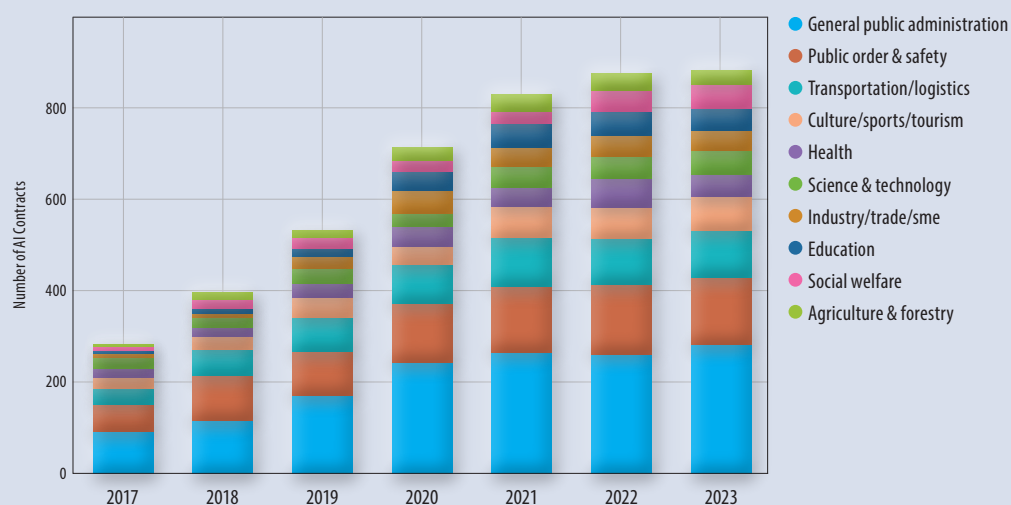
The data also show that AI adoption by Korean firms differs markedly from industry to industry. In 2023, relatively high adoption rates were observed in industries characterized by high knowledge intensity and extensive data use, based on KOSIS mid-level industrial classifications, including the sectors of information and communication (25.7%), financial and insurance activities (15.3%), electricity, gas, steam, and air conditioning supply (14.7%), and education services (14.3%). By contrast, traditional and capital-intensive industries, such as the real estate (1.1%), transportation and storage (1.6%), and water supply, sewerage, waste management, and remediation activities (1.6%) sectors, exhibited lower levels of AI adoption. Moreover, the data suggest that no firms in the arts, sports, and recreation services sectors or miscellaneous service sectors have adopted AI at the corporate level. These patterns highlight the role of industry-specific technological and data environments in shaping AI adoption.

FIGURE 7.3
PUBLIC SECTOR AI ADOPTION IN THE ROK


Source: Lim et al. (2025).

Note: Data accumulation in the Public Procurement Information Portal began in 2014. Since only partial contract information was recorded and disclosed at that time, discrepancies from actual figures may exist.

In the Korean public sector, the use of AI has expanded steadily in both scale and value over recent years. The number of AI-related contracts increased from 325 cases in 2017 to 1,033 cases in 2023, more than tripling over the six-year period. During this time, the total value of government-related AI contracts grew from KRW296.8 billion (~USD200 million) to KRW1.3279 trillion (~USD896 million). This represents a 450% jump, indicating a sustained expansion of AI adoption in public sector projects. In addition, the share of AI-related contracts among all IT service contracts showed a clear upward trend. In terms of the number of contracts, the share rose from 1.1% in 2017 to 2.1% in 2023 while the value-based share peaked at 12.31% in 2022 before declining to 9.42% in 2023, reflecting a temporary slowdown in total AI contract value in that year.

FIGURE 7.4
AI ADOPTION BY FIELD, PUBLIC SECTOR TOP 10, 2017–23


Source: Lim et al. (2025).

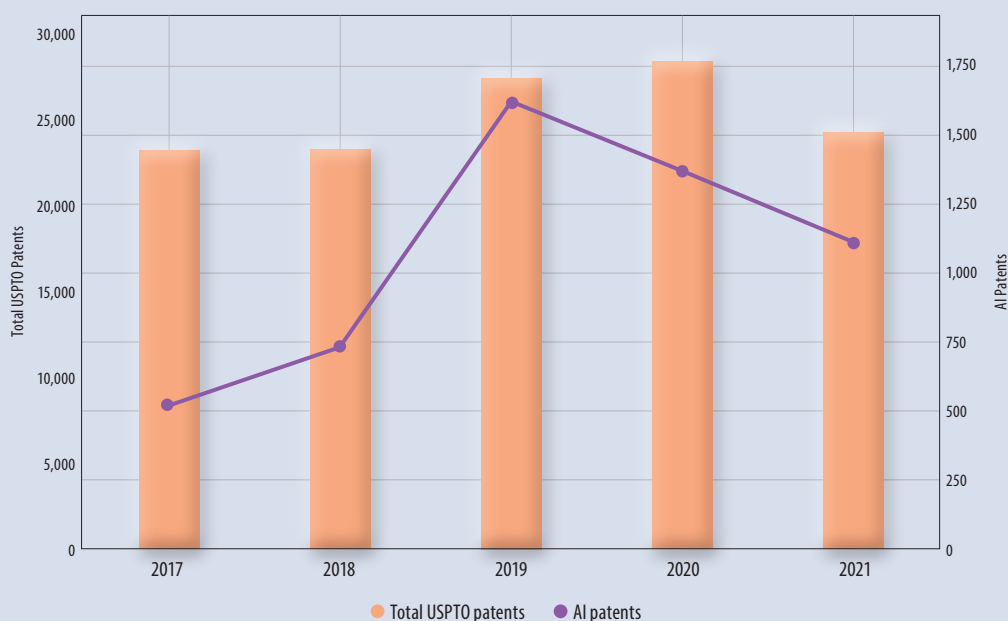
By field, AI adoption in the public sector was most pronounced in public administration, which accounted for the largest share and exhibited continuous growth over the period. Reflecting rising demand for system development related to e-government services and civil administration platforms, the number of AI-related contracts in this field increased from 89 cases in 2017 to 279 cases in 2023, representing a 300% rise. The public safety sector also expanded significantly, with contracts increasing from 62 to 148 over the same period, driven largely by growing demand for AI-based crime prevention and disaster response systems. In addition, the transportation and logistics sector emerged as another major area of AI adoption, with the number of contracts rising from 32 in 2017 to 103 in 2023, primarily due to the expansion of intelligent transport network projects.

AI Research and Development (R&D) and Investment in the ROK

This section examines trends in the ROK's AI-related technological and research outputs, focusing on patent applications and academic publications.

FIGURE 7.5

US PATENT AND TRADEMARK OFFICE PATENT FILINGS BY ROK, 2017–21

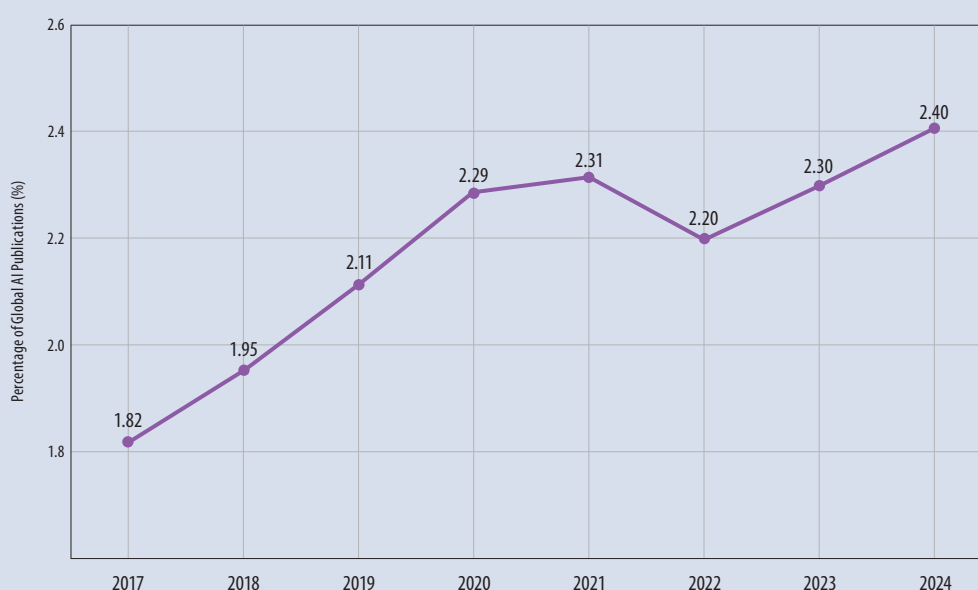


Source: Organisation for Economic Co-operation and Development [OECD] Data Explorer (2024c).

The ROK's AI patent applications increased until 2019 and then declined in 2020 and 2021, peaking earlier than overall patent filings. Specifically, AI patent applications rose from 517 cases in 2017 to 1,617 in 2019, before showing a moderate decline in the following two years. Over the same period, overall patent applications continued to rise until 2020 but turned downward in 2021. In comparison with other major countries, Japan experienced a similar downward trend, with filings decreasing from 2,308 cases in 2019 to 1,354 in 2021, whereas India maintained steady growth, increasing from 568 to 1,398 cases.

FIGURE 7.6

ROK'S SHARE OF AI-RELATED ACADEMIC PUBLICATIONS, 2017–24



Source: OECD.AI (2025a).

Note 1: The Korean share is calculated based on fractional counts, reflecting co-authorship weights.

Note 2: The OpenAlex dataset provides a comprehensive open-source bibliographic database of scholarly publications. AI-related papers are identified as those tagged under the research categories "Artificial Intelligence" or "Machine Learning."

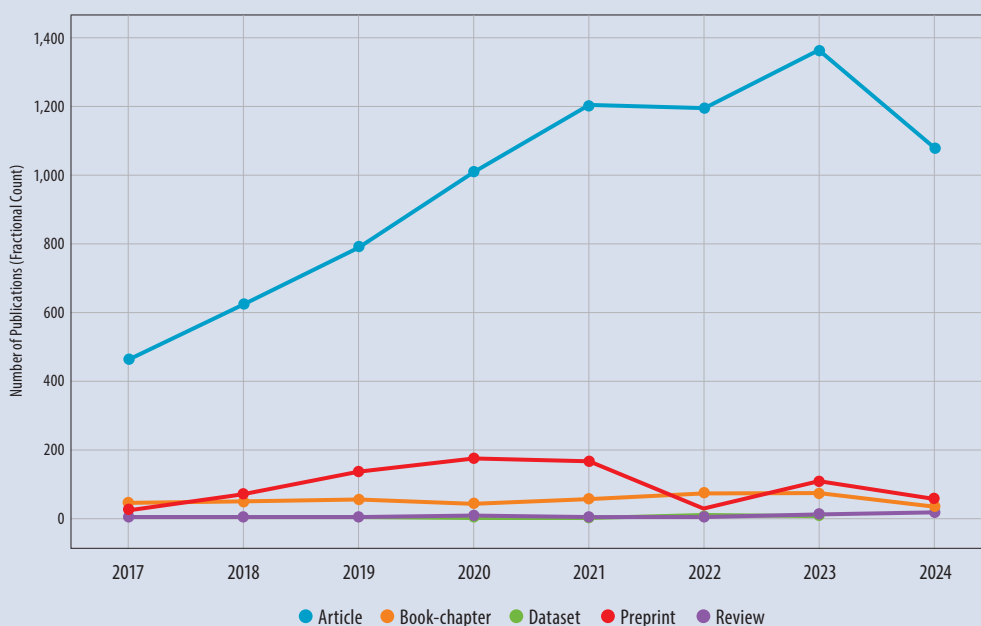
Note 3: Research outputs from related domains such as Natural Language Processing, Speech Recognition, and Computer Vision are included only when classified within "Artificial Intelligence" or "Machine Learning."

The number of AI-related academic papers published by Koreans or Korean institutions has increased consistently since 2017. The ROK's share of all published AI papers was 1.8% in 2017; by 2024, this figure had jumped to 2.4%. However, this is a modest percentage compared to the world's AI research leaders. Korean research teams are publishing more and more AI research papers every year, but the country's AI research output remains limited in terms of international visibility and reach.

By publication type, journal articles account for most Korean AI-related research output. By volume, research peaked at 1,365 papers in 2023, after which the number of annual papers published showed a decline. The country continues to publish a relatively large number of AI papers every year. The number of AI-related preprints increased sharply after 2017, reaching 177 papers in 2020, but preprint volume has fluctuated in subsequent years. The number of reviews and surveys published by Koreans and Korean institutions remains limited in absolute terms, but has grown over time. Other types of publications, including datasets and book chapters, are marginal contributors to the country's overall research output.

FIGURE 7.7

AI PUBLICATIONS BY TYPE IN THE ROK, 2017–24



Source: OECD.AI (2025a).

Note 1: The fractional count represents publication weights adjusted by the number of coauthors.

Note 2: The dataset used is OpenAlex, obtained from OECD (2025a).

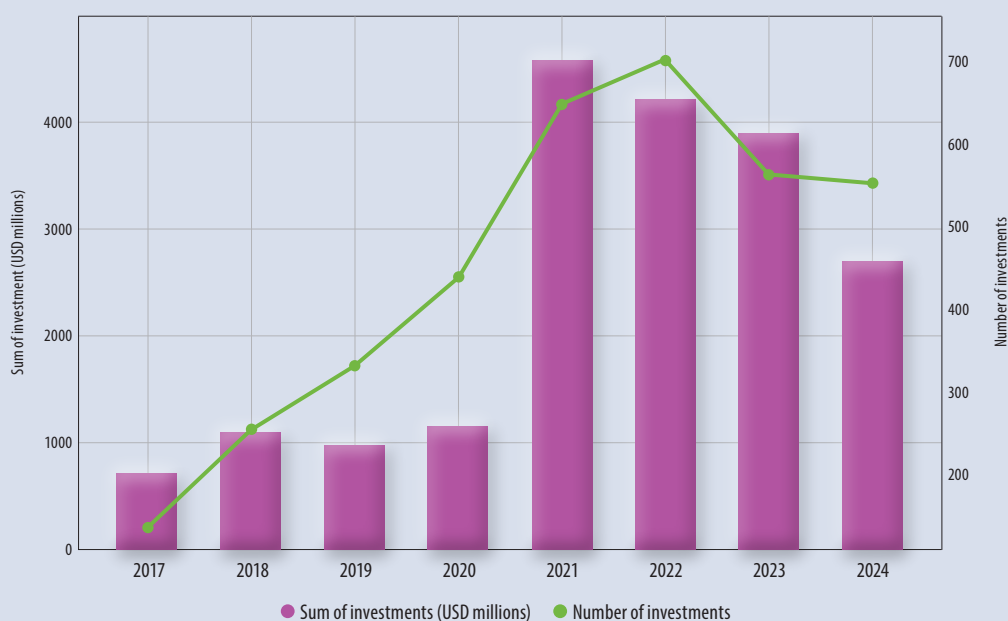
Investment Trends in the ROK's AI Industry

This section reviews recent trends in private and public investment in Korea's AI industry, drawing primarily on venture capital data from OECD.AI and government R&D investment statistics from Park and Ma (2025).

Venture capital investment in the ROK's AI industry increased steadily after 2017, reaching a peak of USD4.58 billion across 647 deals in 2021 before declining to USD4.23 billion in 2022, USD3.90 billion in 2023, and an estimated USD2.69 billion across 553 deals in 2024. The number of investment deals also decreased over the same period, falling from 703 in 2022 to 553 in 2024. This trajectory mirrors the global AI investment cycle, in which venture capital investment peaked in 2021 and subsequently entered a correction phase. Despite this global downturn, the United States of America (US) and PR China continue to sustain high levels of AI investment, reaching tens and even hundreds of billions of dollars annually. Even at its peak, annual AI investment in the ROK remained below USD5 billion. This highlights a substantial gap in investment scale relative to leading AI economies.

FIGURE 7.8

ROK AI VENTURE CAPITAL INVESTMENT, 2017–24

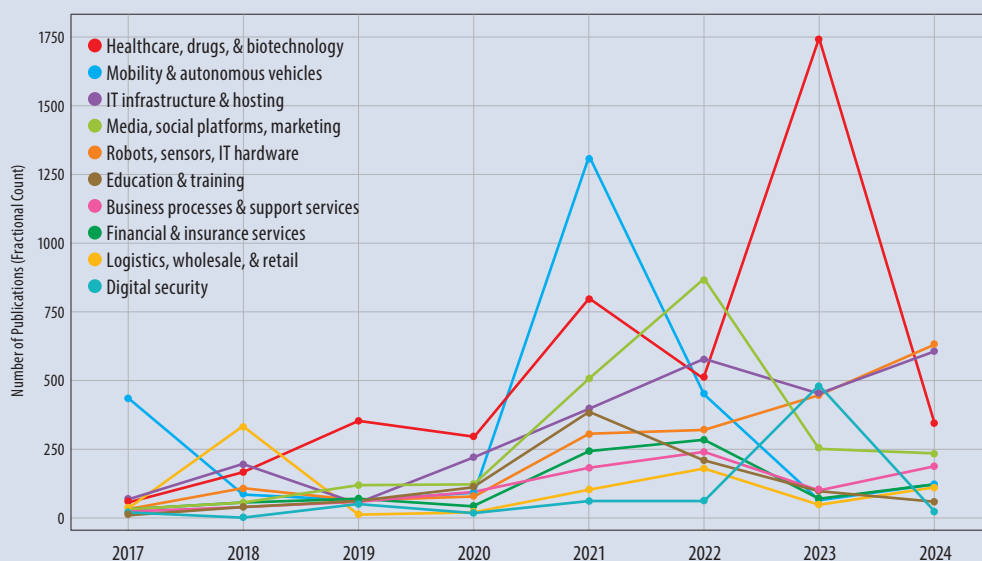


Source: OECD.AI.

Note: OECD.AI quantifies AI investment using Preqin data, which refer to financial investments made by global venture capital firms in AI and data-related startups.

FIGURE 7.9

ROK AI VENTURE CAPITAL INVESTMENT TREND BY INDUSTRY, 2017–24



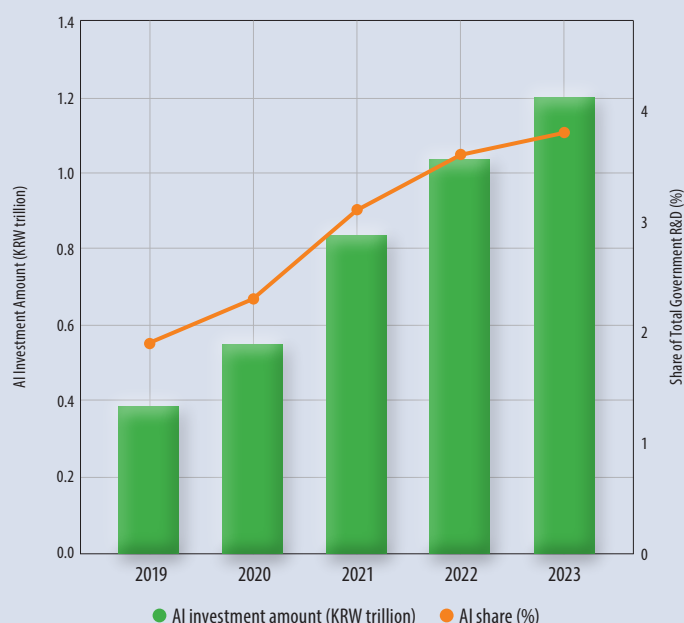
Source: OECD.AI (2025b).

Note: Preqin data obtained from OECD.AI is used for the venture capital investment trend.

By industry, the ROK's AI-related venture capital investment has been highly concentrated in a limited number of sectors. Based on cumulative investment from 2017 to 2024, the Healthcare and Biotechnology industry attracted the lion's share of investment, with inflows of USD4.26 billion. It was followed by the Mobility and Autonomous Driving (USD2.60 billion), IT Infrastructure and Hosting (USD2.56 billion), Media, Social Platforms, and Marketing (USD2.18 billion), and Robotics, Sensors, and IT Hardware (USD1.97 billion) industries. In annual terms, the healthcare sector recorded the highest AI-related investment in the ROK, with an injection of USD1.74 billion in 2023. Investment in the mobility and autonomous driving sector peaked in 2021 but has declined since.

FIGURE 7.10

KOREAN GOVERNMENT AI R&D INVESTMENT, 2019–23



Source: Park & Ma (2025).

Note 1: The AI investment share represents the ratio of AI-related R&D investment to total government R&D expenditure. Government R&D totals for 2019–22 are based on executed amounts from the Annual Report on National R&D Projects while the 2023 figure is based on the 2023 Government R&D Budget Analysis Report (KISTEP).

Note 2: Illustration by the authors.

Government investment in AI-related R&D has expanded steadily over the past five years, increasing from approximately KRW386.2 billion (~USD262 million) in 2019 to KRW1.1927 trillion (~USD805 million) in 2023, representing a 3.1-fold rise. The share of AI spending as a percentage of total government R&D expenditure also increased from 1.9% to 3.8%, roughly doubling, although it remains below 5%. In terms of investment structure, the Ministry of Science and ICT (MSIT) accounts for more than half of total AI R&D funding, followed by the Ministry of Trade, Industry and Resources (MOTIR) and the Ministry of SMEs and Startups (MSS), albeit with substantial differences in scale. By field, investment has been heavily concentrated in what the government refers to as “Efficient Learning and AI Infrastructure Advancement,” which accounts for over 65% of total funding. Government R&D projects dealing with industrial applications and field-oriented innovation remain relatively limited.

Overall, the ROK has experienced broad-based growth in AI adoption, research activity, and investment in recent years, and the number of workers specializing in AI has also increased. However, developments

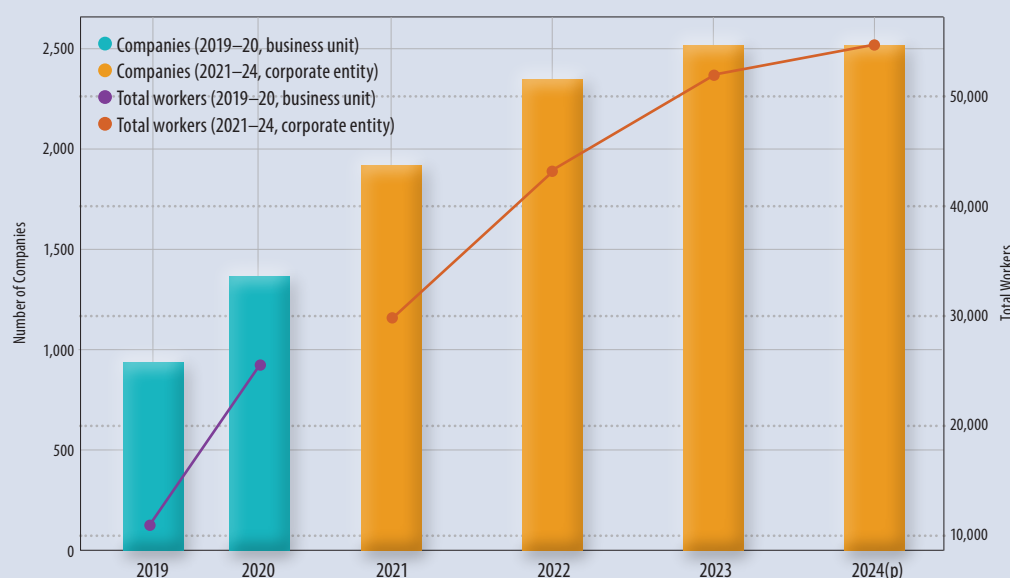
across these dimensions differ in scale and structure across industries, sectors, and stages of the AI ecosystem.

AI Workforce in the ROK

This section provides an overview of the AI workforce in the ROK, drawing on data from the Artificial Intelligence Industry Status Survey (KOSIS)¹ to examine trends in employment, firm participation, and workforce composition.

FIGURE 7.11

AI WORKFORCE IN THE ROK, 2019–24



Source: Bong et al. (2025).

Note: The data represent the entire survey population. Since 2021, the survey unit has changed from “establishment” to “enterprise,” making direct time-series comparisons with pre-2021 data inappropriate.

Employment in the ROK’s AI sector has increased rapidly in recent years. The total AI workforce grew from approximately 11,000 employees across 929 firms in 2019 to 25,000 employees across 1,365 firms in 2020, representing a sharp increase within a single year. Growth continued after the survey unit was revised to enterprises (from establishments) in 2021, with the number of employees reaching 51,000 across 2,517 firms in 2023 and further increasing to 54,000 in 2024. Over the same period, the number of AI-related firms expanded substantially while the average number of employees per firm rose from 12 in 2019 to 21.5 in 2024, suggesting broader industrial participation alongside an increase in average firm size. However, caution is required when interpreting time-series trends due to the change in survey unit after 2021.

¹ The dataset is available only in Korean on KOSIS (인공지능산업실태조사); no official English version exists. English translation by the author.

TABLE 7.1

STATUS OF WORKERS IN AI-RELATED OCCUPATIONS, 2024

Category		Total	By Educational Attainment (Degree)				By Years of Experience (Years)			
			Associate	Bachelor	Master	PhD	Less than 3	3–7	7–10	10 or more
Total		54,039	2,476	36,358	11,380	3,825	15,509	22,743	9,690	6,098
Primary Business Area	AI SW	37,840	1,477	25,000	8,557	2,806	10,988	15,613	6,749	4,490
	AI Service	14,432	858	10,079	2,557	938	3,969	6,355	2,631	1,478
	AI HW	1,767	141	1,279	266	81	552	775	310	130
Firm Size (Number of Employees)	1,000 or more	15,948	783	9,075	4,510	1,579	4,760	5,861	3,002	2,325
	100–999	16,578	750	11,884	2,876	1,068	4,845	7,039	2,981	1,713
	10–99	17,855	808	12,821	3,279	947	4,962	8,110	3,118	1,665
	Fewer than 10	3,658	135	2,578	715	230	941	1,733	589	395
Revenue (KRW billion)	100 or more	18,983	938	11,179	5,053	1,813	5,606	7,196	3,549	2,633
	10–100	13,251	610	9,561	2,299	782	3,771	5,702	2,393	1,385
	1–10	14,289	676	10,324	2,521	768	4,086	6,292	2,494	1,417
	0.1–1	5,371	208	3,812	1,044	308	1,521	2,462	900	488
	Less than 0.1	2,145	44	1,482	464	154	526	1,091	354	175

Source: Bong et al. (2025).

Note: Unit in persons

Building on the growth in AI employment, workforce data in related occupations reveal several notable characteristics. As of 2024, total number of employees in AI-related jobs stood at 54,000, with bachelor's degree holders accounting for the largest share at 67%, followed by those with master's degrees (21.1%), Ph.Ds (7.1%), and associate degrees (4.6%). In terms of work experience, employees with three to seven years of experience (42.1%) and less than three years' experience (28.7%) constituted the majority of workers in the field, indicating that the AI workforce is largely composed of workers in the early stages of their careers. By firm size, employment is concentrated in firms with 10–99 employees (33%) and 100–999 employees (30.7%) while firms with annual revenues exceeding KRW100 billion accounted for the largest share of employment at 35.1%, followed by firms with revenues between KRW1 billion and KRW10 billion (26.4%).

National AI Policies and Strategies

National AI Strategy of the ROK

The ROK first promulgated a National Strategy for Artificial Intelligence in 2019. In the years since, it has sought to employ various policy instruments to promote the diffusion and adoption of AI. Many policies have been formulated and implemented through coordinated, whole-of-government efforts involving multiple ministries. In September 2025, a Presidential Decree established the National AI Strategy Committee, a top-level consultative body under the Office of the President. The committee has a mandate to deliberate on and approve major AI-related policies (Ministry of Science and ICT [MSIT], 2025e).

In the government budget proposal for the following year, total public expenditure on AI amounted to approximately KRW10 trillion (~USD6.75 billion), including around KRW4.5 trillion (~USD3.1 billion) allocated to what the government defined as “AI-driven economic and societal transformation” and

KRW640 billion (~USD431 million) dedicated to science and technology R&D innovation (MSIT, 2025d). The following section provides an overview of the ROK's key AI-related policy initiatives.

TABLE 7.2

ROK'S AI POLICY MATRIX

Policy	Year	Primary Goal	Key Areas/ Initiatives	Executive Authority
National Strategy for AI	2019	Establish a globally competitive AI ecosystem	• AI chips • Public services • AI talent • R&D hubs	MSIT, MOTIR, MSS, MOEF, other ministries
AI-Digital Innovation Growth Strategy	April 2024	Build a world-class AI ecosystem by capturing the momentum of generative AI	• AI chips • AI talent • AI-native infrastructure • Targeted AI • Public services	MSIT, MOTIR, MSS, MOEF, other ministries
National AI Strategy Policy Directions	September 2024	Strengthen the AI ecosystem	• Start-ups and AI workers • Technology and infrastructure innovation • Inclusiveness and fairness • Global leadership	MSIT, National AI Strategy Committee (under Office of the President)
AI Basic Act	January 2025 (Promulgation), effective from January 2026	Improve quality of life and enhance national competitiveness	• National AI policy governance • AI industry development and support • Safety and trust in AI	MSIT, National Assembly
Strengthen National AI Capabilities through AI Computing Infrastructure Expansion	February 2025	• Expansion of AI computing infrastructure • Develop next generation AI models • Accelerate AI adoption	• Master plan on National AI computing infrastructure • Private AI investment • Support for the AI chip industry • AI model R&D • AI talent	MSIT, National AI Strategy Committee
AX flagship projects under the New Government's Economic Growth Strategy	August 2025	Become one of the world's top 3 AI powers and a global leader in Physical AI	• Physical AI • Public services • AI workers • Infrastructure & data openness	MOEF, MOTIR, MSS, MSIT, other ministries
ROK AI Action Plan - Policy Directions	September 2025	Leapfrog competitors to rank among the world's top three AI powers	• AI innovation • Nationwide AI transformation • Fostering an AI-native society	MSIT, National AI Strategy Committee
AI for All Initiative	November 2025	• Promote AI education for all ages • Foster universal AI literacy • Create a multitiered talent pipeline	• Tailored AI education • Higher education • Lifelong vocational training	MOE

Source: Government policy documents.

In 2019, the ROK announced its vision to transform from an IT leader to an AI powerhouse by 2030. This strategy focuses on three pillars: (i) building a world-class AI ecosystem; (ii) promoting AI utilization across all industries; and (iii) establishing a human-centered AI framework to address social challenges, including aging population. Key measures include large-scale R&D in AI semiconductors and the establishment of specialized AI graduate schools (Joint Ministerial Release, 2019).

AI Policies of the ROK

AI-Digital Innovation Growth Strategy

The AI-Digital Innovation Growth Strategy aims to accelerate what the government terms the “AI Transformation (AX)” across industries and in the daily lives of citizens. It prioritizes high-impact generative AI projects, on-device AI technology, and the development of AI-native networks. The government also pledged to integrate AI into manufacturing and services while fostering a safe digital environment for all citizens (Joint Ministerial Release, 2024a).

National AI Strategy Policy Directions

Launched alongside the National AI Committee, the National AI Strategy Policy Directions aim to position the ROK as a global top-three player (G3) in AI. It outlines four flagship projects: (i) expanding AI computing infrastructure (securing 15x more GPU resources by 2030); (ii) incentivizing private investment through tax credits; (iii) nationwide AX adoption (especially in finance and biotech); and (iv) ensuring AI safety through the newly established AI Safety Institute (Joint Ministerial Release, 2024b).

AI Basic Act

The AI Basic Act, which came into effect in January 2026, provides the legal foundation for the ROK’s AI governance. It codifies the National AI Committee’s role and the AI Safety Institute’s mandate. The act balances industry promotion (R&D support, data clusters) with safety regulations for high-risk AI, ensuring transparency and accountability while fostering innovation (MSIT, 2024c).

Strategy to Strengthen National AI Capabilities

Building on the G3 vision, the Strategy to Strengthen National AI Capabilities focuses on securing sovereign AI capabilities. It prioritizes the development of next-generation large language models (LLMs), industry–academia collaborative graduate programs, and global joint research. It also proposes a set of flagship AX projects to digitize healthcare, education, and other public services (Joint Ministerial Release, 2025a).

AX Flagship Projects and the New Government’s Economic Growth Strategy

The administration of President Lee Jae Myung is leading an initiative that focuses on physical AI: robots, autonomous vehicles, and smart manufacturing. It aims to create synergies by combining the ROK’s manufacturing capabilities with AI, ultimately helping Korean firms compete in the global industrial AI market. It includes the creation of a National AI Growth Fund to bridge the investment gap for AI start-ups (Ministry of Economy and Finance [MOEF], 2025).

ROK AI Action Plan

Guided by the core principles of “human-centered, inclusive AI” and a robust public–private partnership (PPP), the plan is structured around three primary policy pillars: (i) building an AI innovation ecosystem; (ii) driving nationwide AX; and (iii) contributing to a global AI-enabled society. Across 12 strategic domains, the government aims to facilitate substantive growth by securing critical data infrastructure, which it collectively terms as the “AI Highway.” It also aims to create a robust pipeline of AI talent and spearhead AX in industry, defense, and across society. Furthermore, by fostering an environment for home-grown AI models through regulatory innovation, the plan seeks to improve the quality of life for all citizens and fulfill the ROK’s commitments to the international community (MSIT, 2025e).

Promotion Plan for the National AI Computing Center to Build the AI Highway

The government unveiled a roadmap for the AI Highway, which refers to the high-bandwidth infrastructure needed for AI data and processing. A key component is the National AI Computing Center, established via a PPP. The main instruments of the initiative are a special-purpose company and a government “pump-priming” injection of policy funds. This early financing is intended to mitigate upfront cost and demand risks, and to mobilize private capital and expertise. The initiative aims to secure over 15,000 cutting-edge GPUs by 2028, with continued expansion toward 50,000 GPUs by 2030 for the AI Highway (MSIT, 2025e).

AI for All Initiative

In November 2025, the Ministry of Education (MOE) launched the “AI for All” human capital development. The initiative aims to lead the era of AI-driven transformation and enhance the overall AI capacity of the entire population. This aligns with the government’s broader education policy priorities, which emphasize the development of AI-native workers (Ministry of Education [MOE], 2025b).

Key Stakeholder Mapping

This section maps the ROK’s core AI stakeholders across the private sector and public sector and parastatals. The ecosystem is characterized by large enterprises that commercialize and deploy AI at scale (devices, platforms, mobility, and infrastructure), start-ups that push competition in foundation models and AI semiconductors, and a public governance and R&D backbone that coordinates policy, funds research, expands compute and data infrastructure, and develops AI rules and trust frameworks.

Private Sector

The ROK’s private sector combines platform firms, electronics and mobility manufacturers, telecommunication operators, and a fast-growing cohort of AI start-ups. Large enterprises anchor deployment (consumer devices, enterprise systems, mobility, networks, and AI data centers) while start-ups concentrate on foundation models, AI accelerators, and applied AI products. This complements AX national policy goals around adoption, alongside infrastructure and competitiveness. A 2025 EY survey found that over 82% of Korean corporate executives plan to increase AI investment within the next two years, primarily to capture operational efficiency, advanced analytics, and service innovation.

Major Players

Samsung Electronics

Samsung Electronics positions AI as a core capability across on-device AI, agentic AI (AI systems that can plan and execute tasks), and AI semiconductors, particularly high-bandwidth memory (HBM). It presented an agentic AI vision at Samsung AI Forum 2025 and linked this to AI-driven semiconductor design automation and AI-optimized manufacturing processes (Samsung Semiconductor Newsroom, 2025). Collaboration is framed around mobile AI agents with Google (Gemini) and strengthening the HBM3E/HBM4 supply chain for NVIDIA (Kwon, H., 2025).

SK Telecom

SK Telecom is shifting toward an “AI company” model centered on AI data centers (AIDCs) and telecom-specific LLMs, aiming to translate network assets into scalable AI revenue streams (Newsis, 2025). It leads the Global Telco AI Alliance (GTAA) and is described as collaborating with Lambda on AI data center infrastructure (Park, J., 2025).

NAVER

NAVER positions itself as a sovereign AI provider through its HyperCLOVA X family. It emphasized technological sovereignty at DAN25 and expanded model lineups that include lightweight (“DASH”)

and reasoning-oriented (“Think”) variants (NAVER Cloud Corp., 2025). Collaboration patterns include exporting sovereign AI infrastructure to the Middle East (including Saudi Arabia) and expanding foundation model access channels for domestic start-ups (NAVER Corp., 2025).

Kakao

Kakao’s recent focus is on multimodal AI and open-source foundation models under the Kanana line. After releasing Kanana-1.5 in July 2025, Kakao open-sourced Kanana-2 on 19 December 2025, adding a “Thinking” model to strengthen reasoning and inference capabilities (Kakao Corp, 2025a). Kakao is the first domestic firm to establish a strategic partnership with OpenAI, using this channel to advance AI service development (Kakao Corp, 2025b).

LG Electronics

LG Electronics’ positioning is “Affectionate Intelligence” through smart-home and device agents, including embodied systems integrated into its ThinQ ecosystem. Reports describe a shift from concept to demonstration at CES 2026, where LG showcased home-robot capabilities linked to ThinQ (LG Electronics, 2026). Collaboration is framed around an on-device AI partnership model, including a 2025 partnership with Qualcomm and domestic AI start-ups to strengthen AI competitiveness in media and smart-home solutions (Seong, H., 2025).

Hyundai Motor Group

Hyundai Motor emphasizes software-defined mobility, AI-enabled manufacturing, and robotics, linking investments to AI infrastructure and robotics value chains. It is currently pursuing cooperation with NVIDIA to enhance in-vehicle AI capabilities, autonomous driving, smart factories, and robotics (Jeon, M. J., 2024). A Hyundai report also describes a CES Foundry update in which Hyundai Motor and sister company Kia Motors collaborated with DeepX to develop an on-device robot AI chip for autonomous decision-making and finalized preparations for mass production (Hyundai Motor Group, 2026).

KT

KT is one of the ROK’s main telecommunications operators. KT’s framing is AICT (AI + ICT), spanning enterprise AI and infrastructure. It announced a 2025 AX strategy at MWC25, including commercialization of “Korean-style AI” and KT Secure Public Cloud (SPC), plus organizational restructuring, dedicated AX delivery centers, and strategic investment funds to accelerate adoption (KT Corporation, 2025). KT’s collaboration with Microsoft is a multibillion dollar strategic AI alliance to jointly develop a Korean sovereign cloud and AI models, positioning KT as a central platform provider for public-sector and enterprise AI (Sung, 2024).

Start-ups and SMEs

Upstage (2020)

Upstage focuses on small, high-performance LLMs and document AI, including optical character recognition (OCR). Reports suggest it has raised about KRW220 billion (~USD148 million) in total, including strategic investments from Amazon Web Services (AWS) and Advanced Micro Devices, Inc. (AMD) (Seo, 2025). It is noted that Solar Pro 2 was ranked as a “Frontier Model” by Artificial Analysis (Amazon, 2024). Collaboration centers on supplying foundation models via AWS Bedrock and delivering OCR/document automation for global finance and insurance firms (Upstage, 2025).

Rebellions

Rebellions develops neural processing units (NPUs), which are specialized AI accelerator chips. It reached a valuation over USD1 billion following a merger with Sapeon (Rebellions, 2024), with the integrated entity launching officially in December 2025 and accelerating next-generation REBEL chip development

(Rebellions, 2025). Collaboration includes building a full-stack AI platform using SK Telecom infrastructure and manufacturing with Samsung Foundry on a 4-nm process (Jang, K. H., 2024).

Wrtn

Wrtn positions itself as a business-to-consumer (B2C) AI “super app.” Reports suggest it has raised about KRW130 billion (~USD87.55 million), one of the largest funding rounds by a Korean consumer AI service start-up (Nam H. W., 2025). It has more than 6 million monthly active users (MAU) and a roadmap toward an integrated AI portal spanning search, shopping, and finance (Ryu, S., 2025). It operates a multi-LLM platform that integrates GPT-4o and HyperCLOVA (Lee, E. Y., 2023).

Twelve Labs

Twelve Labs focuses on multimodal video understanding and search. It concluded a Series A round of roughly KRW70 billion (~USD47.5 million) with participation from NVIDIA (NVentures) and New Enterprise Associates (NEA) (Park, S. E., 2024), continued advancing its Pegasus model, and was included in the Global AI 100 for four consecutive years (Twelve Labs, 2024). It is currently collaborating with NVIDIA and pursuing deployments for global over-the-top (OTT) platforms and broadcasters (Park & Lee, 2024).

FuriosaAI

FuriosaAI develops NPU chips and inference systems. It recently concluded a Series C bridge round totaling about KRW170 billion (~USD114.7 million) (Choi, 2025) and has begun mass production of its second-generation chip RNGD (Renegade), following global validation (Jang, K.Y., 2024). Collaboration includes work with LG AI Research (EXAONE) on inference servers and supply relationships for global data centers and industrial sites (Nam, H. H., 2025).

Superb AI

Superb AI focuses on vision AI and MLOps (machine learning operations, referring to tools that deploy, monitor, and manage ML systems). It has raised a total of KRW63 billion (~USD42.4million) and concluded a pre-IPO round of KRW14 billion (~USD9.5 million) in December 2025, with an IPO target in 2026 and a strategy centered on “physical AI” solutions for manufacturing and logistics automation (Superb AI, 2025). Collaboration includes supplying vision inspection solutions to Hyundai Motor Group, Doosan, and Samsung, alongside strategic investments from major manufacturers (Superb AI, 2025).

Scatter Lab

Scatter Lab specializes in affective AI and conversational agents. It received a KRW15 billion (~USD10.1 million) equity investment from SK Telecom and is developing social chatbots and emotional dialogue engines used within SK Telecom’s multi-LLM strategy (Park, J. H., 2023).

Public Sector and Parastatals

The ROK’s public sector AI system combines top-level strategy setting with operational coordination, line-ministry execution, and a parastatal layer that provides data, compute, R&D funding and evaluation, security and trust infrastructure, and governance research. The ROK’s governance model centers on a public–private framework designed to coordinate cross-ministerial priorities and accelerate implementation.

Major Players

National AI Strategy Committee

The National Artificial Intelligence Strategy Committee, chaired by the President, is the ROK’s primary AI policy body. It deliberates major AI policies, coordinates pan-ministerial strategies, and

oversees implementation and performance management through a public–private governance framework. It has four operating principles: (i) human-centered and inclusive AI; (ii) whole-of-nation mobilization through public–private collaboration; (iii) AI-native and AI-friendly systems; and (iv) balanced regional AI development. The committee’s stated direction is to support growth, broad quality-of-life improvements, and international contributions.

Office of the Senior Presidential Secretary for AI Future Planning

This office functions as a senior-level presidential secretariat. It was established on 15 June 2025, with Jung-woo Ha appointed as the inaugural officeholder in 2025. It operates as the principal coordination unit within the Presidential Secretariat for AI strategy planning, execution, coordination, and monitoring across ministries, serving as an operational bridge between the National AI Strategy Committee and line ministries.

Ministry of Science and ICT (MSIT)

MSIT is positioned as the primary coordinating and executing ministry for national AI and science and technology policy. Following a revision to the Government Organization Act in September 2025, the MSIT minister was elevated to Deputy Prime Minister status, expanding MSIT’s authority to plan, coordinate, and implement the National AI Strategy and to deliberate on and disburse R&D funding (MSIT, 2025e; MSIT, 2025f).

Ministry of Trade, Industry and Resources (MOTIR)

MOTIR is the lead ministry for manufacturing AX and regional AI deployment in industry. It places Manufacturing-AI Convergence (M.AX) at the center of industrial strategy by expanding AI factories, promoting collaborative AI models across large firms, SMEs, and start-ups, and supporting demonstration projects in industrial complexes (Ministry of Trade, Industry and Resources [MOTIR], 2025a). The “5 Growth Poles and 3 Special Growth Engines” framework is its mechanism for anchoring industrial and AI transformation regionally while upgrading exports and supporting global market entry (MOTIR, 2025b).

Ministry of SMEs and Startups (MSS)

MSS is tasked with promoting AI-based smart manufacturing among SMEs and building the manufacturing AI ecosystem. Its main strategy is the “AI-Based Smart Manufacturing Innovation 3.0 Strategy.” It details plans for the expansion of AI-driven smart factories, the development of specialized manufacturing AI firms, and regional/sectoral/supply-chain initiatives to internalize AI in SME production (Ministry of SMEs and Startups [MSS], 2025).

Ministry of Education (MOE)

MOE leads “AI for All,” combining universal AI capability development across the life cycle with multitier talent development (advanced and interdisciplinary). The ministry’s role is described as building an integrated AI education and training system spanning primary, secondary, higher, and lifelong education while strengthening regional talent hubs and industry–university collaboration (MOE, 2025).

Ministry of Culture, Sports and Tourism (MCST)

MCST supports AI-based content creation and demonstration through financial assistance and end-to-end support, including capacity-building, legal advisory, distribution, and promotion (Ministry of Culture, Sports and Tourism [MCST], 2025b). It also leads governance reform through an AI Copyright System Reform Consultative Body, addressing training data governance, data-market activation, standards for AI-generated outputs, and infringement assessment (MCST, 2025a).

Ministry of Employment and Labor (MOEL)

MOEL leads workforce-side AI adoption and vocational training reform through the “Labor Market AI Human Capital Development Initiative (AI+ Capability Up Project).” The ministry focuses on tailoring training to firm-level AX needs, expanding regional training infrastructure, and coordinating across ministries to embed AI capabilities into vocational systems (Ministry of Employment and Labor [MOEL], 2025).

Other Public and Quasi-public Institutions***National Information Society Agency (NIA)***

NIA supports national AI policy coordination and data infrastructure. It operates the Public Sector AI Transformation Support Center, providing proof-of-concept (PoC) support and consulting to more than 90 public institutions (National Information Society Agency [NIA], 2025a). It also hosted AI Hub data utilization awards in December 2025 and expanded public–industrial data openness (NIA, 2025b).

Institute for Information & Communications Technology Planning & Evaluation (IITP)

IITP plans and evaluates ICT and AI R&D and supports human capital development. It is noted for its work on next-generation AI trajectories (including agentic AI and physical AI) in preparation for AX 2.0 (Park, 2025). It cooperates the Global AI Frontier Lab in New York with NYU and manages joint AI research funding with the U.S. National Science Foundation (New York University, n.d.).

National IT Industry Promotion Agency (NIPA)

NIPA focuses on AI industry promotion and diffusion. It advances AI semiconductor utilization infrastructure (AI Farms) and supports the data center ecosystem under an “AI G3 Leap” strategy (NIPA, 2025). It hosted AI Data & Cloud Promotion Week (December 2025) and operates IT–AI cooperation hubs in the Middle East (MSIT, 2025g).

Korea Internet & Security Agency (KISA)

KISA develops AI security and trust frameworks. It conducts cyber threat response exercises addressing misuse of generative AI and supports pilot testing of AI security products and services (KISA, 2025a). It also works with telecom operators, such as SK Telecom on pseudonymized data linkage for spam prevention and participates in discussions on global security certification (PIPC, 2021).

Electronics and Telecommunications Research Institute (ETRI)

ETRI is a core national R&D institution for AI and semiconductors. It supports R&D planning and technology roadmaps for strategic technologies. It has signed an MoU with LG AI Research focused on AI data compliance and LLM R&D (Electronics and Telecommunications Research Institute [ETRI], 2025).

Korea Institute of Science and Technology Information (KISTI)

KISTI provides data and high-performance computing (HPC) infrastructure for AI research. It promotes construction of the national supercomputing system (No. 6) and work on science and technology data sovereignty (MSIT, 2025c). It hosted the Future Promising Technologies Conference 2025 and presented climate technology roadmaps based on human–AI collaboration (Park, H., 2025).

Korea Information Society Development Institute (KISDI)

KISDI conducts AI law, regulation, and governance research, including advisory work related to the AI Basic Act and AI ethics and governance (Korea Information Society Development Institute [KISDI], 2025). It hosted an AI Service User Protection Conference in 2025 with Korea Media and

Communications Commission (KCMC) and participated in international policy discussions (Korea Media and Communications Commission [KCMC], 2025).

Korea Advanced Institute of Science & Technology (KAIST)

KAIST is positioned as a key node for AI talent development and frontier research. It serves as a core operating institution of the National AI Research Hub (Gu, B., 2025) and supports an industry-linked ecosystem through AI competitions and the expansion of robotics and AI start-up pipeline (KAIST, 2025).

Potential Entry Points for APO Collaboration

The stakeholder map suggests practical entry points that align with typical APO collaboration modes: (i) public-sector AI transformation and data governance support through NIA; (ii) joint research and talent programs through IITP's international lab and joint funding channels; (iii) diffusion models for industrial AI and SME manufacturing transformation through MOTIR (M.AX) and MSS (Smart Manufacturing Innovation 3.0); (iv) security and trust frameworks through KISA; and (v) applied research and ecosystem building through KAIST, alongside targeted engagement with private-sector platforms (NAVER, Kakao, KT, SK Telecom) and semiconductor and start-up actors (Samsung, Rebellions, FuriosaAI, Upstage), depending on the collaboration theme.

TABLE 7.3

MINISTERIAL ROLES

Ministry	Strategic Role	Description
Ministry of Science and ICT (MSIT)	The government of President Lee Jae Myung elevated the head of MSIT to the level of Deputy Prime Minister. MSIT now has broad authority to oversee national AI and science & technology policy and is tasked with leading the whole-of-government AI push.	Following the revision of the Government Organization Act (September 2025), the head of MSIT now holds Deputy Prime Minister status. Under this new designation, MSIT serves as the national coordination and executing agency responsible for promoting science, technology, and AI policy. It oversees the planning, coordination, and implementation of the National AI Strategy, facilitates integrated cross-government AI policy coordination, and has the authority to deliberate on and disburse R&D funding (MSIT, 2025e; MSIT, 2025f).
Ministry of Trade, Industry and Resources (MOTIR)	Lead ministry for facilitating the AI transformation in the manufacturing sector and at the regional level. Main cornerstones: M.AX strategy and new trade strategy.	With manufacturing competitiveness as its core objective, MOTIR places Manufacturing–AI Convergence (M.AX) at the center of the ROK's national industrial strategy (MOTIR, 2025a). The ministry promotes AI transformation in industrial sites through the expansion of AI factories, collaborative AI models involving large firms, SMEs, and start-ups, and demonstration projects in industrial complexes. Through a framework called “5 Growth Poles and 3 Special Growth Engines,” it anchors industrial and AI transformation at the regional level while advancing export upgrading and global market entry (MOTIR, 2025b).
Ministry of SMEs and Startups (MSS)	Diffusion of AI-based smart manufacturing among SMEs and development of the manufacturing AI ecosystem.	MSS is tasked with implementing the “AI-Based Smart Manufacturing Innovation 3.0 Strategy” to enhance the competitiveness of SME manufacturers. By expanding AI-driven smart factories, fostering specialized manufacturing AI firms, and advancing regional, sectoral, and supply-chain specific initiatives, the ministry leads the diffusion and internalization of AI among SME manufacturers (MSS, 2025).

Ministry	Strategic Role	Description
Ministry of Education (MOE)	Expansion of AI capabilities across the life cycle (AI for All) and establishment of a multilayered AI human capital development system.	Under the “AI for All” initiative, MOE pursues two objectives: expanding universal AI education across the life cycle and cultivating multitier AI talent, including advanced and interdisciplinary professionals. The ministry develops an integrated AI education and training system spanning primary, secondary, higher, and lifelong education while strengthening regional talent hubs and industry–university collaboration (MOE, 2025).
Ministry of Culture, Sports and Tourism (MCST)	Support for AI-based content creation and demonstration, and leadership in AI copyright and training data governance reform.	MCST supports AI-based content creation and demonstration through financial assistance, including supplementary funding, and provides end-to-end support covering capacity building, legal advisory services, and distribution and promotion (MCST, 2025b). In parallel, it leads institutional reform through the AI Copyright System Reform Consultative Body, addressing governance of AI training data, activation of data markets, standards for AI-generated outputs, and infringement assessment (MCST, 2025a).
Ministry of Employment and Labor (MOEL)	Enhancing AI utilization capabilities across all stages of the labor market and reforming the vocational training system.	Under the “Labor Market AI Human Capital Development Initiative (AI+ Capability Up Project)”, MOEL enhances AI job-related capabilities across the labor market and embeds AI into the vocational training system. Through tailored training linked to firms’ AI transformation (AX), expanded regional training infrastructure, and inter-ministerial coordination, the ministry promotes an AI transformation with labor at its core (MOEL, 2025).

Source: The authors.

TABLE 7.4

SUMMARY OF KEY STAKEHOLDERS (PUBLIC SECTOR AND PARASTATALS)

Institution (Established)	Core Role	Recent AI Policy Activities & Collaboration
National Information Society Agency (NIA, 1987)	National AI policy coordination and data infrastructure	Policy: Operates the Public Sector AI Transformation Support Center, providing AI PoC and consulting support to more than 90 public institutions (NIA, 2025a). Collaboration: Hosted the AI Hub Data Utilization Best Practices Awards (December 2025) and expanded public–industrial data openness (NIA, 2025b).
Institute for Information & Communications Technology Planning & Evaluation (IITP, 2014)	ICT/AI R&D planning, evaluation, and human capital development	Policy: Outlined potential future trajectories of next-generation AI technologies (e.g. agentic AI, physical AI) in preparation for AX 2.0 (Park, 2025). Collaboration: Cooperates the Global AI Frontier Lab in New York (with NYU) and administers joint AI research funding with the U.S. NSF (New York University, n.d.).
National IT Industry Promotion Agency (NIPA, 2009)	AI industry promotion and diffusion across industry and society	Policy: Advances AI semiconductor utilization infrastructure (AI Farms) and supports the data center ecosystem under the AI G3 Leap strategy (NIPA, 2025). Collaboration: Hosted AI Data & Cloud Promotion Week (December 2025) and operates IT–AI cooperation hubs in the Middle East (MSIT, 2025g).

Institution (Established)	Core Role	Recent AI Policy Activities & Collaboration
Korea Internet & Security Agency (KISA, 2009)	AI security and trust framework development	Policy: Conducts cyber threat response exercises addressing the misuse of generative AI and supports pilot testing of AI security products and services (KISA, 2025a). Collaboration: Works with telecommunication operators (e.g., SKT) on pseudonymized data linkage for spam prevention and participates in global security certification discussions (Personal Information Protection Commission, 2021).
Electronics and Telecommunications Research Institute (ETRI, 1976)	Core R&D in AI and semiconductors	Policy: Supports R&D planning and technology roadmaps for national strategic technologies (AI, semiconductors). Collaboration: Strengthens global competitiveness through the signing of an MoU with LG AI Research to collaborate on AI data compliance and the R&D of LLMs (ETRI, 2025).
Korea Institute of Science and Technology Information (KISTI, 1962)	Data- and HPC-based AI research infrastructure	Policy: Promotes the construction of the national supercomputing system (No. 6) and works to strengthen science and technology data sovereignty (MSIT, 2025c). Collaboration: Hosted the Future Promising Technologies Conference 2025 and presented climate technology roadmaps based on human–AI collaboration (Park, H., 2025).
Korea Information Society Development Institute (KISDI, 1985)	AI law, regulation, and governance research	Policy: Conducts policy research and provides government advisory services on the AI Basic Act and AI ethics and governance (KISDI, 2025). Collaboration: Hosted the AI Service User Protection Conference (2025, with KCMC) and participated in international policy discussions (KCMC, 2025).
Korea Advanced Institute of Science & Technology (KAIST, 1971)	AI human capital development and frontier research	Policy: Serves as a core operating institution of the National AI Research Hub (Gu, B., 2025). Collaboration: Hosts industry-linked AI competitions and expands the robotics and AI start-up ecosystem (KAIST, 2025).

Source: Compiled by the authors based on multiple sources.

TABLE 7.5

SUMMARY OF KEY STAKEHOLDERS (LARGE ENTERPRISES)

Company (Founded)	Core AI Focus	Recent Activities	Key Collaboration
Samsung Electronics (1969)	On-device AI, agentic AI, AI semiconductors (HBM)	Announced its Agentic AI vision at the Samsung AI Forum 2025, accelerating AI-driven semiconductor design automation and AI-optimized manufacturing processes (Samsung Semiconductor Newsroom, 2025).	Collaborates with Google (Gemini) on mobile AI agents and strengthens HBM3E/4 supply chain for NVIDIA (Kwon, H., 2025).
SK Telecom (1984)	AI data centers (AIDC), telecom LLMs	Accelerated its transformation into an AI company, focusing on scalable AI revenue models and telecom-specific AI services (Newsis, 2025).	Leads the Global Telco AI Alliance (GTAA) and cooperates with Lambda on AI data center infrastructure (Park, J., 2025).
NAVER (1999)	Sovereign AI, HyperCLOVA X	Emphasized technological sovereignty at DAN25 and expanded lightweight (DASH) and reasoning-oriented (Think) model lineups (NAVER Cloud Corp., 2025).	Exports sovereign AI infrastructure to the Middle East (e.g., Saudi Arabia) and provides foundation model access for domestic start-ups (NAVER Corp., 2025).

Company (Founded)	Core AI Focus	Recent Activities	Key Collaboration
Kakao (2006)	Multimodal AI, open-source foundation models (Kanana)	Following the release of Kanana-1.5 (July 2025), Kakao open-sourced the next-generation model Kanana-2, on 19 December 2025. The new release significantly enhanced performance with the addition of a “Thinking” model, strengthening reasoning and inference capabilities, and positioning Kanana as one of the ROK’s most advanced lightweight open models (Kakao Corp, 2025a).	Kakao became the first domestic company to establish a strategic partnership with OpenAI, advancing the development and enhancement of AI services (Kakao Corp, 2025b).
LG Electronics (1958)	“Affectionate Intelligence,” smart home and device agents	After initially presenting CLOiD as a home-wide AI agent, LG Electronics publicly demonstrated its real-world household capabilities at CES 2026, marking the transition from a conceptual system to a physically embodied AI home robot integrated with the ThinQ ecosystem (LG Electronics, 2026).	LG Electronics has continued to promote an on-device AI collaboration model and, in 2025, partnered with Qualcomm and domestic AI start-ups to enhance competitiveness across its media and smart home AI solutions (Seong, H., 2025).
Hyundai Motor Group (1967)	Software-defined mobility and manufacturing	Hyundai Motor Group is focusing its AI and robotics investments on building advanced value chains centered on AI infrastructure and AI-enabled robotics while strengthening cooperation with NVIDIA to enhance AI capabilities in vehicles, autonomous driving, smart factories, and robotics (Jeon, M. J., 2024).	Hyundai Motor Company and Kia announced at CES Foundry that, through collaboration with DeepX, they have completed the development of an on-device robot AI chip that enables robots to make autonomous decisions, and have finalized preparations for mass production (Hyundai Motor Group, 2026).
KT (1981)	AICT (AI + ICT), enterprise and infrastructure AI	KT announced its 2025 AX (Artificial Transformation) strategy at MWC25, positioning itself as a leading accelerator of the ROK’s AX transition. The company plans to commercialize its “Korean-style AI” and KT Secure Public Cloud (SPC) in the second quarter of 2025 while expanding AX adoption across industries through strengthened collaboration with Microsoft, organizational restructuring, dedicated AX delivery centers, and strategic investment funds (KT Corporation, 2025).	Beyond a conventional partnership, KT and Microsoft formalized a multibillion dollar strategic AI alliance to jointly develop Korean sovereign cloud and AI models. This alliance positions KT as a central platform provider for public-sector and enterprise AI in the ROK (Sung, 2024).

Source: Compiled by the authors based on multiple sources.

TABLE 7.6

SUMMARY OF KEY STAKEHOLDERS (SMES AND START-UPS)

Company (Founded)	Core AI Focus	Recent Activities	Key Collaboration
Upstage (2020)	Small, high-performance LLMs	Investment: Raised approximately KRW220 billion (~USD150 million) cumulatively, including strategic investments from AWS and AMD (Seo, 2025). Activity: Released Solar Pro 2, ranked as a Frontier Model by Artificial Analysis (Amazon, 2024).	Supplies foundation models via AWS Bedrock; leading OCR and document automation solutions for global finance and insurance firms (Upstage, 2025).
Rebellions (2020)	AI semiconductors (NPU)	Investment: Achieved unicorn status (valuation > KRW1.3 trillion/~USD883 million) following merger with Sapeon (Rebellions, 2024). Activity: Official launch of the integrated entity in December 2025; accelerated development of next-generation REBEL chips (Rebellions, 2025).	Builds a full-stack AI platform with SK Telecom infrastructure; collaborates with Samsung Foundry on 4-nm process manufacturing (Jang, K. H., 2024).
Wrtn (2021)	B2C AI super-app	Investment: Raised approximately KRW130 billion (~USD88.2 million), the largest funding round among Korean consumer AI service start-ups (Nam, H. W., 2025). Activity: Surpassed 6 million MAU; announced evolution toward an integrated AI portal combining search, shopping, and finance (Ryu, S., 2025).	Operates a multi-LLM platform integrating GPT-4o and HyperCLOVA together (Lee, E. Y., 2023).
Twelve Labs (2021)	Multimodal video understanding	Investment: Raised ~KRW70 billion (~USD47.5 million) in a Series A round, with participation from NVIDIA (NVentures) and NEA (Park, S. E., 2024). Activity: Advanced its Pegasus video search model; ranked in Global AI 100 for four consecutive years (Twelve Labs, 2024).	Technical collaboration with NVIDIA; provides video archive search solutions for global OTT platforms and broadcasters (Park & Lee, 2024).
FuriosaAI (2017)	AI semiconductors (NPU)	Investment: Completed the final closing of a Series C bridge round totaling approximately KRW170 billion (~USD115.5 million) (Choi, 2025). Activity: Mass production and global performance validation of second-generation chip RNGD (Renegade) (Jang, K, Y., 2024).	Collaborates with LG AI Research (EXAONE) on inference servers; supplies global data centers and industrial sites (Nam, H. H., 2025).
Superb AI (2018)	Vision AI, MLOps	Investment: Raised KRW63 billion (~USD43 million) cumulatively; completed Pre-IPO round (KRW14 billion/~USD9.5 million) in December 2025. Activity: Targets IPO in 2026; leads physical AI solutions for manufacturing and logistics automation.	Supplies vision inspection solutions to Hyundai Motor Group, Doosan, Samsung; strategic investments from major manufacturers (Superb AI, 2025).

Company (Founded)	Core AI Focus	Recent Activities	Key Collaboration
Scatter Lab (2011)	Affective AI and conversational agents	Investment: Secured KRW15 billion (~USD10.1 million) equity investment from SK Telecom. Activity: Advanced social chatbots (Iruda, Gangdaon); supplies emotional dialogue engines to A. (SKT).	Core partner in emotional intelligence within multi-LLM strategies of SKT (Park, J. H., 2023).

Source: Compiled by the authors based on multiple sources.

Strategic Positioning and Recommendations

This section presents the results of a SWOT analysis of the ROK's AI ecosystem and the implications for the country's overall strategic positioning in the AI landscape.

SWOT Analysis

Strengths

i) High adoption rate of emerging digital technologies by firms and a robust software ecosystem

According to the OECD Digital Economy Outlook 2024, Korean firms lead globally in the adoption of new technologies, including the IoT, data analytics, and AI. The ROK ranked first in IoT (53%), big data analytics (40%), and AI technology (28%) adoption, and fifth in cloud computing (70%). The ROK has developed a robust AI software ecosystem, including multiple proprietary generative AI models. It also ranks among the top tier in terms of high-quality broadband connectivity (MSIT, 2024b; OECD, 2024a).

ii) Launch of national AI computing infrastructure

In 2021, the ROK government introduced an AI promotion plan designed to facilitate the adoption of AI across the country. The strategy promotes the establishment of an AI-focused innovation hub in the southwestern city of Gwangju, alongside other region-specific projects designed to leverage local industrial strengths and comparative advantages nationwide (MSIT, 2021).

In addition, the MSIT has announced plans to establish a national AI computing center with a capacity of 2 exaflops by 2030, supported by a total investment of KRW2 trillion (~USD1.4 billion), to improve access to high-performance computing resources for start-ups and SMEs (MSIT, 2024c).

iii) Global supply capacity in AI chips

The ROK also possesses world-class capabilities in AI semiconductor memory and fabrication. Analysis by the Center for Security and Emerging Technology (CSET) identifies the ROK as one of a small number of countries capable of producing advanced semiconductors essential for AI development, with Samsung Electronics and SK Hynix playing a pivotal role in global AI supply chains through high-bandwidth memory and foundry manufacturing (McFaul et al., 2023).

iv) Rapid growth in AI investment

According to McFaul et al. (2023), investment in Korean AI firms has increased in almost every year since 2014. As shown earlier in this report, venture capital investment in the ROK's AI industry has increased since 2017, reaching approximately USD4.58 billion in 2021.

v) Strong competitiveness in AI-related patents

The ROK ranks third globally in both AI patent applications and granted AI patents between 2010 and 2021. Inventors in the ROK filed 24,178 AI patent applications during this period. Most patents are related to machine learning (77%), followed by computer vision, personal devices, and computing. Although major conglomerates account for a substantial portion of AI-related patents, research-oriented institutions also represent important contributors to AI patenting, both of which are integral to the ROK's broader AI innovation ecosystem (McFaul et al., 2023).

vi) Coherent national strategy and governance framework

Since the establishment of the National AI Strategy in 2019, the ROK has strengthened its AI governance framework, culminating in the passage of the AI Basic Act, which came into effect in January 2026. This law codifies AI reliability and trustworthiness, transparency, explainability, and safety (Joint Ministerial Release, 2019; MSIT, 2024b).

vii) Highly educated workforce of digital natives

The ROK's high level of educational attainment is a significant strength in the adoption and effective use of AI. Among young adults aged 25–34 in the ROK, 70.6% have a bachelor's degree or higher, the highest among OECD countries (MOE, 2025a). Combined with publicly funded programs, such as K-Digital Training, this strong educational foundation has expanded the supply of highly skilled AI and digital talent and is expected to further accelerate the growth of the AI ecosystem. In addition, as discussed in the first section of this report, the country's AI workforce has continued to grow.

Weaknesses**i) SMEs lack access to capital**

AI investment and capabilities are concentrated among large firms, meaning that a substantial share of AI patents is filed by major Korean conglomerates. AI innovation is dominated by the big players, with SMEs playing a marginal role. SMEs and start-ups also face barriers to accessing information and adopting technology, which contributes to the AI gap. This gap impedes the pace of a broader industrial AI transformation (McFaul et al., 2023).

ii) Lack of large-scale compute infrastructure

Furthermore, access to large-scale computing resources remains insufficient. Although multiple R&D policies are being implemented to localize the production of AI semiconductors and develop AI models, firms and public sector players still rely overwhelmingly on foreign providers of core infrastructure, such as GPUs and cloud services, with domestic firms playing a limited role.

iii) Population aging and brain drain

The ROK's population is rapidly aging, driven by persistently low fertility rates. This may have adverse long-term effects on the supply of AI talent and the country's capacity for technological innovation (OECD, 2024b). In a report on AI use and the labor market, the OECD emphasizes the need for better alignment of labor market institutions and training systems in the ROK with the pace of technological change (OECD & Korea Labor Institute [KLI], 2025).

The country has also experienced significant outflows of talent to work abroad. The government has sought to respond by implementing policies to develop high-level talent, retain it domestically, and attract or re-attract experts from abroad.

Opportunities

i) The rapid expansion of the global generative AI market

The global generative AI market is expanding rapidly, driven by increasing demand for LLMs and multimodal models (BCC Research, 2025). In response, the government has announced plans to form and support a National AI Team and to provide a comprehensive package of GPU resources, data, and research funding to develop world-class LLMs (MOEF, 2025).

ii) Large-scale government investment plans

The AI-related budget for 2026 amounts to KRW9.9 trillion (~USD6.7 billion) and represents an increase of more than threefold compared to the previous year. Of this total, newly launched initiatives account for approximately 47.7% of all AI-related programs (National AI Strategy Committee, 2025).

iii) Leveraging AI chip demand for industrial and on-device AI

As demand for AI chips expands, the ROK has growing opportunities to leverage its strengths in advanced memory and semiconductor manufacturing for AI applications. One major opportunity is the spread of industrial AI, where there is potential for Korean firms to secure a leading position in next-generation technologies, such as on-device semiconductors and vertical AI (Ji, 2025). These developments create strategic opportunities for the ROK to expand its presence in the global market.

iv) Global leader in AI ethics

At the global level, the ROK has taken a leading role in establishing norms by enacting the AI Basic Act, the second major piece of legislation to do so after the EU's similar law (MSIT, 2024b). This positions the ROK to play a more active role in shaping international initiatives.

Threats

i) In the race but still behind

As the US and PR China take the lead in developing large AI platforms and hyperscale models, the ROK risks losing market competitiveness. The US has announced a strategy to accelerate AI innovation, build the necessary infrastructure, and lead in international AI security. PR China has likewise introduced its AI Plus strategy to drive AI adoption across industries and accelerate global AI innovation while also launching the AI Global Governance Initiative (Jang, 2025; Jie, 2025).

ii) Global trade uncertainties

Growing uncertainty in the global trade environment, driven by protectionism and escalating trade disputes, poses a significant challenge to the ROK's AI sector. These dynamics affect not only hardware-dependent supply chains but also digital value chains, heightening cybersecurity risks and undermining the stability of international AI collaboration and deployment (World Economic Forum [WEF], 2025).

iii) Risks to privacy, security, and the labor market

In addition, risks related to privacy protection, algorithmic bias, labor market polarization, and ethical responsibility arising from the spread of AI adoption are becoming increasingly significant. This underscores the need for the ROK to align AI policies with existing legal and ethical frameworks (OECD & KLI, 2025).

Summary

The SWOT analysis indicates a technologically advanced and policy-active AI ecosystem, with high firm-level adoption of digital technologies, a robust domestic software base, globally significant semiconductor supply capacity, and strong patent competitiveness (McFaul et al., 2023; MSIT, 2024b; OECD, 2024a). Strategic momentum is reinforced by a coherent governance framework, including the AI Basic Act in effect as of January 2026, and major public plans to expand national AI compute capacity and scale investment, including the planned 2-exaflop national AI computing center by 2030 and a KRW9.9 trillion (~USD6.7 billion) AI-related budget for 2026 (Joint Ministerial Release, 2019; MSIT, 2024c; National AI Strategy Committee, 2025). At the same time, constraints persist in SME access to capital, insufficient domestic large-scale compute, and demographic pressures that may weaken talent supply over the longer term (McFaul et al., 2023; OECD, 2024b; OECD & KLI, 2025). Externally, rapid global growth in generative AI and expanding AI chip demand create opportunities for the ROK to extend strengths in LLM development, industrial AI, and on-device and vertical AI while its early norm-setting role through the AI Basic Act supports ambitions in AI ethics leadership (BCC Research, 2025; Ji, 2025; MOEF, 2025; MSIT, 2024b). The principal risks arise from intensifying platform competition led by the US and PR China, heightened trade uncertainty affecting both hardware and digital value chains, and mounting privacy, security, and labor-market challenges associated with AI diffusion (Jang, 2025; Jie, 2025; OECD & KLI, 2025; WEF, 2025).

TABLE 7.7

SWOT MATRIX: ROK

Strengths	Weaknesses
- Robust IT ecosystem (MSIT, 2024b; OECD, 2024a) - National AI Computing Infrastructure (MSIT, 2024c) - Systematic government support with central coordinating body (MSIT, 2024b; MSIT, 2025e) - Supply capacity in AI Chips (McFaul et al., 2023) - Ability to develop and hyperscale models (McFaul et al., 2023) - Highly educated population (MOE, 2025a)	- SMEs lack access to capital (McFaul et al., 2023) - Insufficient large-scale computing resources - Overreliance on foreign infrastructure - Difficulty retaining skilled AI workers (OECD, 2024b; OECD & KLI, 2025)
Opportunities	Threats
- Expanding generative AI market (BCC Research, 2025) - Large-scale government investment plans (National AI Strategy Committee, 2025) - Growing demand for on-device semiconductors (Ji, 2025) - Leadership position in AI ethics (MSIT, 2024b)	- Large tech, investment, and talent gaps with PR China and the US (Jang, 2025; Jie, 2025) - Uncertainty in global trade environment (WEF, 2025) - Risks of AI diffusion (privacy, security, bias) (OECD & KLI, 2025)

Source: Compiled by the authors.

Future Needs and Collaboration Pathways

Domestic Priorities

Strategic Direction and Policy Orientation

The Lee Jae Myung administration's economic growth strategy frames AI policy through four complementary approaches that link strengths and weaknesses to opportunities and threats. Strength–Opportunity measures emphasize flagship physical AI projects spanning robotics, automobiles, and semiconductors, alongside a nationwide AX (AI transformation) initiative, a public–private AI growth fund, and expanded human capital development to raise economy-wide AI maturity (MOEF, 2025).

Strength–Threat measures prioritize competitiveness under intensifying global AI competition and domestic compute constraints by supporting elite AI teams with concentrated access to GPUs, data,

and talent, expanding public data access, building national data centers to reduce reliance on global platforms, and strengthening AI governance through the AI Basic Act.

Weakness–Opportunity measures focus on closing capability gaps by attracting 2,000 overseas AI experts through special visas, expanding SME-oriented AI education centers, and strengthening incentives for private investment in start-ups.

Weakness–Threat measures aim to reduce structural vulnerabilities through domestic AI semiconductor ecosystem development, an AI employment safety net and reskilling policies, and digital sovereignty measures grounded in localization and infrastructure investment (Source: Compiled by the authors from the MOEF (2025)).

Compute, Cloud, and Digital Sovereignty

Reducing reliance on foreign computing infrastructure is an urgent strategic priority. Policy emphasis centers on expanding domestic capacity across AI semiconductors, cloud infrastructure, and national AI computing centers. Regulatory facilitation for data center power supply and site selection is positioned as an enabling step, alongside increased investment in domestic computing infrastructure to serve start-ups, SMEs, and research users at scale.

Sector-specific AI Transformation and SME Adoption

Strengthening industry-specific AI capabilities is critical for productivity gains, particularly in sectors where adoption remains slow and where SMEs face persistent capability constraints. Priority actions include selecting sectoral transformation projects, developing domain-specific solutions, and providing continuous professional training and consulting support to help firms move from experimentation to routinized operational use.

Talent, R&D, and Industry–University Linkages

Expanding practice-oriented AI talent is positioned as a core requirement for sustaining growth and reducing dependence on foreign capabilities. Priorities include scaling industry–university cooperative programs, strengthening research collaborations, using targeted visa pathways for foreign AI experts and early-career researchers, and creating financial incentives to encourage Korean AI scientists overseas to repatriate.

Collaboration Opportunities

Local Perspective

Industry–academia–government coordination

Domestic collaboration needs to address two linked constraints: limited access to AI infrastructure and reliance on foreign computing resources. SMEs and start-ups often face barriers in accessing GPUs and cloud services domestically, which reinforces dependence on global platforms. A policy focus on domestic AI semiconductor production, national computing centers, and domestic cloud services can be reinforced by incentives that crowd in private investment and shorten time to deployment. Collaboration should also prioritize industry-specific guidelines and best practices for AI transformation in traditional sectors, such as manufacturing, agriculture, and logistics, where adoption remains limited. Finally, coordinated governance across ministries is necessary to reduce fragmentation and align delivery with mid- to long-term roadmaps and performance-based management systems.

Global Perspective

Cooperation among APO members and partners

International cooperation priorities include joint research on AI ethics and standards, the development of multilateral governance frameworks, the creation of international AI benchmarking platforms, and the establishment of joint testbeds. The ROK's experience in digital government and public data

initiatives also provides a basis for technology transfer and training programs that support public-sector AI adoption in partner economies. Additional cooperation avenues include a joint AI research and education platform to support human capital development and academic exchanges, international testbeds that help diffuse AI technologies using domestic Korean AI semiconductors and models, and joint computing infrastructure programs that integrate data center resources and public cloud capacity to strengthen shared AI capabilities.

APO Joint Initiatives

Joint Governance, Standards, and Benchmarking

i) Regional AI ethics and standards working group

Establish a joint program on AI ethics, standards, and governance practices, with a focus on interoperable guidance for high-impact and regulated use cases.

ii) International AI benchmarking and evaluation platform

Create a shared benchmarking platform that supports comparable measurement of model performance and governance readiness across member economies, including pathways for joint testing and evaluation.

Shared Testbeds and Applied Deployment

i) Joint testbed network for semiconductors, models, and applied systems

Develop joint testbeds that enable cross-border validation and diffusion of AI technologies, including applied systems that can be evaluated using consistent methodologies across members economies.

ii) Public-sector AI adoption exchange and training program

Implement structured exchanges and training programs for public-sector AI adoption that draw on the ROK's digital government experience, including public data practices, procurement approaches, and implementation playbooks.

Regional Compute and Infrastructure Cooperation

Coordinated compute access and cloud integration program

Design a cooperative approach to shared compute access and infrastructure integration, linking data center resources and public cloud capacity across participating economies to reduce access constraints and support joint projects.

TABLE 7.8

STRATEGIC DIRECTIONS AND POLICY EXAMPLES

Strategy Type	Strategic Direction	Representative Policy Examples
SO (Strength–Opportunity)	Leverage internal strengths to seize opportunities	- Flagship physical AI projects (robots, autos, semiconductors) - Nationwide AX (AI transformation) initiative - Public–private AI growth fund - Human capital development based on highly educated population

Strategy Type	Strategic Direction	Representative Policy Examples
ST (Strength–Threat)	Use internal strengths to counter external threats	• Elite AI teams with focused support (GPUs, data, talent) • Open public data and national data centers • Leadership in AI governance via AI Basic Act
WO (Weakness–Opportunity)	Overcome limitations by capturing opportunities	• Global AI talent attraction (2,000 experts, special visas) • SME-oriented AI education centers • Incentives to boost private investment in start-ups
WT (Weakness–Threat)	Reduce vulnerabilities and respond to external risks	• AI semiconductor ecosystem development • AI employment safety net and reskilling policies • Digital sovereignty through localization and infra investment

Source: Compiled by the authors based on Ministry of Economy and Finance (MOEF) (2025).

CHAPTER 8

LAO PDR

Each member economy is assessed through a common analytical framework covering five core dimensions: (i) ecosystem baseline; (ii) policy and strategy; (iii) stakeholder landscape; (iv) strategic positioning; and (v) future pathways. This structure enables consistent cross-economy comparison while allowing for context-specific insights into how AI capabilities are developed, governed, and applied in practice.

AI Ecosystem Baseline Assessment

AI Adoption in Lao PDR

Lao PDR currently exhibits one of the lowest levels of AI integration in Asia, with the IMF estimating that only about 3% of jobs in the country are highly complementary to AI (Tristan & Shujaat, 2025). This low figure highlights the structural challenges that limit the ability of its economy and workforce to benefit from AI technologies. A large proportion of the labor force remains concentrated in agriculture and informal services, sectors dominated by low-tech, and labor-intensive practices that provide limited opportunities for AI-driven productivity improvements. At the same time, while digital connectivity is improving with the country reaching 63% internet penetration, cloud infrastructure and computing power remain concentrated in urban areas, such as Vientiane; this means rural regions with limited capacity to adopt advanced technologies (Simon, 2025).

Human capital further constrains AI adoption: fewer than 15% of higher education institutions in Lao PDR have introduced AI-related courses, and about 60% of students report never using AI-powered learning tools. Only 25% of instructors feel comfortable using AI in teaching and learning (Sirivanh et al., 2025). This combination of limited economic diversification, uneven digital infrastructure, and a lack of AI-related skills results in very low integration of AI into the workforce and education system. The IMF's estimate is therefore less a reflection of AI's irrelevance in Lao PDR than an indication that the country is still at the very early stages of readiness, requiring substantial investment in digital infrastructure, education, and workforce training to lay the groundwork for broader AI adoption.

In terms of linkages between Lao PDR's role as a regional electricity supplier and the development of AI ecosystem in neighboring countries, there is no conclusive statistical evidence showing that AI ecosystem buildouts have directly increased Lao PDR's electricity exports. Even so, policy and market signals suggest an emerging indirect link, as growth in AI intensive data centers is materially increasing power demand in key neighboring economies. Singapore's Green Data Center Roadmap anticipates heavier compute loads and tighter efficiency standards, and the International Energy Agency (IEA) projects that global data center electricity use could more than double by 2030 with AI as a primary driver. Analysts focusing on Thailand forecast about 6 TWh of data center demand by 2030 (Infocomm Media Development Authority, 2024; International Energy Agency, 2025).

AI R&D and Investment in Lao PDR

Patent activity in Lao PDR remains extremely limited, which explains the absence of AI-related patent filings in the country. The World Intellectual Property Organization (WIPO) reports that Lao PDR ranked 102 globally in 2023 while most applications came from nonresidents seeking local protection (World Intellectual Property Organization [WIPO], 2023). This very low baseline means that AI-specific patent applications are negligible and are not separately reported in international or regional

databases. This reflects broader structural challenges, including limited research and development (R&D) investment, a shortage of skilled professionals, and underdeveloped institutional frameworks to support advanced innovation. Globally, however, AI patenting is surging: between 2010 and 2020, more than 340,000 AI-related patents were filed, with applications growing at nearly 28% annually between 2015 and 2020, and overall filings increasing tenfold since 2013 (Bao, 2025; Sirivanh et al., 2025). The absence of Lao PDR in these trends underscores how far the country is from participating in the global AI innovation landscape. Nonetheless, there are some prospects for future development: in 2023, the European Patent Office (EPO) signed a validation agreement with Lao PDR, which allows European patents to be recognized in the country and may create opportunities for exposure to advanced technologies, including AI (European Patent Office, 2025). In the short term, however, without targeted investment in education, research infrastructure, and digital skills, domestic AI patent applications in Lao PDR are likely to remain negligible.

Government and Private R&D Investment in AI

At present, Lao PDR does not publish disaggregated figures for AI-related R&D in either public budgets or national statistics, and no official data are available on private-sector spending in this area. The closest proxy is overall R&D intensity, which remains extremely low. According to UNESCO's country mapping, gross domestic expenditure on R&D (GERD) amounts to just 0.04% of GDP, with particularly low participation from the business and enterprise sector. This indicates that the national innovation base is still very limited, and private sector contributions to R&D remain minimal. As a result, current AI-specific spending is likely negligible in absolute terms. The Global Innovation Index (GII) profile further reinforces this picture, pointing to substantial data gaps for Lao PDR and helping explain the absence of concrete information on AI-related investment (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2018).

Since mid-2025, the government has promulgated some new, AI-focused capital initiatives. These include a handful of Memoranda of Understanding (MoUs), feasibility studies for a green-energy-powered AI infrastructure pilot, an AI Innovation Center, and an AI Special Economic Zone. These are important pipeline projects that could mobilize both public and private investment, but no appropriations or capital expenditure figures have been disclosed. At this stage, they indicate policy direction rather than confirmed spend (Lao News Agency (KPL), 2025).

AI-related Indicators

Lao PDR still lacks a stand-alone national AI strategy, and its public-sector AI readiness remains in Association of Southeast Asian Nations' (ASEAN) lower tier: Oxford Insights' 2024 Government AI Readiness Index gives Lao PDR an overall score of 36.08 (government 28.10; technology sector 28.79; data & infrastructure 51.36). In 2025, the UN system confirmed that UNESCO's AI Readiness Assessment Methodology (RAM) was carried out in Lao PDR to map legal and institutional gaps. This is useful groundwork while a formal strategy is pending. Regional guidance (e.g., ASEAN's expanded AI governance guide for generative AI) is available for voluntary adoption (Oxford Insights, 2024). On connectivity and compute readiness, roughly two thirds of the population was estimated to have access to the internet at the start of 2025, and access speeds are trending up. Ookla's Global Index shows Lao PDR ranked 84th for mobile and 107th for fixed broadband in September 2025, and Unitel won Ookla's 1H-2025 "Best Mobile Network" award. This signals that demand-side conditions for AI applications are improving (Simon, 2025; Speedtest, 2025).

Digital adoption indicators are moving in the right direction. The central bank has rolled out a QR code-based payment scheme, with cross-border linkages established with Thailand (2024) and Vietnam (2025). This greatly reinforces retail payment rails that AI services can leverage (e.g., for small and medium-sized enterprises (SMEs) and tourism use-cases). Global Findex remains the baseline dataset for tracking household digital-payment uptake (Greater Mekong Subregion, 2025).

In terms of governance and security, Lao PDR has a general data protection framework via the Law on Electronic Data Protection (No. 25/NA, 2017) and related instruments, but no AI-specific law yet. Overall, the country is still developing its cybersecurity capacity. International Telecommunication

Union’s 2024 Global Cybersecurity Index gives Lao PDR a score of 33.7. The digitization of public services is at a low level, and its e-government score sits in the lower tier (UN E-Government Development Index (EGDI) country profile) (International Telecommunication Union, 2025).

Innovation and language assets are nascent but growing. The WIPO Global Innovation Index (GII) 2025 places Lao PDR 109th overall. For language tech, Lao PDR is included in FLORES (FLORES-200/Plus), which supports evaluation and localization work. In 2025, officials and local partners announced a national Lao large language model (LLM) initiative aimed at public services, education, agriculture, and tourism. However, this remains early-stage activity and not yet a mature production asset (WIPO, 2025).

TABLE 8.1

AI-RELATED INDICATORS IN LAO PDR

Indicator	Latest Value (year)	Implications
National AI strategy (stand-alone)	NA	Baseline for governance and public investment signals
Government AI Readiness Index	36.08 overall (2024)	Comparative capacity across government, tech sector, and data/infrastructure (Oxford Insights, 2024)
UNESCO AI Readiness Assessment	Conducted; calls for stronger coordination (2025)	Independent appraisal and roadmap inputs while no national AI strategy exists (United Nations [UN], 2025)
Data protection framework	Law on Electronic Data Protection No. 25/NA (2017); guidance in force	Foundational for AI data governance, privacy, and trust (No. 25/NA, 2017)
Internet users (% of population)	63.6% (2023)	Adoption headroom and addressable market for AI services (WorldBank, 2024)
Network performance (Ookla)	Mobile rank 84, fixed rank 107 (September 2025)	User-side readiness for cloud/AI apps (Speedtest, 2025)
Nearby hyperscale cloud	Amazon Web Services (AWS) Thailand region goes “live” (January 2025); Microsoft and Google announced Thailand regions (2024)	Lowers latency/costs for Lao PDR workloads without a domestic region (Amazon Web Services [AWS], 2025)
Cross-border QR payments	Thailand–Lao PDR goes “live” (April 2024); Vietnam–Lao PDR goes “live” (January 2025)	Digital payments rail that AI services (e.g., fintech, tourism) can leverage
Cybersecurity posture	33.7/100 (2024)	Security capacity for trustworthy AI deployment
E-Government Development Index (EGDI) (UN)	Rank 152, EGDI 0.440 (2022)	Public-sector absorptive capacity for AI (UN, 2024)
Innovation capacity (WIPO GI)	Rank 109/139 (2025)	Overall innovation inputs/outputs relevant to AI ecosystem
National LLM/AI initiatives	Lao PDR’s LLM announced 2025; public–private collaboration	Early pipeline of local AI applications (education, health, agriculture, tourism)

Source: Compiled by the author based on No. 25/NA (2017), AWS (2025), Oxford Insights (2024), Speedtest (2025), UN (2024 & 2025), and World Bank (2024).

National AI Policies and Strategies

AI has become a priority for governments across ASEAN as countries seek to leverage emerging technologies for economic growth, governance, and social development. In Lao PDR, discussions on AI are increasingly framed within the broader context of digital transformation, as set out in the 20-Year Digital Economy Vision (2021–2040) and accompanying strategies and plans. While many countries in the region have already launched formal national AI strategies, Lao PDR remains in the

early stages of developing its own and has not yet officially published a National AI Strategy. Reports from regional and international organizations confirm that such a document is currently being drafted. This indicates that while the political will is present, the process of creating a comprehensive AI framework is still underway and has yet to reach formal adoption (Times, 2025a).

In the absence of a published national strategy, AI governance in Lao PDR is currently guided by existing digital economy frameworks and regional principles. The 20-Year National Digital Economy Vision and the 10-Year Strategy (2021–2030) emphasize the modernization of infrastructure, the expansion of digital services, and the integration of emerging technologies. At the regional level, Lao PDR aligns itself with the ASEAN Guide on AI Governance and Ethics (2024) and the Expanded Guide on Generative AI (2025), which provide voluntary but practical recommendations for responsible and ethical AI adoption. Furthermore, Lao PDR has engaged with UNESCO’s AI Readiness Assessment Methodology (RAM) to evaluate its preparedness and to lay a foundation for integrating AI into national systems in a way that respects human rights, ethics, and governance standards (Lyantioniette et al., 2025).

Key Measures and Programs

As Lao PDR lacks a national AI strategy, all AI-related policy activity is proceeding under the aforementioned Digital Economy Vision 2021–2040, the 10-Year Strategy that runs to 2030, and the country’s Five-Year plan, which ran up to last year. These promulgations direct the country’s ministries to invest in digital infrastructure, modernize online public services, and pursue human capital development initiatives. The Digital Economy Vision directs all sectors to reference all three frameworks when designing their work plans, enabling AI projects and feasibility studies to proceed even without a specific AI strategy.

The legal basis for trustworthy AI already exists. The Law on Electronic Data Protection includes provisions governing the collection and processing of electronic data, and practice is evolving as usage grows. Sector rules issued by the Ministry of Post and Telecommunications license software businesses and Internet Content Centers (ICCs) as well as set service and security expectations. Separate licensing covers the operation of data centers and cloud services under the Ministry of Technology and Communications (MTC). Together, these instruments define which entities can operate digital platforms and infrastructure in Lao PDR, what technical and security baselines they must meet, and how services are supervised. They are not AI-specific, but they describe how operators can ensure compliance for any AI systems built or procured.

The public sector is taking a whole-of-government approach to coordination. In 2023, the National Committee on Digital Transformation was formed and is chaired by a top government official. The committee has a mandate to set plans and policies for digital government, the digital economy, and digital society and to supervise implementation across central and local levels. This is the natural venue to coordinate AI policy, procurement rules, and interagency data sharing while a dedicated AI strategy is being prepared.

The new activity in 2025 was project-based and focused on feasibility. The Ministry of Technology and Communications signed an agreement to study and design a national-standard data center with a secure government data-exchange system, working with a private partner from the Phongsavanh Group. The aim is to create a central, secure platform for government data accessible to multiple agencies, which is an essential foundation for making AI reliable for use in public services. Public reports describe progress toward the completion of an economic and technical feasibility study.

A second track explores local AI infrastructure and an innovation space. The National Data Center signed an MoU with Silicon Tech Park to pilot an AI Innovation Center that uses clean electricity and to study a dedicated AI special economic zone (SEZ) in Vientiane. This points to growing interest in attracting AI-related compute and services that meet regional expectations for efficiency and sustainability. The announcements describe scope and intentions rather than detailed budgets, reflecting that Lao PDR has only just begun to study the feasibility of AI projects.

Language technology is a practical near-term focus. Authorities and partners announced a Lao national LLM, with technical development led by ALO Technology Group and the China–Lao Information Communication Center, and content partnerships with the National Library, various publishers, the Ministry of Education and Sports (MOES) ICT Center, and the National University of Laos. Early use cases include education, health information, agriculture extension, and tourism services, which are domains where AIs versed in the Lao language would be critical to facilitating real uptake.

Regional guidance can be used immediately while the national framework is still forming. ASEAN’s Guide on AI Governance and Ethics provides a practical playbook for organizations that design and deploy AI. An expanded guide for generative AI adds policy recommendations on testing and assurance, incident reporting, content provenance, and security. These guides are voluntary, but Lao agencies can embed them in procurement templates, pilot sandboxes, and staff training to ensure that projects launched in 2025 and 2026 follow consistent guardrails.

Two system-wide conditions are worth keeping in view because they shape AI delivery capacity. First, the government is redirecting electricity allocation toward higher-value uses. Officials have indicated that Lao PDR intends to stop supplying power to cryptocurrency miners by early 2026 in order to prioritize AI data centers, electric vehicles (EV), and the metals industry. This policy shift supports AI and data-center workloads if projects clear investment and standards hurdles. Second, the government is still building capacity. External assessments place Lao PDR in the lower tier of government AI readiness and cybersecurity maturity, which underlines the need for skills, operational playbooks, and disciplined procurement as pilots scale. Ongoing assessment work that began in 2025 is designed to help agencies sequence these next steps.

A practical next step is drafting a clear implementation sequence. The government could use the Digital Economy Vision and existing laws to anchor AI pilots and data-sharing arrangements. The National Committee on Digital Transformation could serve as the cabinet-level coordinator to issue short AI policy notices, designate priority sectors, and adopt ASEAN guidance into procurement by default. The data center and government data exchange should proceed from feasibility to funded implementation with staged milestones and measurable service-level targets. Finally, the Lao language model needs to be applied to a small set of production pilots in education, health, agriculture, and tourism, with a commitment to evaluation and safety checks. This approach turns announcements into services with timelines and accountability while keeping space to publish a full national AI strategy when the institutional pieces and budgets are ready.

TABLE 8.2

LAO PDR’S NATIONAL POLICY MATRIX

Policy/Instrument (Type)	Core Objectives	Implementation Measures to Date	Budget/Funding	Key Quantitative Trend/Trajectory	Executive Authority
20-Year National Digital Economy Development Vision; 10-year Strategy; 5-year Plan (policy framework - 2021)	- Grow the digital economy - Modernize infrastructure - Enable data-driven public services and industry	- Vision/Strategy/Plan approved - Guidance to line ministries to align projects and regulations	Not specified publicly in the Digital Economy Vision/Strategy/Plan	Internet penetration rising: % of population using internet increased 54% (2020) to 62% (2021) to 62.7% (2022) to 63.6% (2023) (Fred, 2025)	Ministry of Technology and Communications (Ministry of Technology and Communications [MTC], 2021b)
Law on Electronic Data Protection No. 25/NA (law) - 2017	Establish principles for collection, processing and protection of electronic data	- Law in force - Instructions and practice notes referenced by legal trackers	Not specified publicly	No established time series	National Assembly; MTC for sectoral guidance (No. 25/NA, 2017)

Policy/Instrument (Type)	Core Objectives	Implementation Measures to Date	Budget/Funding	Key Quantitative Trend/Trajectory	Executive Authority
Decision on Software Business Operation and Internet Content Center No. 143/MPT (regulation) - 2017	- License and supervise software and Internet Content Center operations - Set technical and security standards	- Licensing rules, security, and localization requirements - Enforcement provisions	- Licensing fees per regulation - No program budget disclosed	No established time series	Ministry of Post and Telecommunications (now MTC) (Ministry of Post and Telecommunications, 2017)
License to operate an Internet Data Center (IDC) and Cloud Service (administrative license) - 2017	- Permit IDC and cloud operation - Designate competent authority	Formal licensing process and forms in place under Department of Digital Technology (DDT)	- Fees per licensing schedule - No program budget disclosed	No established time series	MTC (DDT) (Department of Digital Technology, 2017)
National Committee on Digital Transformation (decree-based coordination body) - 2023	Provide whole-of-government leadership for digital transformation	- Decree issued - Committee chaired at high level - Membership appointed	Not specified publicly	- Government AI readiness improving - Oxford Insights score 31.72 (2022) to 33.05 (2023) to 36.08 (2024) (Oxford Insights, 2022; 2023; 2024)	Office of the President/PMO; MTC as line lead (Yau, 2025)
UNESCO AI Readiness Assessment Methodology (RAM) in Lao PDR (diagnostic program) - 2025	- Map institutional, legal, and capacity gaps for ethical AI - Inform next steps (e.g., coordination mechanisms)	- Capacity-building workshops held - RAM listed by UNESCO as underway in Lao PDR	- Donor-funded - No national budget disclosed	Baseline year 2025	UNESCO with Government of Lao PDR (MTC and partners) (UNESCO, 2023)
Lao LLM initiative (program/initiative) - 2025	Develop Lao-language model and datasets for public-service, education, health and tourism use cases	- Public announcement - Collaboration with National Library, publishers, MOES ICT Center, NUOL, and MTC	Not disclosed	Baseline year 2025	ALO Technology Group; China-Lao Information Communication Center; MTC, MOES, NUOL as partners (Times, 2025b)
AI Innovation Center and feasibility of AI Special Economic Zone (SEZ) (MoU/program concept) - 2025	- Pilot AI infrastructure services using clean electricity - Study dedicated AI SEZ in Vientiane	- MoU signed between National Data Center and Silicon Tech Park - Feasibility work initiated	Not disclosed in MoU	Baseline 2025	National Data Center (under MTC); Silicon Tech Park (Lao) (Lao News Agency (KPL, 2025)
National Data Center and Government Data-Exchange System (MoU/feasibility) - 2025	Establish national-standard data center, secure government data exchange and national cloud	- MTC signed MoU with Phongsavanh Group - Six-month economic and technical feasibility study authorized	Not disclosed in MoU	Baseline 2025	MTC; Phounphonhakhone Co. (Phongsavanh Group) (Xinhua, 2025)
ASEAN Guide on AI Governance and Ethics and Expanded Guide for Generative AI (regional guidance) - 2024	- Provide practical guidance for trustworthy AI and GenAI - Promote interoperable approaches in ASEAN	- Documents available for voluntary adoption - Relevant to procurement, sandboxes, and training	Not disclosed	Regional guidance issued 2024	ASEAN sectoral bodies; optional uptake by Lao agencies (Association of Southeast Asian Nations [ASEAN], 2024)

Source: Compiled by the author based on government policy documents.

Key Stakeholder Mapping

Lao PDR’s emerging AI ecosystem is being built in a pragmatic, infrastructure-first way, with telecommunications and cloud platforms laying the groundwork for future AI deployment while mobility, logistics, and education initiatives provide early, visible use cases. Across both public and private actors, the emphasis is less on frontier model development and more on enabling data, connectivity, compute, and practical digital services that can absorb AI tools over time.

Private Sector

Private-sector momentum is concentrated in three areas: network and cloud infrastructure, platform-based mobility and delivery services, and skills development. Together, these segments are creating the operating conditions for wider AI adoption, especially where data-driven operations, digital payments, and service automation can generate near-term productivity gains.

Major Players

Unitel (Viettel Laos)

Unitel is the country’s leading telecommunications operator and a central driver of digital transformation through its focus on AI, big data, and cloud services (Tin Tuc, 2024). In this role, Unitel functions as a foundational enabler for AI readiness by expanding the connectivity and cloud capacity needed for data-intensive digital services across the economy.

Global Digital Management Solutions (GDMS)

GDMS is positioned as a key infrastructure actor through its role as the first VMware public and hybrid cloud partner in Lao PDR and its deployment of a sovereign cloud offering (Global Digital Management Solutions, 2025). It already hosts sensitive government and education workloads, which is significant as it creates a pathway for in-country hosting of future AI applications, including those requiring stronger data residency and governance assurances.

Huawei

Huawei is a major external technology partner supporting “smart infrastructure” deployments in transport. The Vientiane–Vangvieng smart expressway project introduces intelligent monitoring, automated tolling, and traffic management systems that rely on AI, the IoT, and big data analytics to improve safety and operational efficiency (Huawei, 2020). Huawei is a key provider of digital systems for the China–Laos Railway, including smart railway capabilities, such as predictive maintenance, digital signaling, and passenger information systems, which together demonstrate how AI-enabled infrastructure can support logistics performance and cross-border trade reliability (Huawei, 2020).

Start-ups

LOCA

LOCA is a home-grown ride-hailing and smart mobility platform and one of the most visible examples of data-driven service operations in the Lao PDR context (Advertorial, 2025). Beyond ride-hailing features, such as round-the-clock support and card payments, LOCA is also positioned as a sustainability-oriented platform by scaling EV fleets and investing in nationwide fast-charging infrastructure, aligning with greener urban development and smart-city ambitions (Advertorial, 2025). LOCA uses AI tools across daily operations, including digital advertising, ride scheduling, translation services, and call-center management, with a particular emphasis on serving international customers more effectively. The LOCA chief executive officer frames AI primarily as a productivity and service-quality enabler rather than a cost-cutting instrument, emphasizing workforce efficiency and customer experience improvements.

GoTeddy

GoTeddy is a fast-growing delivery super-app that supports food delivery, parcel services, and online shopping integration, helping to expand e-commerce logistics capacity and improve connectivity between consumers, merchants, and service providers (LaotianTimes, 2020). In the Lao PDR context, the platform is an example of local adaptation of global platform models, contributing to the broader transition toward a more service- and logistics-enabled digital economy.

Foodpanda Laos

Foodpanda's Lao PDR operations have demonstrated sustained growth in engagement and operational performance in 2025, supported by AI-enabled improvements in order management, restaurant and rider queuing, real-time tracking, and advertising workflows. The platform's core operating system and AI infrastructure are developed and maintained by Foodpanda's global headquarters in Germany, allowing Lao PDR's operations to benefit from standardized technology while tailoring service execution to local market conditions. According to a human resources manager at Foodpanda, AI plays an important role in ordering, queuing, tracking, and advertising functions.

KOKKOK Move

KOKKOK Move is a mobility platform with an unusually broad service range, covering everyday transport options and heavier logistics services, making it relevant to both consumer mobility and business delivery needs. The platform was developed by Lao Smart Mobility Co., Ltd. in collaboration with Korean outfit Coconut Silo. They combine local operational knowledge with external technical expertise. In operational terms, AI supports core platform functions, such as user registration, queuing systems, reservations and bookings, and secure digital payments. A deputy manager at KOKKOK Move emphasizes AI's role in automating complex processes and optimizing real-time decisions to raise productivity and efficiency.

Core Products and Services

Across the private sector, the most concrete AI-adjacent capabilities are emerging in cloud and data platforms, smart transport infrastructure, and platform-mediated mobility and delivery services. GDMS's sovereign cloud and Unitel's emphasis on cloud services represent early steps toward in-country hosting capacity for sensitive workloads while Huawei-enabled smart transport systems illustrate how AI, IoT, and analytics can be embedded in national infrastructure. Consumer-facing platforms, such as LOCA, GoTeddy, Foodpanda, and KOKKOK Move provide early operational use cases where AI tools can support scheduling, queuing, tracking, customer support, translation, and advertising, which generate visible service improvements without requiring domestic frontier model development.

Public Sector and Parastatals

Public sector activity is framed around foundational infrastructure for data governance and compute readiness, alongside policy-linked partnerships to accelerate national digital capacity. The government's role is to establish shared infrastructure and institutional channels that make private-sector adoption feasible and more secure over time.

Major Players***Ministry of Technology and Communications (MTC)***

The MTC is advancing core national infrastructure initiatives through 2025 Memoranda of Understanding (MoUs), including the establishment of a national data center and a government data exchange (Sengpaseuth, 2025; Xinhua, 2025). The same set of initiatives also includes a pilot for a green-powered AI Innovation Center in partnership with Silicon Tech Park (Lao PDR), which is presented as a step toward AI-ready compute and a national platform for digital innovation (Sengpaseuth, 2025). Taken together, these initiatives create the conditions for localized hosting of sensitive workloads and future AI services that require stronger governance, interoperability, and reliable compute access.

Ministry of Education and Sports (MOES)

Education-related public initiatives contribute to AI readiness primarily through broader digital inclusion and foundational skills pathways. The Khang Panya Lao platform expands access to e-learning for children, with particular relevance for rural areas (Ministry of Education and Sports [MOES], 2021). In the ecosystem framing, these initiatives support a longer-term talent pipeline by improving baseline digital access and learning capacity that future AI-enabled services can build upon.

Others

Skills development efforts connect public goals to private delivery models, including immersive learning and upskilling programs delivered by external providers and local partners. The EON Reality Spatial AI Center offers access to more than 10,000 extended reality and augmented reality learning modules for schools and vocational training (Eonreality, 2025) while local actors, such as XMT, are promoting AI and digital transformation skills through training and regional partnerships (xmtechnovator, 2024). These initiatives, while not always purely public-sector programs, align with public objectives to broaden the talent base required for sustained AI adoption.

Use Cases and Adoption Signals

Lao PDR's near-term AI trajectory is likely to be led by service platforms and infrastructure-linked deployments, where AI tools can be embedded into operational workflows, such as dispatch, translation, customer support, queuing, tracking, and predictive maintenance. Interview-based accounts reinforce this applied orientation, with LOCA emphasizing workforce productivity and customer experience, Foodpanda focusing on platform-level operational optimization supported by global AI infrastructure, and KOKKOK Move highlighting real-time process automation in mobility and logistics.

TABLE 8.3

SUMMARY OF KEY STAKEHOLDERS

Institutions (Year Established)	Primary Role	Recent Activity	Collaboration
Public Sectors			
Ministry of Technology and Communications (MTC) (2021)	National lead for digital policy, regulation, data center and cloud licensing, cyber and digital government	- Implementing the 20-Year Digital Economy Vision, 10-Year Strategy, 5-Year Plan - Moving ahead on national data center and government data-exchange system (WorldBank, 2022)	Line-ministry coordination; private partners for data-center and cloud projects
National Committee on Digital Transformation (2023)	Whole-of-government coordination of digital transformation	Committee constituted and operating under presidential decree (Times, 2023)	Chaired by the Prime Minister
National Data Center (under MTC)	Operates national-scale compute and data services for government	- MoU to pilot an AI Innovation Center using clean electricity - Feasibility for an AI special economic zone - Separate MoU to study national data center plus government data-exchange system (Times, 2023)	Silicon Tech Park; Phongsavanh Group
Ministry of Education and Sports (MOES)	Education policy, digital learning, skills	- Digital Strategy for Education 2025 to 2035 - Sector programs with partners (MOES, 2021)	UNICEF, European Union (EU), Australia (Basis Education Quality and Access in Lao PDR "BEQUAL")

Institutions (Year Established)	Primary Role	Recent Activity	Collaboration
Public Sectors			
Lao Statistics Bureau (LSB) (2010)	Official statistics and national data portal (LAOSIS)	Operating LAOSIS as the gateway to official statistics (LAOSIS, 2019)	Line ministries; development partners
Lao Telecommunications Public Company (Lao Telecom) (1996)	State-linked telecom operator supporting connectivity for digital services	- Ongoing 4G and 5G rollout 28-year milestone in 2024 (Times, 2024)	MTC; international vendors
Private and Quasi-public Ecosystem			
Star Telecom (Unitel) (2009)	- Largest mobile operator - Connectivity backbone for cloud and AI services	15 years anniversary in 2024 - Nationwide network expansion (Tin Tuc, 2024)	Joint venture of Lao Asia Telecom and Viettel; works with government on digital initiatives
ALO Technology Group	Lead private partner for Lao LLM development	Announced Lao national LLM with public institutions in 2025 (Times, 2025b)	China–Lao Information Communication Center, MTC, MOES, National University of Laos (NUOL), National Library
China–Lao Information Communication Center	Technology partner for AI and digital projects	Supporting Lao LLM and related infrastructure (Times, 2025b)	ALO Technology Group; Lao public institutions
Silicon Tech Park (Lao)	Infrastructure developer for data center and AI projects	- MoU for an AI Innovation Center using clean power - Feasibility of an AI special economic zone	National Data Center (MTC)
Phongsavanh Group/ Phounphonnakhone Co.	Conglomerate partnering with government on digital infrastructure	MoU with MTC for a six-month feasibility on national data center and government data-exchange system (Xinhua, 2025)	MTC
Academic and International Partners			
UNESCO (1945)	- AI ethics capacity building - Readiness assessments	- AI Governance capacity-building in Vientiane - UNESCO AI Readiness Assessment Methodology activities referenced for Lao PDR in 2025 (UN, 2025)	Government of Lao PDR; UN in Lao PDR
UN in Lao PDR (Resident Coordinator Office)	Convening and program support across digital and governance	Highlighted internet use growth and urged stronger coordination around AI (UN, 2025)	Line ministries; UN agencies; development partners
World Bank	Diagnostics and policy advice on digital government and the economy	- Report on positioning Lao PDR for a digital future - Notes MTC creation and mandates (WorldBank, 2022)	MTC; PM Office
Economic Research Institute for ASEAN and East Asia (ERIA) (2008)	Regional research on digital economy and policy	2024–25 chapters profiling Lao PDR digital policy framework and MTC governance (Sengpunya, 2025)	Lao ministries; ASEAN bodies
ASEAN Working Group on AI Governance (2024)	Regional guidance for trustworthy AI	ASEAN AI Governance and Ethics Guide (2024) and Expanded Guide for Generative AI (2025) (ASEAN, 2024)	ASEAN digital ministers; member states, including Lao PDR

Institutions (Year Established)	Primary Role	Recent Activity	Collaboration
Academic and International Partners			
UNICEF and EU (education partners)	Digital education systems and content	- Support for MOES education data systems and campaigns - BEQUAL program with Australia (United Nations International Children's Emergency Fund [UNICEF], 2024)	MOES; Australia's Department of Foreign Affairs and Trade (DFAT)

Source: Compiled by the author based on ASEAN (2024), LAOSIS (2019), MOES (2021), Sengpunya (2025), Times (2023; 2025), Tin Tuc (2024), UN (2025), UNICEF (2024), WorldBank (2022), Xinhua (2025).

Strategic Positioning and Recommendations

Lao PDR's AI agenda shows clear strengths in a national digital vision, emerging data-protection and sovereign cloud efforts, improving connectivity and payments, and active local platforms. Key weaknesses include the absence of a dedicated AI policy, limited cybersecurity and R&D capacity, skills gaps, rural connectivity shortfalls, and fragmented operational data.

Opportunities arise from APO training, sandboxes and standards, nearby cloud regions and green-energy positioning, high-impact sectors, such as mobility, tourism and agro-SMEs, and growing Lao-language technologies. Threats include inequality in service access, privacy and security risks, vendor lock-in, fiscal constraints, talent outflow, cross-border data issues, and power reliability.

The SWOT response is to: (i) leverage existing programs and platforms to run mobility and tourism sandboxes and multilingual service packs under shared governance; (ii) use APO programs and regional cloud capacity to close skills and data gaps through academies, fellowships, common schemas, SME vouchers, and a curated marketplace; (iii) apply the data protection framework, certified environments and open interfaces to reduce risk while adopting lightweight service standards and integrating EV fleet telemetry for reliability; and (iv) sequence projects in small, testable steps with human-in-the-loop safeguards, issue a concise national AI policy note that names data custodians and assurance roles, diversify financing through APO demonstrations and partner cofunding, and publish open playbooks to maintain momentum.

SWOT Analysis

Strengths

i) National digital economy vision and governance coordination

Lao PDR benefits from a clear national direction on the digital economy and a coordinating mechanism through the National Committee on Digital Transformation. This provides an institutional anchor for aligning ministries, prioritizing cross-government digital initiatives, and sustaining momentum on foundational reforms.

ii) Early data governance and sovereign infrastructure building blocks

The country has enacted a foundational data protection law and has begun laying groundwork for state-led digital infrastructure, including early moves toward a National Data Center, a government data exchange, and a sovereign cloud. These elements can become practical enablers for trusted data sharing and the responsible deployment of AI-enabled public services.

iii) Improving connectivity, payments, and regional cloud adjacency

Connectivity and digital payments are improving, including cross-border QR payment functionality, and Lao PDR can benefit from proximity to nearby cloud regions. Together, these conditions can reduce latency and cost barriers for digital services and help expand the reach of AI-enabled applications beyond early pilots.

iv) Live platforms and applied use cases, including momentum in language technology

Active digital platforms and real-world use cases are already present, including ride-hailing and taxi service, delivery applications, and smart transport infrastructure, such as rail and expressway systems. A Lao LLM initiative involving education partners also signals emerging momentum in language technologies that could support inclusive, Lao-language digital services.

Weaknesses**i) Strategy, public-sector readiness, and cybersecurity maturity gaps**

Lao PDR does not yet have a stand-alone AI strategy, and public-sector readiness and cybersecurity maturity remain limited. These gaps can slow adoption, increase implementation risk, and make it more difficult to scale pilots into reliable, trusted services.

ii) Thin innovation base and uneven skills and connectivity

R&D intensity is very low, patenting is minimal, and the AI skills pipeline remains thin. These constraints are compounded by uneven rural connectivity, which can reinforce rural–urban service gaps and limit the reach of national digital initiatives.

iii) Execution risk from MoU-heavy pipelines, fragmented operational data, and limited assurance

Many initiatives remain at the MoU or feasibility stage, and operational data is often fragmented across institutions and platforms. Limited assurance practices can further reduce confidence in safety, reliability, and compliance, slowing the transition from pilots to scaled deployment.

Opportunities**i) Regional standards, training, and governance support through the APO, ASEAN, and UNESCO**

Lao PDR can leverage multicountry training, sandboxes, and standards development through the Asian Productivity Organization (APO), alongside ASEAN AI governance guidance and outputs from UNESCO readiness work, including the Readiness Assessment Methodology (RAM). These mechanisms can help close capability gaps while strengthening trust, interoperability, and regional alignment.

ii) Lower-cost scaling through regional cloud proximity and green energy positioning

Proximity to regional cloud infrastructure creates an opportunity to reduce latency and costs while national data center capacity ramps up. Lao PDR can also explore green energy positioning for AI workloads, which could become an advantage if energy efficiency and emissions constraints increasingly shape data center investment decisions.

iii) High-impact sectors for early public value and productivity gains

Several sectors are well suited to early AI-enabled productivity improvements and service upgrades, including mobility and logistics, tourism, agro-SMEs, education, and healthcare. These domains offer practical opportunities to demonstrate value quickly, build institutional confidence, and create reusable playbooks for scaling.

iv) Inclusive language technology and Lao-language service expansion

Momentum in language technology, including a Lao LLM initiative and improved Lao PDR coverage in multilingual evaluation resources, such as FLORES, creates opportunities for inclusive public and commercial services. This can support tourism-facing services, public information, and help desk functions that work reliably in Lao and relevant regional languages.

v) Strengths–Opportunities (SO) strategies, scaling strengths into opportunity capture

A practical near-term approach is to establish an APO-aligned mobility and tourism data sandbox anchored at the National Data Center, publish shared reliability and safety metrics, and host core workloads on a sovereign cloud while enabling controlled burst capacity through adjacent public cloud services. Lao PDR can also leverage the Lao LLM initiative and education partners to develop a multilingual service package for tourism, public information, and help desks, then connect this to cross-border QR payments to support end-to-end “translate, verify, pay, ride” service flows. To accelerate scaling under common guardrails, ASEAN governance guides can be embedded into procurement templates and pilot playbooks so that live platforms, such as LOCA and delivery applications, expand with consistent assurance expectations.

vi) Weaknesses–Opportunities (WO) strategies, converting constraints into buildable pathways

To address skills and operational bottlenecks, Lao PDR can launch an APO Academy and fellowship track focused on dispatch operations, contact centers, data stewardship, and cybersecurity, and codevelop open evaluation sets for Lao and regional languages. While national data center capacity scales, regional cloud services can be used with standard data schemas to reduce operational fragmentation and move projects beyond MoU stages into measurable pilots. SME vouchers and a curated marketplace can also encourage first use of trusted AI tools in marketing, inventory management, customer care, and traceability.

Threats**i) Widening inequality and rising privacy and security risks**

If adoption concentrates in urban centers, rural–urban service gaps may widen. At the same time, privacy and security risks can increase as data volumes grow and more services digitize, particularly if assurance practices and incident response are underdeveloped.

ii) Fiscal constraints, delays, brain drain, and dependence on foreign suppliers

Budget limitations and project delays can stall momentum while brain drain can weaken institutional capacity. Heavy reliance on foreign foundational technologies and vendors can increase long-run dependency and reduce bargaining power over costs, customization, and resilience.

iii) Cross-border data and provenance concerns, plus power reliability constraints

Cross-border data flows can create concerns around safety, provenance, and compliance, particularly where governance regimes differ. Power allocation and reliability risks can also constrain data center and AI workload expansion, especially if demand grows faster than grid readiness.

iv) Strengths–Threats (ST) strategies, using strengths to mitigate external risks

A risk-reducing approach is to operationalize the data protection law through sandbox Data Protection Impact Assessments (DPIAs), privacy-preserving telemetry, and incident reporting, and to host sensitive workloads on sovereign or government-certified environments. Procurement can require open interfaces and portability to reduce vendor lock-in, and Lao PDR can adopt lightweight APO service standards for mobility, delivery, and tourism to strengthen interoperability and accountability. As EV fleets expand, smart-charging telemetry can be tied to dispatch policies to improve service reliability while actively managing grid and cost pressures.

v) **Weaknesses–Threats (WT) strategies, reducing exposure while capability matures**

Projects can be sequenced in low-risk increments, supported by independent security testing, red-teaming for critical applications, and fallbacks to human-in-the-loop operations. A lean national AI policy note can prioritize a small set of high public-value use cases, name data custodians, and assign assurance roles to reduce fragmentation. Financing can be diversified through APO demonstrations, development partners, and platform co-funding, and progress can be sustained by publishing open playbooks that allow implementation to continue even under budget pressure.

TABLE 8.4

SWOT MATRIX: LAO PDR

	Strengths (S)	Weaknesses (W)
	- National Digital Economy Vision and coordination via the National Committee on Digital Transformation. - Foundational data-protection law; early moves on a national data center, government data exchange, and sovereign cloud. - Improving connectivity and payments (cross-border QR), plus nearby cloud regions. - Live use-cases and platforms (LOCA, delivery apps, smart rail/expressway) and a Lao LLM initiative with education partners.	- No stand-alone AI strategy yet; low public-sector readiness and cyber maturity. - Very low R&D intensity and minimal patenting; thin AI skills pipeline and uneven rural connectivity. - Many initiatives remain at MoU/feasibility stage; fragmented operational data and limited assurance practices.
Opportunities (O)	SO Strategies	WO Strategies
- APO multicountry training, sandboxes, and standards; ASEAN AI governance guides and UNESCO RAM outputs. - Regional cloud proximity to cut latency and cost; green energy positioning for AI workloads. - High-impact sectors: mobility/logistics, tourism, agro-SMEs, education, and health. - New language tech momentum (Lao LLM, FLORES coverage) for inclusive services.	- Stand up an APO-aligned mobility and tourism data sandbox at the National Data Center to publish shared reliability and safety metrics, and host it on sovereign cloud with adjacent public cloud burst capability. - Convert Lao LLM and education partners into a multilingual service pack for tourism, public information, and help desks; tie to cross-border QR to complete “translate-verify-pay-ride” flows. - Embed ASEAN governance guides into procurement templates and pilot playbooks so live platforms (LOCA, delivery apps) scale under common guardrails.	- Launch an APO Academy and fellowships to upskill dispatch, contact center, data stewardship, and cybersecurity; codevelop open evaluation sets for Lao and regional languages. - Use regional clouds while national DC capacity ramps, pairing with standard data schemas to defragment operational data and accelerate real pilots beyond MoUs. - Create SME vouchers and a curated marketplace to drive first-use of trusted AI tools in marketing, inventory, customer care, and traceability.
Threats (T)	ST Strategies	WT Strategies
- Inequality and rural–urban service gaps; privacy and security risks; vendor lock-in. - Fiscal constraints and project delays; brain drain and over-reliance on foreign cores. - Cross-border data, safety and provenance concerns; power allocation and reliability risks.	- Operationalize the data-protection law through sandbox DPIAs, privacy-preserving telemetry, and incident reporting; host sensitive workloads on sovereign or government-certified environments. - Negotiate open interfaces and portability in all procurements to mitigate vendor lock-in; adopt lightweight APO service standards for mobility, delivery, and tourism. - Tie EV fleet growth and smart-charging telemetry into dispatch policies to improve reliability while managing grid and cost risks.	- Sequence projects in low-risk increments with independent security testing, red-teaming for critical apps, and fallbacks to human-in-the-loop operations. - Establish a lean national AI policy note that prioritizes a few public value use-cases, names data custodians, and assigns assurance roles to avoid fragmentation. - Diversify financing (APO demos, development partners, platform co-funding), and publish open playbooks so progress continues even under budget pressure.

Source: Compiled by the authors.

Summary

Lao PDR's SWOT profile suggests an ecosystem that is building the right institutional and infrastructure foundations, but still faces binding capacity and execution constraints. Its strengths lie in its national digital economy vision and coordination mechanisms, early-stage data governance and sovereign infrastructure initiatives, improving connectivity and cross-border payments, and a set of live platforms that provide real deployment environments. However, the absence of a stand-alone AI strategy, low public sector and cybersecurity readiness, thin R&D and skills pipelines, uneven rural connectivity, and MoU-heavy implementation patterns limit the ability to scale from pilots into reliable, assured services. The opportunity set centers on using the APO, ASEAN, and UNESCO-aligned training and governance templates to close readiness gaps, leveraging nearby cloud regions and potential green energy positioning to reduce scaling costs, and prioritizing high-impact sectors, such as mobility, tourism, agro-SMEs, education, and health. The principal risks relate to widening inequality, privacy and security exposure, fiscal and delivery constraints, dependence on foreign cores, cross-border data and provenance concerns, and power reliability, implying that early progress should emphasize practical sandboxes, interoperable standards, and phased implementation with clear assurance and accountability.

Future Needs and Collaboration Pathways

Domestic Priorities

Digital Infrastructure

Lao PDR needs to consolidate and scale its emerging AI foundations into sustained national capacity. Priorities include fully operationalizing the National Data Center, government data exchange, and the pilot green-powered AI Innovation Center while advancing feasibility work for an AI Special Economic Zone in Vientiane to attract investment and anchor AI resources locally (Sengpaseuth, 2025). Institutional delivery should shift current MoUs and feasibility-stage initiatives into funded, governed systems over the next two to three years, supported by sustained financing and clear implementation responsibility (Xinhua, 2025).

Governance Capacity Building

Lao PDR has articulated its digital ambition through the Digital Economy Vision 2021–2040 and Digital Economy Strategy 2021–2030, but it has not yet issued a stand-alone National AI Strategy. A near-term option is a concise, productivity-first AI policy note under the existing digital economy framework, paired with responsible AI procurement rules, service standards, fairness audits, and a sequencing plan for integrating AI into energy, transport, tourism, and smart-city systems as connectivity expands (Devanesan, 2021; MTC, 2021b). Comparators in the region highlight the role of dedicated national AI strategies in anchoring delivery. Vietnam has implemented its National Strategy on Research, Development, and Application of AI (2021–2030) (Phuc, 2021), and Thailand adopted its National AI Strategy and Action Plan (2022–2027) (DigWatchNews, 2021).

Labor

Human-capital capacity building remains a binding constraint. Existing initiatives provide a foundation, including the EON Reality Spatial AI Center, XMT digital upskilling programs, and UNICEF's *Khang Panya Lao* e-learning platform, but they require expansion into a structured pipeline that produces applied AI practitioners and implementation-ready users (MTC, 2021b). This pipeline also requires Lao-language evaluation resources to ensure AI-enabled services operate reliably in tourism and public services.

Innovation Capacity, R&D, and Dependency Risks

Domestic innovation inputs remain limited, and AI-related intellectual property creation is negligible. The research also notes low R&D investment and limited AI patent activity, with dependence on donor

funding and foreign technology remaining high. Without targeted action, adoption risks widening rural–urban gaps and deepening reliance on external platforms and proprietary cores.

Productivity-first sequencing for adoption

A practical near-term delivery pathway is a productivity-first program that launches mobility and tourism sandboxes using common schemas and privacy-preserving metrics, publishes model clauses for responsible AI procurement, invests in frontline skills and data stewardship, and develops multilingual evaluation packs to strengthen service quality. Adoption can be accelerated through SME vouchers, curated toolsets, and local help desks while pilots are sequenced with human-in-the-loop assurance, open interfaces, and independent audits to reduce lock-in and sustain progress.

Collaboration Opportunities

Local Perspective

i) Applied AI for productivity in platforms and services

Local cooperation can center on applied AI that improves worker productivity, service reliability, and customer experience, reflecting early private-sector use cases in mobility and delivery platforms. Domestic platforms and industry need mechanisms to codesign and test AI systems using shared, privacy-preserving operational indicators, such as wait time, safety, traffic, and demand, supported through a mobility and commerce data sandbox hosted at the National Data Center. Sector-specific applied skills are also needed, including dispatcher analytics, multilingual AI-supported customer care, AI-assisted advertising, and SME marketing, paired with SME vouchers and operational playbooks to reduce adoption friction.

ii) Training institutions and Lao-language capability

Training institutions and higher education bodies (MOES, NUOL, and technical colleges) can support trainer-of-trainers programs, applied certification pathways, and Lao-language evaluation resources to ensure that systems perform reliably in tourism, education, and public services.

iii) Public-sector pilots, procurement, and Key Performance Indicators (KPIs)

Government cooperation can focus on public-value pilots in dispatch, queuing, translation, customer support, tourism experience packs, and EV-fleet routing. This can be reinforced through responsible AI procurement clauses on transparency, oversight, and data protection, backed by KPIs that track reliability, productivity, language quality, adoption, and EV charging utilization, implemented through defined ministry mandates and multi-stakeholder audits.

Global Perspective

Regional platforms and development partners

Lao PDR can deepen collaboration through regional AI platforms and development partners. The China-Laos AI Innovation Cooperation Center, framed as the first China–ASEAN AI platform, provides a channel for joint work on language technologies, AI model development, and applied pilots relevant to Lao services and markets (ChinaAseanMedia, 2025). ASEAN partners, such as Thailand and Vietnam are also positioned as practical counterparts for cross-border corridors in tourism and logistics under shared privacy and security rules. International organizations and APO networks can support multicountry grants, Centers of Excellence, trainer-of-trainers programs, and scalable digital learning models aligned with existing e-learning efforts, helping to move initiatives from the pilot stage to sustained national capability (MTC, 2021b).

APO Joint Initiatives

Shared Training Pipelines

i) **AI-in-operations academy**

APO members can launch a shared AI-in-operations academy focused on dispatch, queuing, and service reliability, with common curricula and applied modules that translate into measurable productivity gains in city services and platform operations.

ii) **Responsible AI procurement clinic**

APO members can establish a procurement clinic that provides reusable clauses and implementation templates for transparent public-sector AI adoption, including requirements for human oversight, auditability, data protection, uptime expectations, and open interfaces.

iii) **Data-steward bootcamp**

A regional data steward bootcamp can train staff to operate secure sandboxes, manage privacy-preserving data sharing, and apply operational governance practices that support cross-agency and cross-border collaboration.

Data, Evaluation, and Safety

i) **Multilingual benchmark consortium**

APO members can form a consortium to build multilingual evaluation packs for Lao and other regional languages, supporting reliable AI performance in public services and tourism, and reducing dependence on Western-centric benchmarks.

ii) **Women's safety and accessibility lab**

A regional lab can assess gender-based disparate impacts in dispatch and pricing while designing women's safety and disability-access features that enhance service quality and trust in mobility and delivery contexts.

Applied Pilots and Service Packs

i) **Mobility reliability sandbox**

A shared mobility reliability sandbox can standardize KPIs across APO cities, enabling comparable measurement of reliability, safety, and service quality while accelerating learning through a common operational framework.

ii) **Tourism translate-verify-pay-ride pack**

A tourism pack can integrate AI translation, verified listings, QR payments, and ride-booking interfaces to raise service quality and consistency for visitors across participating economies.

iii) **Green EV fleet routing and smart-charging interoperability**

APO members can pilot green EV fleet routing and smart-charging interoperability, linking charger uptime monitoring and telemetry to dispatch logic to improve reliability and support grid management.

iv) **Agro-SME quality and traceability tools**

Applied pilots can develop AI tools for agro-SME quality control and traceability, supporting productivity and market access through practical, low-burden implementations.

v) SME AI voucher and marketplace plus social-commerce accelerator

A combined voucher mechanism and curated marketplace of vetted tools can reduce entry barriers for SMEs while a social commerce accelerator supports adoption through playbooks, onboarding support, and shared implementation know-how.

Standards, Oversight, and Continuity

i) AI service standards forum

APO members can institutionalize learning from pilots into lightweight service standards that improve interoperability and operational quality without imposing heavy compliance burdens.

ii) Public-sector AI fellowships

A fellowship track can build implementation capacity in government by placing trained practitioners into priority agencies and pilot sites, strengthening delivery and retention of applied expertise.

iii) Impact and fairness observatory with public scorecards

A regional observatory can publish scorecards on reliability, inclusion, and fairness outcomes, supporting accountability and sustained learning as deployments scale.

iv) Lao PDR participation and hosting roles

Lao PDR can contribute leadership by hosting early mobility and tourism pilots in Vientiane, chairing the safety and accessibility lab, and co-curating Lao-language benchmarks supported through APO cost-sharing and grant financing.

CHAPTER 9

MALAYSIA

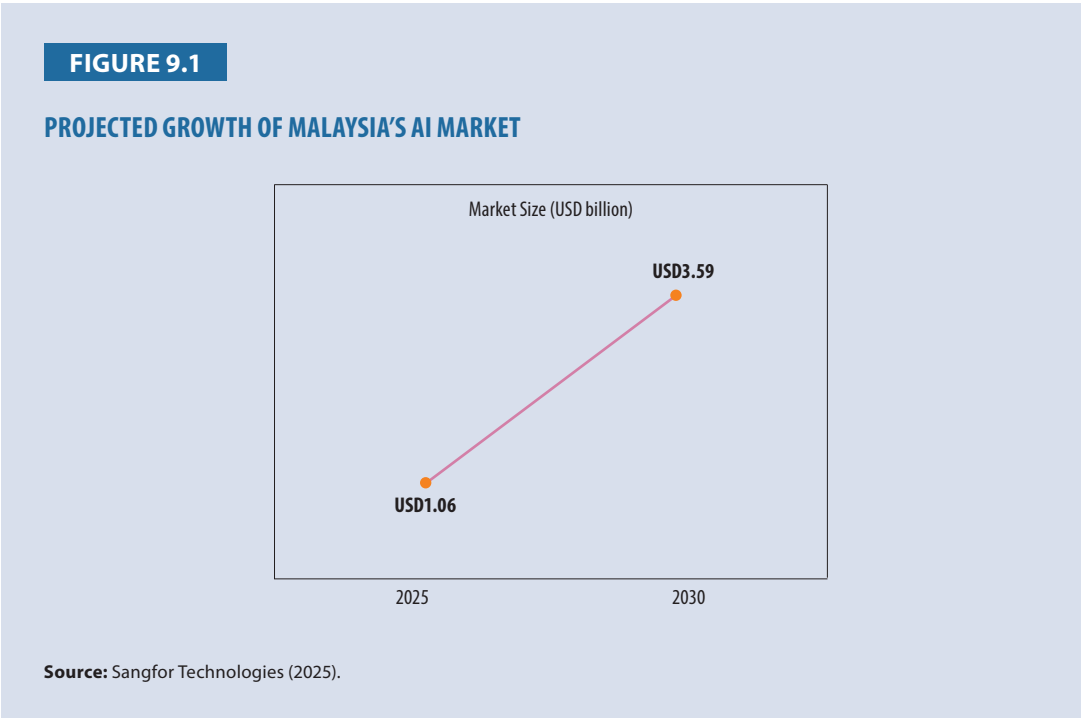
Each member economy is assessed through a common analytical framework covering five core dimensions: (i) ecosystem baseline; (ii) policy and strategy; (iii) stakeholder landscape; (iv) strategic positioning; and (v) future pathways. This structure enables consistent cross-economy comparison while allowing for context-specific insights into how AI capabilities are developed, governed, and applied in practice.

AI Ecosystem Baseline Assessment

This section provides a quantitative assessment of AI development in Malaysia and surveys recent trends. It consolidates key indicators related to AI adoption, market growth, workforce dynamics, R&D investment, and innovation output to establish a statistical baseline for the nation's AI readiness.

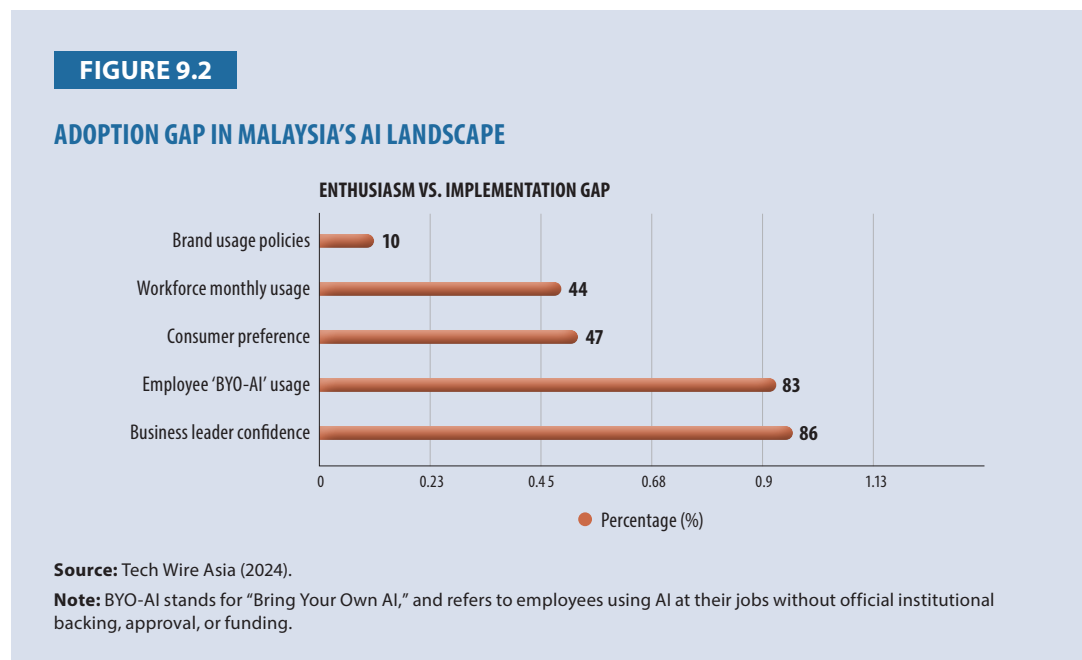
AI Adoption in Malaysia

Malaysia's AI market is on a steep growth trajectory, exhibiting strong economic potential and attracting significant government and private sector interest. The total value of the market is projected to reach USD1.06 billion in 2025, with forecasts indicating a compound annual growth rate (CAGR) of 27.63% and a value of USD3.59 billion by 2030 (Sangfor Technologies, 2025). This rapid expansion is expected to have a profound macroeconomic impact, with multiple analyses estimating that AI could contribute approximately USD115 billion to Malaysia's GDP by 2030 (Chambers and Partners, 2025) (Figure 9.1).



This potential is fueled by a high level of enthusiasm and growing acceptance of AI among the general populace and business leaders. According to Microsoft's 2025 Work Trend Index, 86% of Malaysian business leaders are confident in using AI agents to expand their workforce capacity (Complete AI Training, 2025). This sentiment is mirrored in the workforce, where 44% of Malaysians report using generative AI on a monthly basis, a figure that surpasses the global average of 39% (Marketing-Interactive, 2025). Tech Wire Asia (2024) reported that consumer behavior is also shifting, with 47% of Malaysian consumers expressing a preference for AI-assisted brand interactions over human ones, again exceeding the global average.

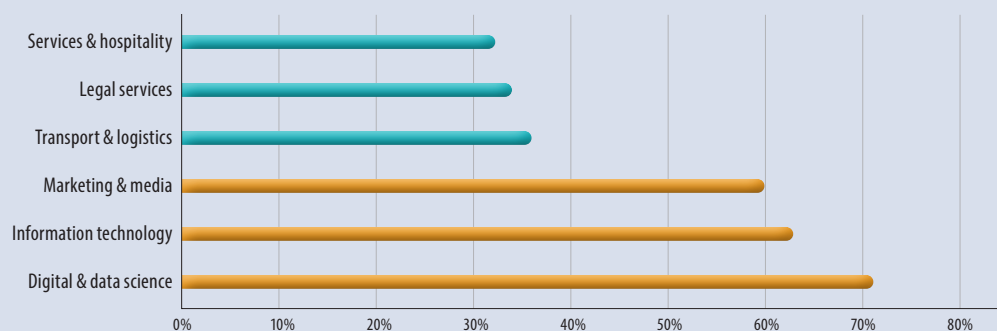
However, as depicted in Figure 9.2, a critical disconnect exists between this widespread enthusiasm and strategic corporate implementation. While employees and consumers are readily adopting AI tools, Malaysian businesses, particularly in traditional sectors, are lagging. A 2024 study by Adobe found that only 10% of Malaysian brands have internal usage policies, even as Malaysian consumers prefer them (Tech Wire Asia, 2024). This points to a significant adoption-implementation gap. The evidence suggests that much of the current AI usage in the workplace is bottom-up, with 83% of AI users in one survey reporting that they bring their own AI tools to work (Complete AI Training, 2025). This ad hoc adoption, while demonstrating workforce initiative, introduces risks related to data security, privacy, and a lack of strategic alignment with corporate goals.



The adoption rate also varies significantly across industries (Figure 9.3), revealing a clear sectoral divide. Unsurprisingly, technology-native sectors show the highest utilization rates. Firms in the digitalization, data science, and AI sectors (71%), IT (63%), and marketing and media (60%) (Marketing-Interactive, 2025) are among the most eager adopters of AI. In contrast, adoption lags in traditional industries, such as transportation (36%), legal services (34%), and services and hospitality (32%) (Marketing-Interactive, 2025). Academic research confirms that AI adoption in the manufacturing industry and other key sectors remains limited, with one study noting that only 26% of Malaysian businesses had begun adopting AI as of 2019 (Ghani et al., 2025). This disparity highlights that while the tools and enthusiasm are present, the capacity to strategically integrate AI into legacy business processes remains a major hurdle for a large portion of the economy. Closing this gap represents a primary challenge and a substantial untapped productivity opportunity for Malaysia.

FIGURE 9.3

AI ADOPTION RATES BY SECTOR IN MALAYSIA

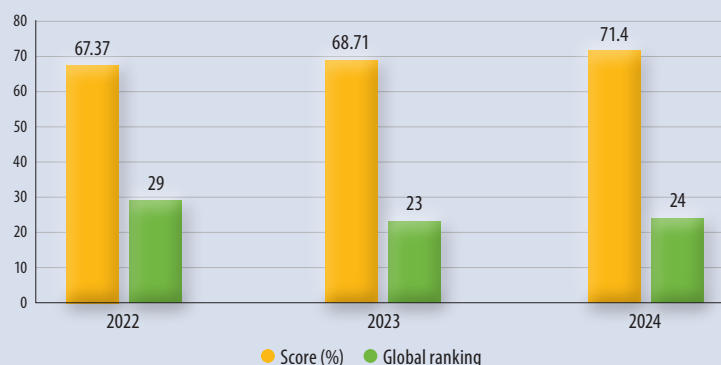


Source: Marketing-Interactive (2025).

In the public sector (Figure 9.4), Malaysia's global ranking in the Government AI Readiness Index increased from 29th in 2022 to 23rd in 2023 (Malaysian Investment Development Authority [MIDA], 2025). Its readiness index score was 68.71% overall in 2023, up from 67.37% in 2022. Malaysia ranked second in the ASEAN bloc, behind only Singapore. In 2024, its scores jumped to 71.4%, even as its global ranking slid to 24th (Oxford Insights, 2024).

FIGURE 9.4

MALAYSIA'S GOVERNMENT AI READINESS INDEX



Source: Oxford Insights (2024).

AI Workforce in Malaysia

The most significant constraint on Malaysia's AI ambitions is a severe and widely acknowledged talent deficit. The nation is projected to require an additional 500,000 skilled workers by 2030 to meet the demands of its technology and technical sectors (Staffing Industry Analysts, 2025a). This demand is driven by the transformative impact of automation and AI. A national study conducted by TalentCorp, an agency under the Ministry of Human Resources (KESUMA), found that while approximately 620,000 existing jobs are at high risk of displacement due to automation, 60 new and emerging roles

have been identified, with a remarkable 70% of these new roles being in AI and digital technologies. This underscores the need for large-scale reskilling and upskilling.

The Malaysian workforce is acutely aware of this impending shift. Surveys indicate that 79% of professionals anticipate AI will change their roles, and a majority (57%) express openness to retraining to remain competitive (HR Hub, 2025a). However, awareness does not equate to preparedness. A significant exposure gap persists, with one in three Malaysian workers having never used AI tools in a professional capacity. This gap is strongly correlated with age, as 73% of baby boomers and 42% of Gen X workers have never used AI at work, compared with much higher adoption rates among younger generations (Staffing Industry Analysts, 2025b). This generational divide in AI literacy presents a major challenge for workforce transformation. Furthermore, a report from the National AI Office (NAIO) indicates that only 19% of Malaysians feel they possess adequate digital skills for their current jobs, highlighting a deep-seated skills gap that extends beyond just AI (National AI Office [NAIO], 2025a). Academic papers echo these concerns, identifying the shortage of AI talent and the skills gap as primary challenges for AI implementation in Malaysia (Muhammad Darus et al., 2025).

The Malaysian government is responding with substantial, large-scale initiatives. KESUMA and its agencies, Talent Corporation Malaysia Berhad (TalentCorp) and the Human Resource Development Corporation (HRD Corp), are at the forefront of this effort. A key initiative is the AI For Educators program, a collaboration with the Ministry of Education aimed at training nearly 400,000 teachers to integrate AI into the learning process (HR Hub, 2025b). To foster closer industry alignment, the MyMahir National AI Council for Industry (MyMahir-NAICI) was established in May 2025 as a joint effort between TalentCorp and the NAIO. This council serves as a national platform to align AI talent development with real-world industry needs (Human Resources Online, 2025). These initiatives are supported by a significant annual national outlay of MYR10 billion (USD2.4 billion) for skills-related education and training (World Economic Forum [WEF], 2025).

These efforts represent considerable investments in the “hardware” of talent development: funding, councils, and training platforms. However, the “software” component, which includes pedagogical adaptation, curriculum relevance, and overcoming cultural inertia, appears to be lagging. A high percentage of workers (55%) report that they would like clearer guidance from their employers on which specific skills to learn, suggesting a disconnect between the supply of national-level training programs and the precise, evolving demands of the job market (Marketing-Interactive, 2025). The success of Malaysia's talent strategy will therefore depend not just on the quantity of individuals trained, but on the quality, relevance, and agility of the training provided, necessitating a more demand-driven approach with tighter feedback loops between industry and training institutions (Environment-Behaviour Proceedings Journal, 2025).

AI R&D and Investment in Malaysia

Malaysia's AI investment landscape is characterized by a stark and telling dichotomy: while it has successfully attracted a large amount of foreign investment in foundational digital infrastructure, its domestic R&D ecosystem shows signs of volatility and structural weakness.

The nation has successfully positioned itself as a regional powerhouse of data center and digital infrastructure investment. In 2024 alone, Malaysia attracted a staggering USD16.9 billion in commitments from global technology giants (MIDA, 2025a). This includes landmark investments from Microsoft (USD2.2 billion for cloud and AI), Google (USD2 billion for its first data center in the region and Google Cloud servers), and Amazon Web Services (AWS) (USD6.2 billion through 2038) (MIDA, 2025b). These investments are cementing Malaysia's status as Southeast Asia's leading data center hub and providing the critical, high-capacity computing infrastructure necessary for large-scale AI deployment (Sangfor Technologies, 2025).

However, the domestic R&D landscape is bleaker. According to data from the Malaysian Science, Technology Information Centre (MASTIC), the country's Gross Expenditure on R&D (GERD) has been volatile. After reaching a peak of MYR17.685 billion (~USD4.5 billion) in 2016, GERD declined

by 14.8% in 2018 before experiencing a slight recovery to MYR15.833 billion (~USD4 billion) in 2020, which remained 10.5% below the 2016 peak (Malaysian Science and Technology Information Centre [MASTIC], 2025). More concerning is the underlying structural shift in funding sources. Between 2010 and 2020, the contribution of the Business Enterprise (BE) sector to R&D funding plummeted from 64.5% to just 34.2%. Over the same period, the share funded by universities and institutions of higher learning surged from 29% to 47.3%, making academia the primary source of R&D funding in the country (MASTIC, 2025).

This divergence reveals a critical imbalance. Malaysia is becoming a world-class “host” for AI infrastructure but is struggling to be a world-class “originator” of homegrown AI innovation. The enormous influx of foreign capital is building digital highways, but the decline in business-led R&D suggests that local companies are creating fewer of the vehicles that will run on them. This creates a potential dependency risk, where Malaysia excels in the lower-value activity of data hosting while innovation and intellectual property (IP) are generated elsewhere. The government has recognized this, and its 2025 budget allocates MYR600 million (~USD151.7 million) to R&D under the Ministry of Science, Technology and Innovation (MOSTI) and the Ministry of Higher Education (MOHE), and MYR10 million (~USD2.5 million) for the new NAI0 (MIDA, 2025a). However, revitalizing private-sector R&D will be crucial if Malaysia is to transition from being primarily an AI consumer to an AI producer, a stated goal of the NAI0 (2025b).

AI-Related Patent Applications

A significant challenge in assessing Malaysia's AI innovation output is the absence of official, publicly available statistics specifically tracking AI-related patent applications. Public sources, such as the Intellectual Property Corporation of Malaysia (MyIPO) and the Department of Statistics Malaysia do not currently provide a technological breakdown of patent filings that would isolate AI-related inventions (Complete AI Training, 2025). General data from MyIPO shows total patent applications filed and granted but does not categorize them by technology field (Intellectual Property Corporation of Malaysia [MyIPO], 2025). Similarly, the World Intellectual Property Organization's (WIPO) 2024 country profile for Malaysia provides aggregate data, reporting 7,405 total patent applications filed by residents and nonresidents, ranking the country 25th globally. However, the source does not offer an AI-specific analysis (World Intellectual Property Organization [WIPO], 2025a, 2025b).

This data gap represents a critical weakness in the nation's ability to conduct evidence-based policymaking for the AI sector. Without metrics on AI patenting activity, policymakers are effectively flying blind, unable to accurately measure innovative output, identify which technological subfields (e.g., computer vision, natural language processing, robotics) are gaining traction domestically, pinpoint key local innovators (universities vs. start-ups), or benchmark national performance against regional competitors. While WIPO has developed sophisticated methodologies and search tools to track AI patent trends globally, these have not yet been systematically applied to produce a specific, official report for Malaysia (WIPO, 2025c).

The legal framework for patenting AI in Malaysia also remains in its infancy. The Malaysian Patents Act 1983 does not explicitly mention AI. However, guidelines issued by MyIPO clarify that for an AI-related invention to be patentable, it must possess “technical character” (Saim, 2024). A more fundamental challenge lies in the definition of inventorship. Saim (2024) also highlighted that like many jurisdictions worldwide, Malaysian patent law currently recognizes only human inventors, which poses a significant hurdle for protecting inventions generated autonomously by AI systems. This legal ambiguity, combined with the statistical invisibility of AI innovation, underscores the need for institutional modernization. Establishing an official methodology to track AI-related IP is a foundational step required to guide and measure the success of Malaysia's national AI strategy.

TABLE 9.1

KEY AI DEVELOPMENT INDICATORS FOR MALAYSIA, 2020–25

Indicator	Value	Year(s)
AI Market Size (Projected) Source: Sangfor Technologies (2025).	USD1.06 billion	2025
Projected AI Contribution to GDP Source: Chambers and Partners (2025).	USD115 billion	by 2030
Business Leader Confidence in AI Source: Complete AI Training (2025).	86% confident in using AI agents	2025
Workforce AI Usage Source: Marketing-Interactive (2025).	44% use generative AI monthly	2024
Gross Expenditure on R&D (GERD) Source: MASTIC (2025).	MYR15.833 billion/USD4 billion (1.04% of GDP)	2020
Business Enterprise Share of R&D Funding Source: MASTIC (2025).	34.2%	2020
Announced FDI in Digital/AI Infrastructure Source: MIDA (2025a).	USD16.9 billion	2024
Total Patent Applications (All Fields) Source: WIPO (2025a).	7,405	2023
AI-Related Patent Applications Source: MyIPO (2025).	Data unavailable	N/A
Number of AI Researchers/Workforce Source: PubMed Central (PMC) (2025b).	Data unavailable	N/A
Projected Tech Talent Deficit Source: Staffing Industry Analysts (2025a).	500,000 skilled workers	by 2030

Note: Data represents the latest available information from the cited sources. “Data unavailable” indicates that no official, specific statistic could be located from the provided research material.

TABLE 9.2

SECTORAL ADOPTION OF AI TOOLS IN MALAYSIA (SELECTED SECTORS, 2024)

Sector/Occupational Field	Approximate Share of Respondents Using Generative AI	Year
Digitalization, data science, & AI	71%	2024
IT	63%	2024
Marketing & media	60%	2024
Transport, logistics, & supply chain	36%	2024
Legal services	34%	2024
Services & hospitality	32%	2024

Source: Marketing-Interactive (2025).

TABLE 9.3

SELECTED INDICATORS OF AI USE IN MALAYSIA, 2023–25

Indicator	Value/Statistic	Year
Professionals expecting AI to change their role Source: HR Hub (2025a).	79% of professionals	2024
Professionals willing to retrain/upskill due to AI Source: HR Hub (2025a).	57% of professionals	2024
Workers who have never used AI tools at work Source: Staffing Industry Analysts (2025b).	≈33% of workers	2024
Baby Boomer workers who have never used AI at work Source: Staffing Industry Analysts (2025b).	73% of Baby Boomers	2024
Gen X workers who have never used AI at work Source: Staffing Industry Analysts (2025b).	42% of Gen X workers	2024
Workers wanting clearer guidance on which AI skills to learn Source: Marketing-Interactive. (2025).	55% of workers	2024

TABLE 9.4

AI-RELATED R&D INDICATORS IN MALAYSIA, TIME SERIES TRENDS

Indicator	Value/Statistic	Year
Gross expenditure on R&D (GERD)	MYR17.685 billion (~USD4.5 billion)	2016
Gross expenditure on R&D (GERD)	≈MYR15.068 billion (~USD4 billion) (14.8% below 2016)	2018
Gross expenditure on R&D (GERD)	≈MYR15.833 billion (~USD4 billion) (1.04% of GDP; 10.5% below 2016)	2020
Business enterprise share of R&D funding	64.5%	2010
Business enterprise share of R&D funding	34.2%	2020
Higher learning institutions share of R&D funding	29.0%	2010
Higher learning institutions share of R&D funding	47.3%	2020

Source: MASTIC (2025).

National AI Policies and Strategies

This section analyzes Malaysia's national strategies and policies designed to guide the development and adoption of AI. It examines the foundational AI Roadmap, the evolution of the governance architecture with the establishment of the National AI Office (NAIO) and new ethics guidelines, and the complex web of policies across various government ministries.

National AI Strategy of Malaysia

Malaysia's formal strategic journey in AI began with the launch of the National Artificial Intelligence Roadmap (AI-Rmap) 2021–2025 (Digital Watch, 2025). Published by the MOSTI, this document serves as the nation's foundational blueprint for AI development (Sharef, 2025); MASTIC, 2025a). Its mission is to cultivate a thriving national AI ecosystem that enables government, businesses, and citizens to capitalize on AI's benefits for economic prosperity and social well-being (Digital Watch, 2025).

The AI-Rmap is organized around six strategic pillars, each backed by initiatives intended to build a comprehensive national AI ecosystem (Digital Watch, 2025). First, it emphasizes establishing AI

governance by developing a robust structure of policies, regulations, and risk management systems; a flagship initiative under this pillar is the proposed transformation of Technology Park Malaysia into a National AI Park. Second, it prioritizes advancing AI R&D by strengthening both fundamental and applied research and embedding AI capabilities within national research institutes. Third, it focuses on strengthening digital infrastructure by expanding the enabling backbone, promoting cloud adoption while improving data sharing, connectivity, and interoperability across systems.

The remaining pillars concentrate on people, diffusion, and innovation dynamics. The fourth pillar, fostering AI talents, targets workforce development through reskilling and upskilling efforts alongside more comprehensive AI education pathways. The fifth pillar, acculturating AI, aims to raise public and organizational awareness and to accelerate adoption across all sectors of society. The sixth and final pillar, the roadmap seeks to kick-start a national AI innovation ecosystem by building a sustainable innovation pipeline through a Quadruple Helix model linking government, academia, industry, and society, and by connecting domestic initiatives to global innovation networks.

While the AI-Rmap provides a crucial and comprehensive starting point, its strategic relevance has been affected by the pace of technological change. Released in 2021, the roadmap was formulated before the global expansion of generative AI, marked by the launch of ChatGPT in late 2022 (MIDA, 2025b). This has led to a widely held view among experts and industry stakeholders that the document is now outdated (MIDA, 2025c). It lacks specific strategies to address the unique opportunities, such as hyper-productivity and content generation, and the distinct challenges, including ethical dilemmas, misinformation, and the immense computational costs associated with large language models, that define the current AI paradigm (MIDA, 2025c). This has created a policy gap, necessitating a reactive approach from the government to keep pace with the technology's rapid evolution. Consequently, there is strong consensus on the need to refresh the roadmap or formulate a successor to guide Malaysia's next phase of AI development (MIDA, 2025b).

AI Policies in Malaysia

In response to the rapidly evolving AI landscape and the limitations of the existing roadmap, the Malaysian government has made a decisive shift from high-level strategic planning towards creating a more robust and hands-on governance architecture. This pivot is embodied by two key initiatives: the establishment of the NAIIO and the publication of the National Artificial Intelligence Governance and Ethics (AIGE) Guidelines.

The NAIIO was officially established on 28 August 2024, and is incubated under the MyDigital Corporation, which falls under the purview of the Ministry of Digital (NAIO, 2025b). The NAIIO is mandated to serve as the central authority for advancing the national AI agenda. Its core functions include driving AI investment, promoting innovation, fostering collaboration, formulating robust policy, and ensuring governance and security. This move centralizes coordination and signals a more focused effort to manage the national AI ecosystem. Crucially, the NAIIO is tasked with developing the successor to the AI-Rmap, the AI Technology Action Plan 2026–2030 as well as an AI Adoption Regulatory Framework and a formal AI Code of Ethics.

Complementing the establishment of the NAIIO, MOSTI launched the AIGE Guidelines in September 2024 (JustAI, 2024). These guidelines are voluntary and are intended to provide a comprehensive framework for the safe, responsible, and ethical deployment of AI technologies (Corinium Intelligence, 2025); (NAIO, 2025c). The AIGE framework is anchored in seven core principles aligned with global best practices, including the OECD AI Principles (National Tech Association of Malaysia [PIKOM], 2025).

In practice, the guidelines call for fairness, meaning AI systems should avoid bias and promote equitable outcomes. They emphasize reliability, safety, and control, requiring systems to be resilient and secure, to function as intended, and to include mechanisms for meaningful human oversight. They also stress privacy and security, requiring protection of personal data and safeguards against unauthorized access. The framework further promotes inclusiveness, urging developers to design AI

that benefits diverse populations without discrimination, and transparency, so that AI decision-making processes are explainable and understandable. Finally, the guidelines highlight accountability, assigning responsibility to developers and users for AI-driven outcomes, and the pursuit of human well-being, positioning human-centered values as the ultimate objective of AI deployment.

Together, the NAIIO and the AIGE guidelines represent a maturation of Malaysia's national approach to AI. The focus has clearly shifted from simply promoting AI adoption to actively governing its development and deployment. This reflects recognition that building public and investor trust through a clear, predictable, and ethical regulatory environment is a prerequisite for unlocking AI's full economic and social potential. The effectiveness of the NAIIO and the future status of the AIGE guidelines, include whether they remain voluntary or evolve into binding regulation, will be critical determinants of Malaysia's success in the global AI landscape (Said & Nabilah, 2024).

From the National AI Roadmap 2021–2025 to the National AI Action Plan 2030

The next phase of Malaysia's AI strategy is being shaped through a successor framework to the National AI Roadmap (AI-Rmap) 2021–2025. As of late 2025, this successor is variously referred to as the AI Technology Action Plan 2026–2030 and the National AI Action Plan 2026–2030 or National AI Action Plan 2030 (NAIO, 2025). For consistency, this report uses National AI Action Plan 2030 to denote this emerging framework, which is being developed under the leadership of the NAIIO and the Ministry of Digital. As of December 2025, the framework remains under development. However, the draft version has been publicly distributed by the NAIIO to collect feedback from various stakeholders prior to finalizing the framework.

The improved framework is intended to guide Malaysia over the period from 2026 to 2030 toward the national objective of becoming an “AI Nation” and achieving inclusive and sustainable AI-driven growth by 2030. Within this framework, the NAIIO has structured the National AI Action Plan 2030 around five strategic priorities: (i) delivering measurable sectoral impact; (ii) embedding responsible and ethical AI consistent with the AIGE; (iii) building robust AI talent pipelines; (iv) supporting local AI innovation and ecosystem growth; and (v) ensuring coordinated government execution across ministries and agencies. Compared with the AI-Rmap 2021–2025, this represents a substantive evolution designed to address the earlier roadmap's most significant limitations.

Taken together, the National AI Action Plan 2030 signals a qualitative shift in Malaysia's AI strategy. It moves from a broad blueprint to an execution-oriented plan with clearer sectoral and time-bound focus; from technology-first optimism to ethics-anchored, risk-aware governance; from institutional fragmentation to a NAIIO-centered coordination model; and from announcement-driven policy to a framework oriented around outcomes and indicators. If implemented effectively and supported with adequate resources, the plan directly responds to several structural weaknesses, particularly: (i) the obsolescence of the AI-Rmap 2021–2025 in the era of generative AI; (ii) the fragmented and reactive policy environment; (iii) the lack of AI-specific indicators and measurable targets; (iv) persistent talent and adoption gaps; and (v) an underdeveloped local innovation ecosystem. These are highlighted in the SWOT analysis below.

At the same time, the plan's eventual impact will hinge on three critical success factors. The first is regulatory follow-through: whether the Action Plan, AIGE Guidelines, AI Adoption Regulatory Framework, and AI Code of Ethics remain largely voluntary or evolve into binding, enforceable instruments with clear accountability mechanisms. The second is budgetary and institutional alignment: whether the NAIIO can secure sustained funding and sufficient authority to harmonize the strategies and budgets of key ministries (Digital, MOSTI, KESUMA, MOHE, MITI (Ministry of Investment, Trade and Industry)) around Action Plan priorities, rather than functioning primarily as a coordinating secretariat. The third is inclusiveness and mitigation of the AI divide: whether implementation ensures that AI benefits extend beyond large firms and urban elites to SMEs, rural communities, and vulnerable groups, thereby reducing the risk that unequal diffusion undermines social cohesion.

For Malaysia's productivity agenda, the National AI Action Plan 2030 therefore serves as a bridge between the foundational ecosystem developed under the AI-Rmap 2021–2025 and the country's ambition to become an inclusive, trusted, and regionally competitive AI Nation by 2030.

Key Measures and Programs

Malaysia's AI policy landscape is driven by at least five major ministries, each advancing distinct but interconnected initiatives. This breadth signals strong government engagement, but it also creates a serious coordination challenge, one that the newly formed NAIIO is explicitly meant to address by coordinating the nominally independent ministries.

MOSTI, as the traditional custodian of science and technology policy, built much of the early institutional foundation. It developed the AI-Rmap 2021–2025 and later issued the AIGE Guidelines (AIPA Lync., 2025) while continuing to oversee national science and technology R&D funding streams that include allocations for AI research (MIDA, 2025a). The Ministry of Digital, by contrast, has become central to operationalizing Malaysia's national digital agenda. It oversees MyDigital Corporation, which incubates the NAIIO, positioning it as the de facto lead for AI governance and strategy implementation (NAIO, 2025b). Within this portfolio, the Malaysia Digital Economy Corporation (MDEC) runs major programs, such as "Malaysia Digital" and administers commercialization-oriented grants, including Malaysia Digital Acceleration Grant - Artificial Intelligence (MDAG-AI) (TechNode Global, 2025).

A parallel track focuses on talent development and workforce adjustment. KESUMA leads the talent and workforce development pillar through agencies, such as TalentCorp, and HRD Corp, which drive upskilling and reskilling programs, conduct impact studies on AI and employment, and coordinate cooperative efforts between academia and the private sector through the MyMahir National AI Council (WEF, 2025). The MOHE complements this by building the longer-term talent pipeline, encouraging and funding public universities to establish dedicated AI faculties and embed AI-focused education across curricula (Sharef, 2025; MIDA, 2025d). The 2025 budget reinforced this strategic direction, allocating MYR50 million (~USD12.6 million) to research universities, with the aim of developing specialized AI applications in areas, such as medicine and semiconductors (BusinessToday, 2024a).

MITI anchors the industrial and geopolitical side of the strategy. It oversees the New Industrial Master Plan 2030 (NIMP2030), including manufacturing-focused digital transformation efforts, and administers programs, such as SmartMFG+ (TechNode Global, 2025) to support firm-level upgrading. At the same time, MITI manages sensitive technology trade issues: in July 2025, it invoked the Strategic Trade Act 2010 to introduce permit requirements for the export and transshipment of high-performance AI chips, reflecting the growing influence of geopolitical constraints on industrial technology policy (AInvest, 2025).

Given that these responsibilities are distributed across multiple powerful ministries, the system faces a real risk of policy silos and fragmentation, and industry stakeholders have called for a more aligned approach with a clear overall direction (MIDA, 2025c). In practical terms, aligning talent development led by KESUMA and MOHE with the evolving needs of industries being transformed under MITI and MDEC requires seamless, real-time coordination. The NAIIO is intended to provide that central integrating function, but its effectiveness will ultimately depend on whether it can harmonize strategies, budgets, and program design across these ministerial actors rather than simply coordinating them in name.

TABLE 9.5

MALAYSIA'S NATIONAL AI POLICY MATRIX

Policy/Initiative Name	Launch/ Established Year	Executive Authority	Key Objectives & Measures	Budget (if available)
National AI Roadmap (AI-Rmap) Source: MASTIC (2025a).	2021	MOSTI	Provide foundational strategy for AI development across governance, R&D, infrastructure, talent, and ecosystem.	N/A
National AI Governance & Ethics (AIGE) Guidelines Source: NAI0 (2025c).	2024	MOSTI	Establish a voluntary framework for responsible and ethical AI deployment based on seven core principles.	N/A
National AI Office (NAIO) Source: MIDA (2025a).	2024	Ministry of Digital/ MyDigital Corp.	Act as the central authority to coordinate national AI strategy, policy, and governance. To develop the AI Technology Action Plan 2026–2030.	MYR10 million (~USD2.5 million) (Budget 2025)
National AI Action Plan 2030 (draft version) Source: NAI0 (2025e).	2025	Ministry of Digital/ MyDigital Corp.	A continuation of the previously developed National AI Roadmap (AI-Rmap). Addresses the weaknesses of its predecessor, particularly in addressing the challenges and opportunities that emerge due to the rise of generative AI.	N/A
AI Sandbox Programme (under NTIS) Source: Ministry of Science, Technology and Innovation [MOSTI] (2025).	2024	MOSTI / MRANTI (NTIS)	• Live environment testing and piloting of AI solutions • Access to AI compute/tools, curated capacity building, regulatory facilitation, and matchmaking to accelerate adoption and commercialization (initial phase launched virtually; NVIDIA collaboration announced)	N/A
MyMahir National AI Council for Industry Source: WEF (2025, June).	2025	KESUMA / TalentCorp	Align AI talent development with industry needs through a Government-Industry-Academia-Training Provider (GIAT) model.	Part of MYR10 billion (~USD2.5 billion) annual skills fund
Malaysia Digital Acceleration Grant - Artificial Intelligence (MDAG-AI) Source: TechNode Global (2025).	2025	MDEC	Provide funding to support the commercialization of AI solutions by local Malaysia Digital (MD) status companies.	Up to MYR2 million (~USD506,000) per company
Strategic Trade Act (STA) 2010 - AI Chip Controls Source: AInvest (2025).	2025	MITI	Regulate the export and transshipment of high-performance AI chips to manage geopolitical risks and ensure trade compliance.	N/A
AI in Higher Education Initiative Source: BusinessToday (2024a).	2025	MOHE	Fund and encourage research universities to establish AI faculties and develop specialized AI programs.	MYR50 million (~USD12.6 million) (Budget 2025)

Key Stakeholder Mapping

Malaysia's AI ecosystem is shaped by a combination of private-sector infrastructure buildout, government-led commercialization and adoption programs, and a university system that anchors domestic research and talent development. The ecosystem is characterized by strong participation from multinational technology firms alongside an emerging set of local champions working across compute infrastructure, national-language models, and sector-specific applications.

Private Sector

Malaysia's private sector combines multinational corporations that supply core cloud and data center capacity with local firms that are beginning to build and deploy Malaysian AI capabilities across finance, energy, telecommunications, logistics, and manufacturing.

Major Players

Multinational corporations (MNCs) are central to Malaysia's AI infrastructure layer through large investments in data centers and cloud regions by Microsoft, Google, Amazon Web Services (AWS), and NVIDIA (MIDA, 2025b). These firms also play a major role in talent development. Microsoft has committed to providing AI skilling opportunities for 200,000 Malaysians, and its AI for Malaysia's Future (AI-For-MY-Future) program targets 800,000 participants (Sangfor Technologies, 2025) through a government-linked skilling partnership.

YTL Corporation/YTL Power

YTL has emerged as a leading local orchestrator across compute, model development, and application deployment. Its collaboration with NVIDIA links next-generation AI compute to YTL Power's Green Data Centre Park in Kulai, Johor, positioning the site as a cornerstone of Malaysia's ambition to function as an AI hub and enabling large-scale AI workloads (New Straits Times, 2025a; The Star, 2025a). YTL AI Labs (2025) has developed ILMU, positioned as Malaysia's first multimodal large language model (LLM), built with Universiti Malaya (UM), with an emphasis on local language performance, onshore data control, and national use cases (YTL Community, 2025; New Straits Times, 2025b; Malaysiakini, 2025). In financial services, Ryt Bank, a digital bank jointly led by YTL Digital Capital and Sea Ltd, received regulatory approval and launched publicly in 2025. Its in-app assistant, Ryt AI, is powered by ILMU, embedding a domestic LLM into a regulated, high-stakes deployment environment (Ryt Bank, 2025; SoyaCincau, 2025). Together, these elements form a comparatively rare end-to-end pathway in an emerging market context, linking compute infrastructure, a national model, and a consumer-facing application layer (PR Newswire, 2025; New Straits Times, 2025c; FinTech Futures, 2025).

Others

Beyond YTL, major Malaysian enterprises are integrating AI into core operations and positioning domestic capabilities for secure and compliant deployment. Petrolia Nasional Berhad (PETRONAS) operates an AI Center of Excellence and is scaling AI for operational efficiency and the energy transition through an expanded strategic collaboration with Microsoft (Petrolia Nasional Berhad, 2025; The Star, 2025b). Telekom Malaysia is positioning national cloud and AI services for government and regulated workloads, reinforcing domestic options for compliant AI hosting and deployment (Telekom Malaysia, 2025). In industrial automation and machine vision, Penang-based firms, such as ViTrox and Pentamaster, continue to integrate AI on the factory floor while Western Digital's Batu Kawan facility has been recognized as a World Economic Forum Sustainability Lighthouse, underscoring advanced analytics and automation practices in Malaysia's electrical and electronics cluster (Western Digital, 2022).

Core Products and Services

Malaysia's AI activity is increasingly visible in logistics, manufacturing, and finance as firms move from pilots toward operational scaling. In logistics, CelcomDigi and DHL demonstrated Malaysia's

first 5G-powered, AI-enabled autonomous warehouse, showing how computer vision and robotics can improve accuracy and throughput in inventory management (Global System for Mobile Communications Association, 2025) while enabling broader rollout pathways. In manufacturing, the adoption of agentic AI and advanced analytics in Penang’s production environments is strengthening readiness for more compute-intensive AI workloads, particularly as supporting infrastructure, such as grid capacity, improves. In finance, while Ryt Bank has developed a native AI stack, incumbent programs include Maybank’s partnership with Microsoft focused on security and AI enablement, and CIMB’s development of generative AI talent pipelines and use cases in collaboration with cloud partners.

Start-ups and SMEs

Malaysia’s start-up and small and medium-sized enterprise (SME) landscape remains at early stage and faces uneven access to growth finance, but market pull is strengthening as domestic compute capacity, local-language LLM capabilities, and industry demand begin to align. Aerodyne (2025) remains a prominent example of export-ready AI services through drone analytics while firms specializing in electronic know-your-customer (e-KYC), identity, and data operations supply enabling components used across multiple verticals. The principal constraint is access to scaling capital and procurement pathways that convert proof-of-concept deployments into sustained adoption at enterprise and public-sector scale.

Public Sector and Parastatals

Malaysia’s public and quasi-public sector supports the AI ecosystem through commercialization programs, innovation sandboxes, investment facilitation, talent strategy, and national coordination. These institutions act as enablers by reducing trial barriers, funding early deployment, aligning skills supply with industry demand, and coordinating the national AI agenda across ministries.

Major Players

Malaysian Research Accelerator for Technology and Innovation (MRANTI)

Established in 2021 through the merger of Technology Park Malaysia and the Malaysian Global Innovation and Creativity Centre, MRANTI is a central agency under MOSTI. It accelerates the commercialization of research and development (R&D) and innovation and functions as a connector, incubator, and catalyst (Malaysian Research Accelerator for Technology & Innovation (MRANTI, 2025a) within Malaysia’s technology ecosystem. MRANTI Park is a 686-acre hub in Kuala Lumpur that includes plans for an AI Park with specialized facilities supporting priority sectors, such as agriculture and health (BusinessABC, 2025). MRANTI also operates the MRANTI AI Programme, which provides training, mentorship, facilitation of funding access, and ecosystem connectivity through technology partners, including NVIDIA, AWS, and Microsoft, with a focus on priority industry use cases (MRANTI, 2025b).

MRANTI AI Sandbox under the National Technology and Innovation Sandbox (NTIS)

In April 2024, MOSTI launched the AI Sandbox Programme under the NTIS (MOSTI, 2025), with MRANTI serving as lead secretariat in collaboration with ecosystem partners, including NVIDIA. The program provides a controlled, real-world testing environment for start-ups, SMEs, and researchers to pilot AI solutions, with access to compute and tools, curated learning and mentorship, and support on standards, IP, and regulatory considerations. The inaugural phase opened virtually to widen participation and was positioned as a mechanism to accelerate talent development and scale AI adoption across sectors, such as manufacturing, logistics, and health. Within the broader NTIS track record since 2020, Malaysia has supported more than 220 projects, commercialized 77 technologies, and generated MYR157 million (~USD39.7 million) in value, indicating a sandbox model that is now being extended explicitly into AI.

Malaysia Digital Economy Corporation (MDEC)

MDEC (2025a), under the Ministry of Digital, leads the Malaysia Digital national strategic initiative. It drives digital investment attraction, supports the growth of local technology champions, and promotes digital adoption across the economy. MDEC administers key funding instruments for AI commercialization, including the Malaysia Digital Acceleration Grant - Artificial Intelligence (MDAG-AI), which supports Malaysian digital firms in bringing AI solutions to market (MDEC, 2025b).

Talent Corporation Malaysia Berhad (TalentCorp)

TalentCorp (2025), an agency under the KESUMA, functions as a strategic human-capital think tank and plays a key role in addressing Malaysia's AI talent gap. It conducts workforce-impact studies on AI, identifies emerging job roles and critical skills, and supports talent ecosystem alignment. It is also a core driver of the MyMahir National AI Council for Industry, which aims to bridge talent supply and industry demand through coordinated skills planning (Human Resources Online, 2025).

National AI Office (NAIO)

Established in 2024, the NAIO is Malaysia's central coordinating body for the national AI agenda (NAIO, 2025b). Incubated under MyDigital Corporation, the NAIO is responsible for policy cohesion and strategic alignment across government initiatives. It launched the NAIO Lab as an innovation hub focused on citizen-centric AI solutions. Its first flagship project, Rakan Tani, is an AI-enabled platform designed to strengthen agricultural outcomes by connecting farmers with buyers and financial services (Ministry of Digital, 2025).

Academia

Malaysia's academic sector, led by public-research universities, functions as the primary domestic source of AI research capability and the central pipeline for AI talent development. Universities are also increasingly adopting AI tools operationally while expanding research programs aligned with national economic priorities.

R&D Capacity

Higher learning institutions (HLIs) have become Malaysia's largest source of R&D funding. In 2020, HLIs accounted for 47.3% of Malaysia's GERD, reinforcing the central role of universities in conducting fundamental and applied research that can seed future commercialization and industrial adoption (MASTIC, 2025).

Talent Development and Institutional Buildout

Malaysia is positioning universities as hubs for AI education through initiatives led by the MOHE, including encouragement for dedicated AI faculties and degree programs (Bernama, 2025). Universiti Teknologi Malaysia (UTM) established Malaysia's first Faculty of Artificial Intelligence in 2024 (InvestKL, 2025). Budget 2025 allocated MYR50 million (~USD12.6 million) to expand AI-related education and training across research universities, with role specialization aligned to national priorities. Universiti Malaya (UM) has been tasked with emphasis on AI in medicine while Universiti Sains Malaysia (USM) has been directed to focus on AI applications for the semiconductor industry (BusinessToday, 2024a).

AI Adoption and Research in Universities

Universities are integrating AI tools into teaching, administration, and research workflows, including personalized learning systems, administrative automation, and more sophisticated plagiarism detection (RSIS International 2025; Hidayana, 2025). University research also addresses the effectiveness and ethics of AI in education, including algorithmic bias, data privacy, and its impact on critical thinking (Hj. Mohamed et al., 2025; Mohd Saman et al., 2025). Academic uptake remains uneven, and a 2021 survey reported AI adoption and development among academics at 14% (Muhammad Darus et al., 2025). Key implementation challenges include academic integrity concerns, data privacy risks, unequal access and capability gaps across institutions, and the possibility that overreliance on AI tools

could weaken critical thinking and human interaction if governance and pedagogy do not evolve in parallel (BusinessToday, 2025b).

TABLE 9.6

SUMMARY OF KEY STAKEHOLDERS

Sector & Source	Organization Name	Year Established/ Launched	Primary Role & Recent Activities	Example Collaborations
Public/Quasi-public	National AI Office (NAIO)	2024	- Central coordinating body for national AI strategy and governance - Launched NAIO Lab and the Rakan Tani project	Collaboration with Global AI Village (GAIV), Ministry of Agriculture on Rakan Tani (Ministry of Digital, 2025).
	Malaysian Research Accelerator for Technology and Innovation (MRANTI)	2021	- Accelerates R&D commercialization - Runs MRANTI AI Programme, developing AI Park	Partners with NVIDIA, AWS, and Microsoft to support innovators in its AI Programme (MRANTI, 2025c).
	Malaysia Digital Economy Corporation (MDEC)	1996	- Drives the national digital economy agenda - Administers grants like MDAG-AI to support AI companies	Partners with MITI on the SmartMFG+ Incentive Program for the manufacturing sector (TechNode Global, 2025).
	Talent Corporation Malaysia Berhad (TalentCorp)	2011	- National human capital think tank - Conducts workforce impact studies and co-leads the MyMahir AI Council	Co-leads the MyMahir Council with NAIO to align talent development with industry needs (Human Resources Online, 2025).
Private (MNC)	Microsoft	(in Malaysia since 1992)	- Major provider of cloud and AI infrastructure - Pledged USD2.2 billion investment	Partnered with the government on the "AI for Malaysia's Future" talent development program (MIDA, 2025b).
	Google	(Data center announced 2024)	- Key provider of cloud services and AI tools - Pledged USD2 billion investment for data center and cloud region	Partners with government on AI literacy programs for students and educators (MIDA, 2025a).
Private (Local large enterprise)	YTL Corporation Berhad	1955	Major infrastructure conglomerate investing in AI.	Partnered with NVIDIA to build a generative AI ecosystem using latest superchip technology (MIDA, 2025b).
Private (Start-up)	Aerodyne Group (2025)	2014	Global leader in drone-based enterprise solutions using AI for data analytics.	Collaborates with AWS to use machine learning for analyzing drone data, reducing costs for clients (Digital News Asia, 2025b).
Academia	Universiti Teknologi Malaysia (UTM)	1972	Leading research university. Established Malaysia's first Faculty of Artificial Intelligence.	Receives government funding and mandate to pioneer AI education in the country (Bernama, 2025).

Sector & Source	Organization Name	Year Established/ Launched	Primary Role & Recent Activities	Example Collaborations
Academia	Universiti Malaya (UM)	1905	- Premier research university - Tasked with exploring new AI applications in the medical field	Receives targeted funding under Budget 2025 to advance AI in healthcare (Business Today, 2024a).

Strategic Positioning and Recommendations

Malaysia's AI ecosystem is shaped by strong state-led strategic intent and an increasingly robust infrastructure base, alongside persistent constraints in talent, domestic innovation depth, and measurement capacity. The country is positioning itself as a credible regional platform for AI development and deployment by combining large-scale digital infrastructure investment with emerging governance efforts aimed at trusted and responsible AI.

SWOT ANALYSIS

Strengths

i) Strong government will and strategic intent

Malaysia benefits from clear, high-level political commitment to advancing national AI capabilities. This is reflected in the development of a national AI roadmap, the creation of dedicated agencies, such as the NAIIO and MRANTI, meaningful budget allocations for AI, and explicit support from senior political leadership (Chambers and Partners, 2025). This sustained political will provides a foundation for long-term, coordinated action.

ii) World-class digital infrastructure

Malaysia has been highly successful in attracting foreign direct investment from major global technology firms, helping it emerge as a regional hub for data centers and cloud computing. This hardware and cloud base provides critical enabling infrastructure for the development and deployment of advanced AI systems (Complete AI Training, 2025) and can function as a durable competitive advantage.

iii) Strategic geographic and trade position

Malaysia's location at the center of ASEAN positions it to serve as a hub for regional data flows and technology trade. This geographic advantage is reinforced by an active trade policy that seeks to manage Malaysia's position in the global technology supply chain, including measures intended to navigate geopolitical complexity around advanced AI chips (AInvest, 2025).

iv) Emerging governance framework

Malaysia has moved proactively to establish governance foundations for trustworthy AI by developing the National AI Governance and Ethics (AIGE) Guidelines and creating a central coordinating body in the NAIIO. Over time, this governance emphasis can become a differentiator that attracts investment and talent that prioritize ethical, safe, and secure AI deployment (NAIO, 2025b).

Weaknesses

i) Critical talent shortages and skills gaps

Malaysia faces a significant shortage of high-end AI talent, including engineers, data scientists, and researchers. A persistent mismatch between skills produced by the education system and the

evolving needs of industry constrains the growth of local AI firms and slows adoption in traditional sectors (PubMed Central, 2025b).

ii) Underdeveloped local innovation ecosystem

Despite active government efforts, Malaysia's domestic AI ecosystem remains relatively nascent. The local start-up scene is small, venture capital funding gaps are significant, and many firms remain reliant on government grants (Global Academic Excellence (M) Sdn Bhd, 2025) while declining private-sector R&D investment limits the creation of homegrown IP (MYStartup, 2025).

iii) Fragmented and reactive policy environment

The national AI strategy, AI-Rmap 2021–2025, is increasingly outdated in the context of rapid advances in generative AI (MIDA, 2025c), contributing to a more reactive policy posture. Policy responsibilities remain distributed across multiple ministries, and while the NAIIO is intended to provide cohesion, the risks of silos and uncoordinated initiatives remain (NAIO, 2025b; MIDA, 2025c).

iv) Data availability and measurement gaps

A key constraint is the lack of official, granular data on core AI indicators. Limited ability to track measures, such as AI-specific patent applications or the number of AI researchers hinders evidence-based policymaking and makes it harder to assess progress against national goals and international benchmarks MyIPO (2025).

Opportunities

i) Becoming the AI hub of ASEAN

Malaysia can leverage its digital infrastructure, strategic location, and emerging governance framework to position itself as a central hub for AI development, data storage, and talent within Southeast Asia. This would support additional investment inflows and strengthen Malaysia's role in the regional digital economy (Sangfor Technologies, 2025).

ii) High-value sectoral transformation

AI offers pathways to productivity gains in Malaysia's priority sectors, including smart manufacturing solutions for its industrial base, agritech platforms to modernize agriculture, AI-enabled diagnostics to improve healthcare outcomes, and expanded capabilities in financial services (Samsurijan et al., 2022; Chambers and Partners, 2025).

iii) Global partnerships and knowledge transfer

Malaysia's relationships with major technology firms can be leveraged beyond infrastructure investment. Structured partnerships can support knowledge transfer, joint talent-development programs, and the creation of collaborative R&D centers of excellence, accelerating domestic innovation and skills upgrading (MIDA, 2025b).

iv) Developing niche AI capabilities

Rather than competing directly in foundational model development, Malaysia can focus on specialized, high-value applications grounded in local data and domain expertise. This approach could support defensible niches relevant to the region, such as Islamic finance, halal supply chain management, and tropical agriculture technology (MIDA, 2025c).

Threats

i) Geopolitical tensions and supply chain risks

Malaysia faces rising exposure to strategic rivalry between the United States of America and PR China in semiconductors and AI. Navigating export controls on advanced chips and the risk of secondary sanctions could disrupt supply chains and reduce investor confidence (Said & Nabilah, 2024; AInvest, 2025).

ii) Intensifying regional competition

Regional peers, particularly Singapore, are pursuing ambitious AI strategies backed by strong ecosystems, creating intensified competition for foreign investment and scarce high-end AI talent (Pintas IP Group, 2025).

iii) Escalating cybersecurity risks

As AI systems diffuse and the economy digitizes further, Malaysia's attack surface expands. High levels of cyberattacks and the spread of AI-enabled threats, such as sophisticated phishing and ransomware pose risks to economic stability and national security (Sangfor Technologies, 2025).

iv) Ethical and social disruption risks

Rapid, unmanaged AI adoption could widen the urban–rural digital divide, accelerate job displacement without adequate retraining and safety nets, and entrench algorithmic biases in critical systems. These dynamics could erode public trust and weaken social cohesion.

Summary

In summary, Malaysia's near-term advantage lies in leveraging world-class cloud and data center capacity, strategic ASEAN (2024) positioning, and governance frameworks to attract investment and anchor regional activity. The main binding constraints are high-end talent shortages, a still-maturing start-up and private R&D ecosystem, and gaps in official data needed for evidence-based policymaking. If Malaysia can convert global partnerships into sustained knowledge transfer and skills development while prioritizing high-value sectoral use cases and niche applications, it is well-placed to strengthen its role as an ASEAN AI hub, provided it actively manages geopolitical supply chain exposure, cybersecurity risks, and the social impacts of rapid adoption.

TABLE 9.7

SWOT MATRIX: MALAYSIA

Strengths	Weaknesses
• Strong government will and clear strategic intent for AI development • World-class digital infrastructure fueled by massive foreign direct investment • Strategic geographic location in ASEAN and a proactive trade policy • Emerging governance framework focused on ethics and responsibility (AIGE, NAIIO)	• Critical shortage of high-end AI talent and a persistent skills gap • Underdeveloped local innovation ecosystem with a significant venture capital funding gap • Fragmented policy environment and an outdated national AI roadmap • Lack of official, granular data on key AI innovation metrics (e.g., patents)
Opportunities	Threats
• Potential to become the premier AI and data hub for the ASEAN region • High-value transformation of key economic sectors (manufacturing, agriculture, health) • Deepen global partnerships for knowledge transfer and co-located R&D • Develop niche AI capabilities in areas of local strength (e.g., Islamic finance, agritech)	• Geopolitical tensions ("chip war") creating supply chain and sanction risks • Intense regional competition for AI investment and talent, especially from Singapore • Escalating cybersecurity threats targeting a more digitized and AI-driven economy • Risk of social disruption from job displacement and a widening digital divide

Source: Authors' synthesis based on national AI strategy and governance documentation, investment and infrastructure updates, and innovation, workforce, and patent metrics (MASTIC, 2023; NAIIO, 2025e; MIDA, 2025; Oxford Insights, 2024; WIPO, 2025a, 2025b; Sangfor Technologies, 2025).

Future Needs and Collaboration Pathways

Domestic Priorities

Institutional Improvement

Malaysia's main domestic challenge is to close the gap between high-level ambition and delivery capacity for firms, workers, and innovators. A near-term priority is to refresh the national strategy through a successor roadmap for the 2026–30 period, tentatively framed as "AI-Rmap 2.0," led by the NAIIO. The updated strategy should explicitly address generative AI and move beyond broad pillars by assigning clear ministerial roles, defining actionable implementation plans, and adopting key performance indicators (KPIs) that reinforce policy cohesion and reduce fragmentation ((MIDA, 2025c); NAIIO, 2025b).

Labor

Malaysia's talent development approach needs to shift from a supply-side focus on training quotas to a demand-driven model. The MyMahir National AI Council for Industry should be empowered to establish real-time feedback loops between industry-identified skill needs and the curricula of universities (under MOHE) and national training providers (under KESUMA and HRD Corp) (Human Resources Online, 2025). Targeted initiatives are also needed to close AI literacy gaps among older demographics and workers in nontechnical sectors to support an inclusive transition (Staffing Industry Analysts, 2025b).

Ecosystem Development

Reducing reliance on government support and foreign capital requires policies that cultivate a self-sustaining local AI innovation ecosystem. A core need is to address the venture capital funding gap through public–private co-investment funds tailored to early-stage AI start-ups (MYStartup, 2025). Public procurement can also be used to build domestic demand. A local-first procurement approach for

government AI projects can provide a launch market for Malaysian innovators to test, validate, and scale solutions before expanding internationally.

Data and Measurement Framework

Malaysia needs a national framework for tracking and reporting AI metrics. Managed by the NAIIO in collaboration with the Department of Statistics Malaysia and MyIPO, this framework should include methods to measure AI-specific patent applications and conduct a more precise census of the AI research and engineering workforce. These data inputs are foundational for evidence-based policymaking and for assessing the returns on national AI initiatives.

Collaboration Opportunities

Local Perspective

Fulfilling domestic needs through targeted expertise transfer

From a local perspective, Malaysian industries and researchers need access to global best practices and specialized talent. International collaboration can be used to deliver hands-on training workshops in priority areas, such as large model fine-tuning and AI ethics. Soft-landing programs, developed with other APO economies, can also help Malaysian AI startups navigate foreign markets and reduce cross-border entry friction.

Global Perspective

Strategic partnerships for higher-value innovation

Malaysia can deepen partnerships with global technology firms investing in national infrastructure by shifting from a host or customer role toward co-creation and higher-value innovation. One pathway is to negotiate co-located R&D Centers of Excellence in Malaysia to anchor research activity and talent domestically. Malaysia can also pursue applied “AI for Good” collaborations with international organizations, such as UNESCO, the World Bank, and the UN, using Malaysia as a testbed for AI solutions in climate resilience, public health, and sustainable agriculture.

APO Joint Initiatives

i) APO regional AI talent mobility program

A regional talent mobility program can support short-term exchanges of AI researchers, engineers, and postgraduate students among APO member economies. This can help fill near-term talent gaps, expand cross-border research collaboration, and build a more integrated regional talent pool.

ii) Pan-APO AI governance and ethics workshop

A shared workshop program can convene policymakers and regulators across APO members to build a common understanding of responsible AI and work toward more harmonized standards (Chambers and Partners, 2025). The program can draw on Malaysia’s AIGE guidelines and Singapore’s Model AI Governance Framework, with the objective of strengthening regional trust, improving the conditions for cross-border data flows, and supporting interoperability of AI systems.

CHAPTER 10

MONGOLIA

Each member economy is assessed through a common analytical framework covering five core dimensions: (i) ecosystem baseline; (ii) policy and strategy; (iii) stakeholder landscape; (iv) strategic positioning; and (v) future pathways. This structure enables consistent cross-economy comparison while allowing for context-specific insights into how AI capabilities are developed, governed, and applied in practice.

AI Ecosystem Baseline Assessment

This section presents four core indicators of Mongolia’s AI readiness: AI adoption rate, AI-related patent applications, the AI research workforce, and government and private sector AI R&D investment. Supporting context on digital infrastructure, connectivity, and human capital is also provided. Data are drawn from official national sources and internationally recognized assessments where available; in areas where official AI-specific statistics are not yet published, transparent proxies and qualitative evidence are used, in line with the methodology of the study.

TABLE 10.1

KEY AI INDICATORS: MONGOLIA

#	Indicator	Year	Value
1	Government AI readiness index (proxy for AI adoption rate)	2024	42.36
2	AI-related patent applications†	2025	4
3	ICT workforce, total (proxy for AI researchers)††	2025 - Q1	22,184
3.1	ICT workforce, male	2025 - Q1	12,037
3.2	ICT workforce, female	2025 - Q1	10,147
4	Government and private sector AI R&D investment**	2025	Not available. No official or private data are available. The Ministry of Digital Development, Innovation and Communications (MDDIC) is developing AI R&D activities and related budget plans.

Source: Oxford Insights (2024); Intellectual Property Office of Mongolia (2025); National Statistics Office of Mongolia (2025).

Notes:* Proxy indicator; no official national statistics are available for AI adoption; ICT = Information and communications technology; Q1= first quarter.

** No official statistics exist for public or private AI R&D investment; the Ministry of Digital Development, Innovation and Communications (MDDIC) reports activities and budget planning are under development.

† Patent counts refer to applications filed with the Intellectual Property Office of Mongolia; values are by application year.

†† ICT workforce used as a proxy for AI researchers; time series shown to indicate trend.

AI Adoption in Mongolia

There is no official national statistic on AI adoption across sectors in Mongolia; therefore, the government’s AI Readiness Index serves as a proxy. In 2024, Mongolia ranked 98th globally, with a total score of 42.36, indicating an early stage of AI readiness (Oxford Insights, 2024). The same source highlighted that the country shows relative strengths in data availability (85.19) and data

representativeness (70.46) while weaknesses persist in government (36.94), technology sector (26.78), and human capital (27.09). The absence of a national AI strategy continues to constrain progress. According to the Ministry of Digital Development, Innovation and Communications (MDDIC), the government is planning to advance a national Big Data and Artificial Intelligence policy framework under Mongolia's Five-Year Development Guidelines for 2026–2030, signaling growing political commitment to AI-related policy development (Ministry of Digital Development, Innovation and Communications [MDDIC], 2025).

Between 2021 and 2024, Mongolia's overall AI readiness score increased from 37.20 to 42.36, improving its rank from 103rd to 98th. The most significant progress occurred in data and infrastructure (rising from 50.90 to 63.36) and data availability (from 53.34 to 85.19) while governance and ethics also improved (from 39.74 to 52.10). However, innovation capacity and technology maturity remain limited, reflecting slow ecosystem development and low private-sector engagement.

Furthermore, the Artificial Intelligence Landscape Assessment of Mongolia, conducted by UNDP and the MDDIC (2024), confirms that AI adoption remains in its early phase and is uneven across sectors. Pilot applications are emerging in finance, healthcare, public procurement, and traffic management, with growing potential identified in mining, agriculture, education, environmental management, and governance (United Nations Development Programme [UNDP] & MDDIC, 2024).

AI R&D and Investment in Mongolia

Patent activity in Mongolia remains minimal, underscoring the country's position in the early stages of AI development and innovation. According to the Intellectual Property Office of Mongolia, only two AI-related patent applications were filed in 2021, one in 2022, and one in 2025, bringing the total to just four AI-related patents as of 2025 (Intellectual Property Office of Mongolia, 2025).

Government and Private AI R&D Investment

At present, there are no disaggregated official statistics on expenditure related specifically to AI research and development (R&D). Government ICT and digital innovation initiatives, including the World Bank-supported Smart Government Project II (2022–2027), with a total budget of USD40.7 million as well as the planned Tier IV AI and Big Data Center initiatives, reflect a strong policy commitment (World Bank, 2022). However, these projects are not recorded under an AI-specific budget category.

AI Workforce in Mongolia

No official data on AI researchers are available, and the ICT workforce is therefore used as a proxy. Between 2021 and the first half of 2025, the ICT labor force expanded from 17,739 to 22,184 employees, an increase of about 25% (National Statistics Office of Mongolia, 2025). Female participation increased significantly, rising from 6,269 in 2021 to 10,147 in 2025, contributing to a narrowing of the gender gap in digital employment (National Statistics Office of Mongolia, 2025).

In higher education, Mongolia reports roughly 5,380 students enrolled in ICT-related programs across 37 universities and colleges, accounting for nearly 4% of the total student body (Ministry of Education, 2025). However, the overall student-to-instructor ratio remains very high, at as many as 4,000 students per instructor. This constrains the development of advanced AI expertise (MDDIC, 2024).

National AI Policies and Strategies

Key Measures and Programs

As of 2025, Mongolia has not yet adopted a standalone national AI strategy (MDDIC, 2025). Instead, AI priorities are currently governed through the Five-Year Development Guidelines (2026–30), approved by the State Great Khural (Parliament), which integrate AI objectives within the country's broader development planning architecture (State Great Khural, 2025). This approach reflects a sequencing model that prioritizes foundational reforms in digital infrastructure, data systems,

innovation, and human capital while signaling intent to expand AI adoption in the economy and public services. The Guidelines also establish measurable outcomes and responsible institutions for selected AI-related actions, although costed delivery instruments and dedicated financing arrangements have not yet been defined (State Great Khural, 2025).

Policy Framing and Priorities in the Five Year Development Guidelines 2026 to 2030

Within the Guidelines, AI is formally positioned under the Science, Technology, and Artificial Intelligence policy direction, where it is treated as part of a broader science, technology, and innovation agenda. At the same time, AI-related foundations are addressed across other policy directions, most notably Public Sector Productivity and Governance, which emphasizes digitalization, data quality, and evidence-based decision-making. Together, these directions shape Mongolia's current AI governance model, in which AI development is advanced through parallel innovation and digital state reforms rather than a single stand-alone policy instrument.

The Results Based Monitoring and Evaluation framework associated with the Guidelines provides a structured mechanism for tracking progress across AI-relevant dimensions, including adoption, capacity building, digital infrastructure, and ethical governance. While these indicators do not yet capture sector-specific AI deployment in detail, they offer an initial empirical basis for assessing the pace and direction of AI development over the 2026–30 period.

TABLE 10.2

MONGOLIA'S NATIONAL AI POLICY MATRIX

No.	Sector/Central Government Agency/Program	Outcome	Implementation Approach	Executive Authority	Co-responsible Agency
Public-sector Productivity and Governance					
National Outcome (Policy Objective) 7: Improve Governance Performance Indicators					
7.3	Public Administration	Increase public-sector productivity	Institutionalize e-governance	Ministry of Economy and Development	-
7.4	Public Administration	Improve the capacity of representative institutions to make optimal decisions on key issues	Institutionalize evidence- and results-based decision-making	Parliamentary Secretariat	-
Science, Technology, and Artificial Intelligence					
National Outcome (Policy Objective) 10: Increase the contribution and participation of science, technology, and innovation in economic and social development					
10.1	All sectors	Accelerate the process of introducing and utilizing new knowledge and technologies in production and services	Establish a research–industry–market value chain	Ministry of Economy and Development	-
10.1.1	Ministry of Economy and Development	Enhance technology transfer, utilization of patents and intellectual property (IP), and their overall value	Develop a virtual technology sandbox zone	Ministry of Economy and Development	Ministry of Culture, Sports, Tourism and Youth
10.1.1.1	Science and Technology	Establish diverse sources of financing and investment for research, development, and innovation	Encourage private-sector and investor participation through tax and nontax incentives	Ministry of Economy and Development	-
10.1.1.2	Science and Technology	Improve the quality of research outputs produced by scientists and researchers in the field of science, technology, and innovation	Improve research and working conditions; support researchers regardless of ownership; create a competitive environment	Ministry of Economy and Development	Ministry of Education, Ministry of Environment and Climate Change, Ministry of Food, Agriculture and Light Industry

No.	Sector/Central Government Agency/Program	Outcome	Implementation Approach	Executive Authority	Co-responsible Agency
10.1.1.3	Protection of IP rights	Bring IP into economic circulation	Simplify the registration process	Ministry of Economy and Development	-
10.2	All sectors	Enhance the digital economy	Bring data into economic circulation	Ministry of Economy and Development	MDDIC
10.2.1	MDDIC	Increase the effectiveness of AI	Expand AI use in public services; support private-sector adoption through tax and nontax policies	MDDIC	-
10.2.1.1	Infrastructure of an integrated information system	Increase production in the IT sector	Establish an international data center free zone	MDDIC	-
10.2.1.2	Infrastructure of an integrated information system	Increase the use of ethical, human rights based AI	Raise public awareness and promote ethical AI development	MDDIC	-
10.2.2.1	Higher education	Develop a highly skilled workforce in big data and AI R&D	Implement merit-based scholarship programs	Ministry of Education	-
10.2.2.2	Higher education	Apply innovative ideas from students and researchers into practice	Strengthen collaboration between businesses and educational institutions	Ministry of Education	-

Source: State Great Khural (2025).

Policy Analysis

The Guidelines frame AI primarily as a tool to enhance productivity, competitiveness, and innovation capacity. Under the Science, Technology, and Artificial Intelligence direction, priorities include (i) strengthening collaboration among the government, private sector, and research institutions; (ii) improving technology transfer and IP utilization; (iii) diversifying financing for R&D; and (iv) developing human capital in AI-related fields. Progress is monitored through results-based indicators and international benchmarks, including targeted improvements in global knowledge and innovation indices. This embedding approach enhances policy coherence but reduces the visibility of AI as a standalone governance domain.

AI-related objectives and implementation approaches are dispersed across several ministries. The Ministry of Economy and Development leads on innovation policy, IP circulation, and R&D financing. The MDDIC is responsible for expanding AI use in public services, improving AI market competitiveness, strengthening integrated information system infrastructure, and promoting ethical and human rights-based AI. The Ministry of Education plays a central role in building advanced AI and big data human capital and strengthening links between academia and industry. While this distribution helps integrate AI priorities into sectoral policies, it also increases the need for effective inter-agency coordination and clear accountability mechanisms.

The Public Sector Productivity and Governance direction focuses on institutionalizing the Digital First principle, improving official statistics, and strengthening evidence-based policymaking. Although this direction does not articulate AI-specific objectives, it establishes foundational conditions for future AI applications in public service delivery, including interoperable digital systems and improved data quality.

Progress on AI adoption is reflected in the monitoring framework through targets to improve Mongolia's Government AI Readiness Index from its 2024 baseline toward higher performance levels by 2030, indicating an explicit intent to scale AI use in public services alongside broader digital government reforms.

Human capital development objectives are supported by measurable targets to increase the number of Master's and PhD graduates trained in big data and AI R&D over the 2026–30 period, reinforcing the emphasis on building advanced technical capacity.

The expansion of the digital economy and data-driven innovation is tracked through indicators on the size of the digital economy and the share of the IT sector in GDP, providing a quantitative basis for assessing readiness conditions for AI deployment.

The inclusion of an AI Ethics Readiness Indicator within the monitoring framework further anchors ethical and human rights-based AI as a measurable governance objective rather than a purely normative commitment.

Taken together, the Guidelines reflect an approach in which AI is advanced through integration into national development planning and not just a standalone policy framework. This model enables alignment between AI priorities and broader reforms in innovation, digital government, and human capital development. It also allows early AI initiatives to build on ongoing investments in data systems and institutional capacity. At the same time, the absence of a dedicated AI implementation framework creates trade-offs between flexibility and coordination, particularly given the distribution of AI responsibilities across multiple ministries.

While the Guidelines define clear objectives, outcomes, and indicators under the Science, Technology, and Artificial Intelligence direction, they do not yet specify costed delivery instruments, dedicated financing mechanisms, or sequencing arrangements. As AI adoption expands, this implementation gap may constrain execution and weaken accountability without stronger central coordination.

Simultaneously, the current governance model supports the mainstreaming of AI across sectors but increases the risk of fragmented implementation in the absence of formal mechanisms to align regulatory oversight, data governance, and ethical safeguards.

From a policy perspective, the framework provides a credible foundation for medium-term AI development. However, its effectiveness will depend on clarifying implementation responsibilities, financing arrangements, and coordination mechanisms.

Looking ahead, the evolution of Mongolia's AI governance framework is likely to depend on the development of complementary policy instruments that translate strategic objectives into operational action. In particular, the articulation of a national AI strategy or equivalent coordinating framework could help clarify institutional roles, establish delivery mechanisms, and align financing with defined priorities.

Such an instrument would support stronger sequencing of AI-related initiatives, ensure coherence across innovation, digital government, and human capital policies as well as provide a clearer basis for monitoring progress beyond high level outcome indicators.

Greater integration of AI considerations across non-technology policy areas, including public administration reform, service delivery, and sectoral productivity strategies, could strengthen the impact of existing investments in data and digital infrastructure. As these foundations take hold, it will be critical to position AI as a tool for policy implementation and service delivery improvement to achieve sustained and inclusive benefits. It should not be treated merely as an innovation objective.

An important feature of Mongolia's emerging AI policy landscape is the explicit recognition of ethical and human rights-based approaches to AI. The Guidelines include objectives to promote responsible AI use, raise public awareness, and monitor progress through an AI ethics readiness indicator. This early emphasis aligns Mongolia with evolving international norms on trustworthy and human rights-based AI and signals an intention to build public trust alongside technological adoption.

Although operationalization remains at an early stage, embedding ethical and human rights-based AI within national development planning provides a foundation for future regulatory and institutional development.

Key Stakeholder Mapping

Mongolia's AI ecosystem is anchored by a small set of private firms building Mongolian-language AI and applied computer vision solutions, alongside a public-sector digital government stack centered on e-Mongolia and supporting infrastructure. The ecosystem is characterized by pragmatic deployment in citizen services, financial services, monitoring and procurement workflows, and other operational contexts where automation and language technology deliver immediate value.

Private Sector

Mongolia's private sector AI landscape is led by a Mongolian-language AI company with a broad product suite, a fintech-focused platform provider with enterprise AI tooling, and an applied computer vision developer delivering recognition and monitoring systems.

Major Players

Chimege Systems

Established in 2019, Chimege Systems is the country's leading Mongolian-language AI firm, with core capabilities spanning speech-to-text (STT), text-to-speech (TTS), natural language understanding (NLU), natural language generation (NLG), and optical character recognition (OCR). Its product portfolio includes: (i) Chimege Writer for transcribing Mongolian speech into text; (ii) Chimege Reader for converting text into lifelike speech across multiple voices; (iii) Chimege Duudan for real-time speech-to-text transcription using a phone as a microphone; and (iv) Chimege Keyboard as a mobile voice-to-text keyboard for dictation. It also offers: (v) Chimege Protocol as an AI-enabled meeting system for automated note-taking; (vi) Chimege Sub for subtitle generation and translation across Mongolian, English, Russian, and traditional Mongolian script, and (vii) Chimege Sonur as a screen reader for visually impaired users to support access to devices, education, and public services. In addition, Chimege provides Intelligent Virtual Agent (IVA), an AI virtual assistant designed for 24/7 customer service and workplace productivity support.

The AI firm has deployed several high-visibility applications in government and public-interest settings. GovAgent provides citizens with access to information on 1,263 government services and has reached nearly 2 million users nationwide. Meduuleg AI has supported 120 investigators since January 2024 by streamlining interview note-taking and improving investigation efficiency. TenderEval automates evaluation of roughly 1,000 procurement tenders annually, improving efficiency and transparency while reducing human bias. Chimege collaborates with the government of Mongolia through e-Mongolia and has partnerships with private-sector firms, including Mobicom, SocialPay, Toyota Financial Services Mongolia, Ablesoft, and CallPro, alongside a wider network of more than 50 government and private partners.

AND Solutions (AND Global)

Established in 2021, AND Solutions operates as part of AND Global and provides AI-enabled fintech and enterprise automation platforms. Its core AI fields include machine learning and automated machine learning (AutoML), credit scoring and risk modeling, natural language processing and intelligent document processing, workflow automation for loan origination systems, document management and data extraction, and explainable AI (XAI). Its product suite includes Mindox, an intelligent document processing platform; Looms, an end-to-end loan origination and management system; and NIKO as a no-code AutoML platform for rapid model development. It also offers custom credit scoring, a configurable scorecard builder, and a document management system supporting storage, organization, and document processing workflows.

In 2025, AND Solutions raised USD21.4 million in a Series B round to scale its fintech platforms across Asia and enhance its offerings in loan origination, document automation, and alternative scoring. Mindox became the first Mongolian AI solution to achieve Microsoft Azure IP Co-sell status in 2025, and Mindox, Looms, and its document management system are listed on the Azure Marketplace.

The firm also upgraded its ISO 27001 information security certification to the 2022 version. Its collaboration network includes Microsoft and enterprise partners across Asia, including Esquire Financing Inc. in the Philippines, Toyota Financial Services Vietnam, Global Trust Networks in Japan, iCONEXT in Thailand, and SBI LY HOUR Bank in Cambodia.

Rookie Systems

Rookie Systems develops applied AI systems with a focus on computer vision and image processing, spanning recognition, monitoring, and document-scanning use cases. Its solutions include bank-account number detection from camera input, vehicle license plate recognition, and parking systems that identify available slots. It also develops chatbots based on large language models (LLMs) fine-tuned for specific contexts, receipt-scanning solutions from EBarimt that extracts items and prices, and camera-based traffic monitoring systems that assess traffic intensity. The firm also provides custom mobile applications and websites as part of its implementation work.

Rookie Systems has been building and deploying recognition solutions for banking, transport, and parking contexts and has expanded into analytics and video-based monitoring to support operational decision-making and business intelligence. Its reported collaborators include the Ulaanbaatar City Mayor's Office, Golomt Bank, and EBarimt.

Public Sector and Parastatals

Mongolia's public and quasi-public sector shapes the AI ecosystem through digital and AI policy leadership, national digital government delivery, core cloud infrastructure for e-government services, and start-up and skills development programs. These institutions provide an enabling environment for AI adoption and scale through standards, platforms, and shared infrastructure.

Major Players

Ministry of Digital Development, Innovation and Communications (MDDIC)

Established in 2022, the MDDIC is Mongolia's policy lead for digital transformation and AI. It is developing a draft National AI Strategy and has launched the Digital Nation initiative as a national framing for digital modernization. The ministry works with international partners, including the International Telecommunication Union (ITU), UNDP, World Bank, UNICEF, and Japan International Cooperation Agency (JICA), among others.

National Data Center

Established in 2009, the National Data Center provides core infrastructure for e-government and government cloud services. It supports the e-Mongolia platform and is planning a Tier IV AI and Big Data data center to expand national compute and data-hosting capability. It is collaborating with the World Bank through Smart Government Project II.

e-Mongolia Academy

Established in 2021, the e-Mongolia Academy supports Mongolia's digital transition through research, IT system development and operations, training, and consulting. As of early 2025, it provides 1,263 services from 87 government bodies, and it is advancing toward e-Mongolia 5.0 to deliver more citizen-centric services. The platform is widely used by citizens abroad and is designed for broad interoperability through integration with multiple ministries and agencies, connectivity support from telecom operators, and authentication through banking credentials and digital signatures. It also integrates service systems across domains, such as e-business and social welfare and maintains international cooperation with partners, including Estonia's e-Government Academy.

Regulatory Agency of Government Digital Services

Established in 2022, the Regulatory Agency of Government Digital Services regulates, monitors, and develops government digital services, focusing on accessibility, user satisfaction, and service standards.

It monitors service quality and user feedback, expands service points, redesigns e-services, and sets standards for government digital service delivery. It collaborates with the MDDIC and e-Mongolia delivery institutions as well as engages with international partners on digital governance practices.

IT Park

Established in 2002, IT Park supports start-up incubation and training, including through hackathons and AI training workshops. It collaborates with start-ups, NGO, and civil society organizations to build entrepreneurial capacity and expand skills development channels.

TABLE 10.3

SUMMARY OF KEY STAKEHOLDERS (PRIVATE SECTOR)

#	Key Organizations	Established Year	Core AI Fields	Products / Services	Recent Activities	Collaborations
1	Chimege Systems	2019	• Speech-to-Text (STT) • Text-to-Speech (TTS) • Natural Language Understanding (NLU) • Natural Language Generation (NLG) • Optical Character Recognition (OCR)	(i) Chimege Writer - Transcribes Mongolian speech from audio/video into text, useful for books, interviews, and large-scale typing (ii) Chimege Reader - Converts text into lifelike speech with 8 voice options, ideal for news, narration, and presentations (iii) Chimege Duudan - Real-time speech-to-text tool using a phone as a microphone, displaying live transcription on screen (iv) Chimege Keyboard - Mongolia's first mobile voice-to-text keyboard for dictation instead of typing (v) Chimege Protocol - AI-powered meeting system that automates note-taking and boosts productivity (vi) Chimege Sub - Generates and translates subtitles in Mongolian, English, Russian, and traditional Mongolian script for videos and media (vii) Chimege Sonur - Screen reader system for visually impaired users, enabling access to computers, mobile devices, education, and public services (viii) Intelligent Virtual Agent (IVA) - AI virtual assistant offering 24/7 customer service, productivity support, and improved employee satisfaction	(i) GovAgent - AI-powered platform that provides citizens with open access to information on 1,263 government services, reaching nearly 2 million users nationwide. (ii) Meduuleg AI - AI system supporting 120 investigators across Mongolia, streamlining interview note-taking and improving investigation efficiency since January 2024. (iii) TenderEval - AI-based procurement solution that fully automates evaluation of 1,000 tenders annually, enhancing efficiency, transparency, and reliability while reducing human bias.	• Government of Mongolia (E-Mongolia) • Mobicom • SocialPay • Toyota Financial Services Mongolia • Ablesoft • CallPro • Multiple government and private sector partners (50+).

#	Key Organizations	Established Year	Core AI Fields	Products / Services	Recent Activities	Collaborations
2	AND Solutions (Pte. Ltd.), part of AND Global	2021	- Machine Learning / AutoM - Credit Scoring and Risk Modelling - Natural Language Processing / Intelligent Document Processing - Workflow Automation / Loan Origination Systems - Document Management / Data Extraction - Explainable AI (XAI)	(i) Mindox - Intelligent Document Processing platform (ii) Looms - Loan Origination and Management System (end-to-end lending life cycle) (iii) NIKO - No-code AutoML platform for building ML models quickly and with minimal technical overhead (iv) Custom Credit Scoring (tailored risk models) (v) Scorecard Builder (rule-based/configurable scoring logic) (vi) Document Management System (DMS) - handling storage, organization, possibly editing, merging/splitting docs, etc.	(i) Raised USD21.4 million in Series B (2025) to scale fintech platforms across Asia, improve product suite (loan origination, document automation, alternative scoring). (ii) "Mindox becomes the first Mongolian AI solution to achieve Microsoft Azure IP Co-sell status" (2025), along with Looms and DMS on the Azure Marketplace. (iii) ISO 27001 (Information Security) certification upgrade to 2022 version.	- Esquire Financing Inc. (Philippines) - Toyota Financial Services Vietnam - Global Trust Networks (Japan) - iCONEXT (Thailand) - SBI LY HOUR Bank (Cambodia) - Microsoft
3	Rookie Systems	N/A	Computer Vision / Image Processing	(i) Bank-account number detection (recognize printed/written bank account numbers via camera) (ii) Vehicle license plate recognition (iii) Parking system with slot detection (detect available parking spaces). (iv) Chatbots using LLMs, fine-tuned for specific contexts (v) Receipt scanning from E-Barimt (identify items and prices) (vi) Traffic monitoring (camera-based monitoring of traffic intensity) (vii) Custom mobile apps and websites	(i) Building and deploying vision-based solutions for recognition tasks (bank accounts, license plates, parking slots) (ii) Developing chatbots with large language models for specific use cases (iii) Providing predictive and data analytics services (iv) Conducting image and video analysis to support traffic monitoring and business intelligence	- Ulaanbaatar City Mayor's Office - Golomt Bank - EBarimt

Source: AND Solutions (2025); Chimege Systems (2025); Rookie Systems (2025).

TABLE 10.4

SUMMARY OF KEY STAKEHOLDERS (PUBLIC SECTOR AND PARASTATALS)

#	Organizations	Established Year	Primary Roles	Recent Activities	Collaborations
1	Ministry of Digital Development, Innovation and Communications (MDDIC)	2022	Policy lead for digital and AI	- Developing National AI Strategy draft - Launched Digital Nation	Works with ITU, UNDP, World Bank, UNICEF, JICA, etc.
2	National Data Center	2009	Infrastructure (e-government and cloud)	- Supports e-Mongolia - Planning Tier IV AI and Big Data Data Center	Collaborating with World Bank (Smart Government Project II)

#	Organizations	Established Year	Primary Roles	Recent Activities	Collaborations
3	e-Mongolia Academy	2021	Supports the government's digital transition through research, IT system development and operations, training, and consulting services.	- As of early 2025: 1,263 services from 87 organizations via 87 government bodies available - Heavy use by citizens abroad - Platform moving to version 5.0 (E-Mongolia 5.0) to offer more citizen-centric services	- Collaborates with multiple state ministries and agencies - International partners like the E-Government Academy of Estonia - Works with telecoms for connectivity - Uses banking credentials and digital signatures - Integrates various service systems (e-Business, social welfare, etc.)
4	Regulatory Agency of Government Digital Services	2022	Regulates, monitors, and develops government digital services; ensures accessibility, user satisfaction, and service standards	- Monitoring service quality and user feedback - Expanding service points - Redesigning e-services - Setting service standards	Collaborates with MDDIC, e-Mongolia, and international partners on digital governance
5	IT Park	2002	Start-up incubation and training	Hosts hackathons and AI training workshops	Collaboration with start-ups, NGOs, CSOs

Source: Government of Mongolia (2002; 2009; 2021; 2022a; 2022b).

Strategic Positioning and Recommendations

SWOT Analysis

Mongolia's AI ecosystem is characterized by relatively strong digital and institutional foundations, combined with early-stage AI capability development and significant implementation gaps. The SWOT analysis highlights a clear asymmetry between downstream digital readiness and upstream AI-specific capacity, shaping both the country's opportunities for leapfrogging and the constraints it must address to translate intent into sustained outcomes.

Strengths

i) Established digital public infrastructure and state capacity

Mongolia benefits from a solid base of digital public infrastructure that provides a platform for future AI deployment. Integrated e-government platforms, expanding national data systems, and a growing range of digital public services reflect sustained investment in digital state capacity. These foundations lower transaction costs, improve service delivery, and create the preconditions for the responsible use of AI in public administration.

ii) Foundational legal and governance frameworks for AI

The legal environment provides enabling conditions for AI-related activities. Personal data protection, cybersecurity, open data, and transparency legislation establish a baseline governance framework that is broadly aligned with international norms and can be built upon for more advanced AI governance and accountability mechanisms.

iii) Expanding digital workforce and inclusive human capital

Human capital trends present a further strength. The ICT workforce continues to expand, and rising female participation supports more inclusive digital development. While advanced AI expertise remains limited, the broader digital skills base provides a foundation for future upskilling and targeted AI capacity building.

iv) Improving connectivity and digital access

Connectivity and access to digital services have improved steadily, supported by high internet penetration and the rollout of next-generation mobile networks. These developments strengthen nationwide access to digital platforms and increase the feasibility of deploying AI-enabled services beyond early pilots.

v) Strong political commitment and strategic direction

At the strategic level, Mongolia demonstrates clear political commitment to digitalization and innovation. AI-related priorities are articulated within the Five-Year Development Guidelines (2026–30), which currently serve as the country’s de facto national framework for guiding AI development. This integration signals high-level intent, even as detailed implementation mechanisms remain under development.

Weaknesses**i) Absence of a national AI strategy and coordinated implementation**

Despite its strengths, Mongolia’s AI ecosystem faces several binding constraints. Most notably, the country does not yet have an approved National AI Strategy with a costed implementation plan. As a result, AI-related initiatives remain fragmented across ministries, with unclear sequencing, accountability, and delivery responsibilities.

ii) Limited private-sector AI adoption and data visibility

AI adoption in the private sector remains limited and uneven. Most applications are at the pilot stage and government-led, and the absence of official national statistics on AI adoption constrains evidence-based policymaking and benchmarking. This limits feedback loops between policy ambition and market behavior.

iii) Underdeveloped AI innovation ecosystem

The domestic AI innovation ecosystem is underdeveloped. There is a shortage of AI-focused accelerators, incubators, and financing instruments tailored to start-ups and SMEs, and limited pathways for scaling beyond early experimentation. These constraints reduce incentives for local innovation and weaken prospects for domestic value capture.

iv) Severe shortage of advanced AI skills and education capacity

Human capital constraints are particularly acute at the advanced end of the skills spectrum. Mongolia faces a severe shortage of qualified AI instructors and limited higher education capacity for advanced AI training and research. High student-to-instructor ratios and constrained research infrastructure further limit the development of advanced expertise.

v) Fragmented data systems and lack of AI investment tracking

Institutional and data-related weaknesses also persist, including limited visibility and tracking of AI-specific R&D investment, with no dedicated or publicly reported AI budget lines. Data systems remain fragmented, interoperability is weak, and the availability of AI-ready datasets is limited, constraining both public-sector applications and private innovation.

vi) Underdeveloped AI ethics, safety, and oversight mechanisms

AI ethics, safety, and accountability mechanisms remain underdeveloped. There is no dedicated oversight function, and existing ethical principles have yet to be operationalized through concrete guidance, enforcement tools, or institutional mandates.

Opportunities

i) Strategic leapfrogging through a national AI and big data strategy

Mongolia's early-stage position in AI adoption creates opportunities for strategic leapfrogging. The finalization of a National AI and Big Data Strategy could significantly strengthen coordination, governance, ethical guidance, and implementation sequencing, providing clarity for both public and private actors.

ii) Expanding gender-inclusive digital and AI talent pipelines

Demographic and social trends present additional opportunities. Scaling female digital skills and participation can help build a more gender-inclusive AI workforce and leadership pipeline, supporting equitable growth and innovation.

iii) Data center investment and cloud modernization for AI readiness

Planned investments in data centers and ongoing cloud modernization offer potential to improve infrastructure readiness for AI workloads. If aligned with data governance reforms and skills development, these investments could support more advanced applications across sectors.

iv) Regional and international partnerships for capacity building

Regional and international partnerships remain a critical opportunity for accelerating capacity building. Collaboration with multilateral organizations, development partners, and peer countries can support knowledge transfer, policy learning, and access to global best practices in AI governance and deployment.

v) Context-specific AI applications in priority sectors

There is also high potential for context-specific AI applications. Low-resource language tools as well as AI solutions tailored to public services, mining, agriculture, and logistics, offer pathways to generate tangible public value while avoiding direct competition in capital-intensive foundational model development.

Threats

i) Widening rural–urban digital and AI access inequality

Several risks could undermine progress if not actively managed. Unequal access to AI infrastructure, skills, and services may widen existing rural–urban disparities, reinforcing digital and economic divides.

ii) Brain drain and talent retention challenges

Brain drain remains a persistent threat. Difficulties in retaining skilled ICT and AI professionals risk weakening domestic capacity and increasing dependence on external expertise.

iii) Dependence on foreign AI technologies and platforms

Overreliance on foreign AI solutions and cloud platforms may constrain domestic innovation and limit technological autonomy, particularly in the absence of strong local alternatives or interoperability safeguards.

iv) Rising cybersecurity and data privacy risks

Cybersecurity and data privacy risks are likely to increase as AI diffusion accelerates. If enforcement capacity, institutional readiness, and incident response mechanisms do not keep pace, trust in AI-enabled systems may erode.

v) Weak innovation output and governance capacity constraints

Persistently low innovation outputs, including low patent activity, signal weak competitiveness and limited local value capture. At the governance level, weak safety and accountability practices, combined with the absence of costed delivery instruments, may constrain execution and undermine public trust, particularly in public-sector AI applications.

Summary

Overall, Mongolia's SWOT profile reveals an AI ecosystem with relatively strong downstream digital readiness but underdeveloped upstream AI-specific capabilities. While digital public infrastructure, connectivity, and political commitment provide a credible foundation for AI adoption, the absence of a dedicated strategy, limited advanced human capital, weak innovation depth, and under-institutionalized governance constrain the translation of intent into sustained and scalable outcomes. This configuration suggests that Mongolia's near-term advantage lies in selective, application-oriented AI deployment built on existing digital systems, alongside a sequenced strengthening of coordination, skills, data governance, and accountability mechanisms to reduce dependency risks, improve local value capture, and ensure that AI contributes to inclusive and trusted development.

TABLE 10.5

SWOT MATRIX: MONGOLIA

Strengths	Weaknesses
- Established digital public infrastructure and integrated e-government systems - Foundational legal frameworks for data protection, cybersecurity, and transparency - Expanding ICT workforce with improving gender inclusion - Improving digital connectivity, including next-generation mobile networks - High-level political commitment to digitalization as embedded in the Five-Year Development Guidelines (2026–2030)	- No approved National AI Strategy or costed implementation framework - Limited private-sector AI adoption and the absence of national adoption statistics - An underdeveloped AI innovation ecosystem and limited start-up and SME support - Acute shortages in advanced AI skills and higher education capacity - No dedicated or publicly reported AI R&D budget lines - Fragmented data systems, weak interoperability, and limited AI-ready datasets - Underdeveloped AI ethics, safety, and oversight mechanisms
Opportunities	Threats
- A National AI and Big Data Strategy as a coordination and sequencing mechanism - Expansion of gender-inclusive digital and AI skills pipelines - Data center investment and cloud modernization for AI workloads - Regional and international partnerships for capacity building and policy learning - Context-specific AI applications in public services and priority economic sectors	- Widening rural–urban disparities in access to AI infrastructure and skills - Ongoing brain drain and challenges in retaining AI talent - Dependence on foreign AI solutions and cloud platforms - Rising cybersecurity and data privacy risks as AI adoption scales - Persistently low innovation outputs and limited local value capture - Weak safety and accountability practices that undermine public trust

Source: Compiled by the authors based on the Five-Year Development Guidelines of Mongolia (2026–30), official statements and policy materials from the MDDIC, national data protection and cybersecurity legislation, and comparative indicators from Oxford Insights, the World Bank, and UNDP.

Strategic Implications

Mongolia's SO (Strength–Opportunity) strategy is to leverage its digital public infrastructure, legal foundations, and political commitment to scale context-specific AI applications in public services and priority sectors, such as mining, agriculture, and logistics. These deployments can be strengthened by

aligning them with gender-inclusive digital skills initiatives and structured international partnerships, which would accelerate practical impact while reinforcing inclusivity.

Mongolia's WO (Weakness–Opportunity) strategy is to use the forthcoming AI and Big Data Strategy as a coordination and sequencing tool to address the current absence of a National AI Strategy and limited advanced human capital. This approach should be paired with targeted investments in higher education, instructor capacity, and AI-ready data systems while regional and multilateral cooperation can provide practical pathways for closing capability gaps without overextending domestic resources.

Mongolia's ST (Strength–Threat) strategy is to use strong public-sector digital systems and existing governance frameworks to mitigate cybersecurity, data privacy, and public trust risks by embedding safety, accountability, and interoperability requirements early in AI deployment, particularly in government-led applications.

Finally, Mongolia's WT (Weakness–Threat) strategy is to reduce exposure to brain drain, foreign dependency, and uneven access by prioritizing costed delivery instruments, clearer institutional mandates, and phased implementation approaches, as weaknesses in coordination and innovation depth could otherwise amplify external risks and constrain long-term competitiveness.

Future Needs and Collaboration Pathways

Mongolia's AI ecosystem remains in a formative stage, marked by strong policy intent but low institutional maturity, fragmented implementation, and limited research and innovation capacity. To translate this potential into measurable productivity gains, Mongolia will need to prioritize capacity consolidation, governance innovation, and regional cooperation. The following strategic directions outline key national priorities and potential areas for collaboration with the APO and its regional network.

Domestic Priorities

Innovation, Research, and Data Ecosystems

Mongolia needs to strengthen the foundations for AI innovation and applied research. Current innovation indicators remain limited, including only four AI-related patents filed to date, which is linked to weak collaboration between universities and industry (Intellectual Property Office of Mongolia, 2025). National visibility on AI-specific R&D investment is also limited, and dedicated national funding mechanisms for AI innovation have not been established. Data readiness is a further constraint as Mongolia lacks national standards and frameworks for data sharing that can support research translation and commercial innovation.

Ethical, Inclusive, and Sustainable AI Development

Mongolia lacks a formal framework governing AI ethics, algorithmic transparency, and data privacy. This governance gap increases the risk that AI adoption proceeds unevenly, particularly across rural communities, older populations, and persons with disabilities. Building an ethics and inclusion framework is therefore a prerequisite for scaling AI in public services and for sustaining trust in adoption.

Regional Learning and Cooperation Capacity

Mongolia's participation in regional AI policy dialogues and cooperative platforms remains limited. Its national context, shaped by modest market size and emerging institutional capacity, is also underrepresented in regional AI research and policy discussions. Strengthening the capacity for international engagement is therefore a domestic priority, particularly to ensure that Mongolia's needs and constraints are reflected in regional cooperation agendas.

Collaboration Opportunities

Local Perspective

i) Applied AI for productivity in priority sectors

Collaboration can focus on applied AI for productivity in agriculture, mining, and logistics, emphasizing practical use cases, such as business automation, predictive maintenance, and smart logistics. A key local need is operational access to anonymized datasets and a controlled environment for testing and validation that can also support national protocol development for data sharing and model evaluation.

ii) Inclusive AI in public services

Domestic collaboration can prioritize citizen-centered applications that improve service efficiency and inclusion. Practical pilot areas include accessibility tools for persons with disabilities and AI-enabled platforms that improve social service delivery, especially for populations that face barriers to access.

Global Perspective

i) Ethics alignment and sustainability methods

International cooperation can support Mongolia in building a national AI ethics code aligned with global frameworks while being adapted to domestic socioeconomic and cultural conditions. Collaboration can also support methods to assess the environmental footprint of AI systems and embed sustainability principles into national AI policy and implementation practice.

ii) Institutional peer learning

Partnerships with established institutions in other APO member economies can accelerate institutional capability building through exchanges on policy design, technical expertise, and governance implementation.

APO Joint Initiatives

i) AI data innovation lab

An APO–MDDIC–National Statistics Office pilot can establish an AI Data Innovation Lab that operationalizes data utilization for productivity enhancement. The lab can function as a sandbox for machine learning experimentation using anonymized national datasets while supporting development of national data-sharing protocols and AI model evaluation standards.

ii) AI for SMEs and digital start-ups accelerator

In partnership with the Information Technology Park, the APO can support a regional accelerator framed as an AI for productivity challenge. The program can provide mentorship and small-scale innovation grants to start-ups applying AI to business automation, predictive maintenance, and smart logistics, with structured pathways for piloting and scaling.

iii) Joint research on AI productivity metrics

Collaboration with the APO's Research and Planning Division can develop and test productivity indicators that measure AI's contributions to economic growth, social inclusion, and environmental sustainability. This can strengthen cross-country comparability and provide a measurement backbone for evidence-based program design.

iv) AI ethics implementation program

A Mongolia–APO–UNESCO joint program can support adoption of a national AI ethics code through capacity-building workshops, policy alignment, and institutional integration. The program can combine global ethical coherence with context-specific provisions that reflect Mongolia’s development priorities.

v) Inclusive AI for public services pilot

An APO-supported pilot can apply AI to improve public services with an emphasis on inclusion. Priority applications include accessibility tools for persons with disabilities and AI-enabled systems that improve the efficiency and equity of social service delivery.

vi) Sustainability assessment of AI systems

A joint initiative with the APO’s Green Productivity Program can assess the environmental footprint of AI systems and translate findings into practical guidance that embeds sustainability principles into national AI policy and implementation.

vii) Regional knowledge exchange platform on AI for emerging economies

Mongolia can co-lead an APO platform focused on AI for emerging economies, sharing lessons from digital transformation and localized applications, such as speech-to-text tools for low-resource languages. This can improve cross-country learning and position Mongolia as a hub for context-sensitive approaches to responsible AI development.

viii) Twinning and peer-learning partnerships

The APO can facilitate a twinning model linking the e-Mongolia Academy with peer institutions, such as the Republic of Korea’s National Information Society Agency and Japan’s New Energy and Industrial Technology Development Organization. These partnerships can accelerate capability building through exchanges on policy design, technical methods, and institutional management.

ix) Annual AI and productivity forum

An annual forum hosted in Ulaanbaatar can convene policymakers, researchers, and private-sector leaders from the APO member economies to review progress, share experiences, and co-design joint initiatives on AI for productivity and sustainable development. Institutionalizing this forum can strengthen Mongolia’s role as a convening platform for regional dialogue.

CHAPTER 11

NEPAL

Each member economy is assessed through a common analytical framework covering five core dimensions: (i) ecosystem baseline; (ii) policy and strategy; (iii) stakeholder landscape; (iv) strategic positioning; and (v) future pathways. This structure enables consistent cross-economy comparison while allowing for context-specific insights into how AI capabilities are developed, governed, and applied in practice.

AI Ecosystem Baseline Assessment

The government of Nepal adopted its National AI Policy 2025 and established a National AI Center under the Ministry of Communication and Information Technology (MoCIT). It instructed this ministry to establish the National AI Center and promote AI adoption in FY2025–26 (Ministry of Finance, 2025), allocating a budget of NPR23.1 million (~USD155,600) to the project. Although the government has prioritized the adoption, integration, and promotion of AI in the public and private sectors, AI readiness remains at an early stage in Nepal.

AI Adoption in Nepal

The 2024 edition of the Government AI Readiness Index (GARI) ranked Nepal 150th out of 193 countries (Oxford Insights, 2024). Nepal’s overall score stands at 33.14 in 2024. The specific pillar scores are 30.61 for government, 25.44 for the technology sector, and 43.37 for data and infrastructure. These scores indicate relative strengths in government commitment and data infrastructure. However, they also underscore challenges in the technological capabilities essential for AI adoption and integration.

TABLE 11.1

GARI SCORES FOR NEPAL, 2021–24

S.N.	Global Ranking	Overall Score	Government	Technology Sector	Data and Infrastructure
1	127	31.92	33.28	24.47	38.03
2	139	30.75	30.88	23.50	37.88
3	150	30.77	31.04	24.21	37.06
4	150	33.14	30.61	25.44	43.37

Source: Oxford Insights (2024).

Table 11.1 shows Nepal’s GARI scores from 2021 to 2024. The data show some improvement in government AI readiness over this period. Nepal’s data and infrastructure sector ranked highly among all three pillars in each year; the technology sector had the lowest score.

The relatively high score for the government reflects a growing policy focus on AI. The country promulgated a National Artificial Intelligence Policy in 2025 and proposed establishing key institutional mechanisms, such as an AI Regulation Council and a National AI Center. These efforts highlight Nepal’s commitment to strategically guiding AI development (Government of Nepal, 2025b). The score for the data and infrastructure pillar points to relatively good performance, and across the country, there has been an expansion of digital identity systems (e.g., National ID, Nagarik App),

e-government services, and the digital payments ecosystem. Yet widespread gaps remain in broadband and 5G network coverage (Oxford Insights, 2024). The technology sector score is held back by limited R&D investment, a nascent start-up ecosystem, and a shortage of AI-specific talent.

IMF AI Preparedness Index

The IMF Artificial Intelligence Preparedness Index (AIPI) measures the readiness of countries to adopt and leverage AI technologies. Nepal's AIPI score was approximately 0.35 (on a scale from 0 to 1) in 2023 (International Monetary Fund [IMF], 2024).

TABLE 11.2

IMF AI PREPAREDNESS INDEX OF NEPAL, 2023

Year	AI Preparedness Index	Digital Infrastructure	Innovation and Economic Integration	Human Capital and Labor Market Policies	Regulation and Ethics
2023	0.350979	0.08	0.09	0.10	0.09

Source: IMF (2024).

Nepal scored 0.351 on the overall AI Preparedness Index. Its digital infrastructure score was very low, sitting at just 0.08, highlighting significant limitations in broadband access, internet security, and technology availability. The innovation and economic integration component score was only slightly higher, at 0.09, reflecting the country's limited R&D capacity and relatively weak innovation ecosystem. The country's score for its human capital and labor market policies was 0.10, which also points to challenges in skills and education and to a lack of adaptive labor market policies. The regulation and ethics component scored 0.09, indicating underdeveloped legal, ethical, and governance frameworks needed to guide responsible AI use.

Network Readiness Index (NRI)

The 2024 NRI report positions Nepal at 109th out of 133 economies, with an overall score of 35.96 (Portulans Institute, 2024). The report assesses Nepal's ICT readiness across four key pillars: technology, people, governance, and impact.

TABLE 11.3

NEPAL'S NETWORK READINESS INDEX (NRI), 2024

Pillar	Score	Rank (out of 133)
Overall NRI	35.96	109
Technology Pillar	26.57	111
People Pillar	28.46	111
Governance Pillar	39.22	112
Impact Pillar	49.59	93

Source: Portulans Institute (2024).

Nepal scores lowest in the technology (26.57) and people pillars (28.46). This signifies weaknesses in ICT access, infrastructure, skills, and inclusion. The score for the governance pillar (39.22) is somewhat higher but nonetheless suggests that the government has substantial ground to cover in regulation and digital participation. The score for the impact pillar (39.59) is higher, reflecting slightly better outcomes in how digital technologies positively influence the economy and quality of life. The report underscores the need for Nepal to improve its digital infrastructure, regulatory frameworks, human capital, and innovation capacity to enhance network readiness and support sustainable digital transformation.

Digital Payments

Nepal has made significant progress in the development and adoption of digital payments. The country has seen major upgrades to its payment infrastructure, a better regulatory environment, and high rates of user adoption in recent years. According to the Payment Systems Oversight Report 2023/24 by Nepal Rastra Bank (NRB) (2025a), digital readiness has improved substantially, with 4G/LTE services covering 741 of 753 local levels, smartphone penetration reaching 72.94%, and broadband internet access available to 38% of households. The affordability of connectivity has also improved, as the average cost of mobile data dropped from USD2.25 per GB in 2019 to USD0.27 in 2024 (Nepal Rastra Bank [NRB], 2025).

The number of digital wallet users increased nearly fourfold, growing from 6.27 million in August 2020 to 23.46 million in July 2024 while connectIPS, one of the country's major payment systems operators (PSOs), users rose from 162,000 to 1.28 million over the same period (NRB, 2025). The expansion of payment service provider (PSP) agent networks also points to great improvements in accessibility, with the number of agent outlets increasing from 5,139 to 17,563 over a four-year period. Digital channels, such as wallets, QR payments, and instant transfers have surged. Retail payment transactions via connectIPS rose by 49.5% in FY2023/24, reaching 75.6 million transactions valued at NPR5.697 trillion (~USD38.4 billion), representing a 22.2% increase in value from the previous year (NRB, 2025). QR code payments also expanded significantly, with transaction numbers and values increasing by 117% and 104%, respectively (NRB, 2025). Nepal has also advanced interoperability and cross-border capabilities. The launch of cross-border QR payments in February 2024 allows Indian tourists to pay Nepali merchants using UPI QR codes (NRB, 2025). Regulatory and strategic reforms have complemented these developments.

Digital Identity and Digital Public Services

Nepal's digital identity architecture is rapidly consolidating multiple identity documents and public registrations into unified systems via the National Identity Card (NID) and the Nagarik App. The NID, which contains biometric and demographic information, is replacing many older forms of identification and is set to integrate functions, such as driver's licenses, vehicle ownership, tax identification (Permanent Account Number), social security, voter registration, and land transactions under a single identity. The Nagarik App allows users to link their citizenship, NID, or passport as a primary identity credential and further integrates multiple government services. As of October 2025, out of 29.6 million, about 18 million citizens have registered for the NID (Department of National ID and Civil Registration, 2025).

AI R&D and Investment in Nepal

Nepal's innovation and R&D landscape is characterized by a growing but nascent ecosystem. Nepal ranks 107th among the 139 economies featured in the Global Innovation Index (GII) 2025. The GII notes that there is a paucity of R&D investment data for Nepal (World Intellectual Property Organization, 2025). AI research outputs, including patents and academic publications, are limited but showing gradual growth. The domestic AI talent pipeline is also growing, with emerging AI degree programs and training initiatives at leading universities. The private sector is increasingly active in applying AI for automation, data analytics, and digital services, driving early AI innovation despite an overall constrained environment.

Data and Infrastructure

Nepal's data and digital infrastructure are rapidly modernizing. The 2024–25 Annual Report of the Nepal Telecommunication Authority describes significant achievements in improving broadband connectivity across the country. According to the report, 48.77% of the population now has some level of access to fixed broadband, and 90.86% of all Nepalese have access to mobile broadband services. Mobile broadband is also improving in speed: only 2.96% of users remain on 3G while 87.9% have access to 4G networks (Nepal Telecommunications Authority, 2025). Despite these gains, the digital divide remains stark. Only 37.8% of households reported having internet access. Urban households fare somewhat better, with 45.7% having access to the internet while rural connectivity remains much

lower, with just 21.5% of households in rural areas having access. These data are somewhat outdated, as they are based on the 2021 National Census (Central Bureau of Statistics, 2023).

Intellectual Property (IP) Registration

IP rights in Nepal are governed primarily by the Patent, Design and Trademark Act of 1965. The Department of Industry (DOI) under the Ministry of Industry, Commerce, and Supplies is responsible for administering industrial property rights. Nepal lacks comprehensive IP legislation that fully meets international standards, such as those set by the World Intellectual Property Organization (WIPO) or the World Trade Organization's (WTO) Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS).

In terms of development, Nepal's IP system remains relatively underdeveloped. The country lacks a fully digitized IP registration platform, and most applications are submitted manually. Furthermore, public awareness of IP rights is low, which contributes to weak enforcement and a limited culture of innovation protection. The Nepalese parliament passed the Industrial Property Bill in 2025, which is designed to overhaul outdated laws and better protect IP rights, including trademarks, designs, trade secrets, patents, and geographical indications. The bill aims to combat widespread brand counterfeiting by introducing stricter penalties and creating a more robust legal framework that encourages innovation and aligns with international standards, such as the WTO TRIPS agreement (Federal Parliament Secretariat, 2025a).

AI Workforce in Nepal

In Nepal, higher education is gradually evolving to better meet the growing demand for skilled professionals. Several universities and academic institutions have initiated AI-focused degree programs and courses aiming to build foundational knowledge and practical skills in AI. The Tribhuvan University Institute of Engineering offers specialized graduate programs, including Master of Science in Computer System and Knowledge Engineering and Master of Science in Computer Engineering with a specialization in Data Science, which are closely related with AI (Institute of Engineering, 2025). Kathmandu University has launched Bachelor of Technology and Master of Technology programs in AI and maintains a dedicated Department of Artificial Intelligence, evidence of a nascent but growing talent pipeline (Kathmandu University, n.d.-a; Kathmandu University, n.d.-b).

National AI Policies and Strategies

National AI Strategy of Nepal

The 2025 National AI Policy was approved by Nepal's Cabinet in August 2025. It is the country's first dedicated AI policy and aims to create an environment that supports ethical, secure, and inclusive AI use across all sectors of the economy. The policy frames Nepal's long-term ambition as becoming a responsible AI-enabled economy that applies AI to public service delivery, innovation, and inclusive growth, with an overarching emphasis on human-centered and ethical development.

The policy sets out several headline goals. It seeks to increase the IT sector's contribution to GDP by an additional 1%, place Nepal among the top 50 in the Government AI Readiness Index, and train 5,000 skilled AI professionals over the next five years. It also aims to establish AI excellence centers in all provinces and to raise AI literacy among the general population. To support these targets, the policy's objectives emphasize building a sustainable and resilient AI ecosystem, promoting the optimal use of AI to boost economic growth, enabling the government to deploy AI effectively in support of development goals, and strengthening national AI governance (Government of Nepal, 2025).

To achieve these objectives, the policy prioritizes a set of core policy directions, calling for the creation of legal and institutional arrangements as well as supporting infrastructure for the AI ecosystem. It places strong focus on human resource development by prioritizing AI education and research, promotes the use of AI to raise production and productivity in inclusive agriculture, industry, and service sectors while also seeking to develop the domestic AI industry through innovation and

entrepreneurship. In the public sector, the policy envisions AI-enabled service delivery that is more automated, agile, and cost-efficient. Across these areas, it stresses that AI should be used for human benefit and that adverse effects should be minimized (Government of Nepal, 2025).

The policy further outlines strategies and action plans to operationalize these priorities. These include strengthening AI infrastructure, such as data centers, cloud systems, and high-performance computing while building human capital through AI curricula in schools and universities and initiatives designed to encourage “brain gain.” On the governance side, it proposes new mechanisms, such as an AI Supervision Council and a National AI Center, alongside a wider emphasis on ethical and responsible AI practices. This package also includes measures to address misuse and advance data protection laws and related safeguards (Government of Nepal, 2025b).

A central institutional feature of the policy is the creation of an AI Regulatory Council, chaired by the Minister of Communication and Information Technology. Its membership includes secretaries from the Office of the Prime Minister and Council of Ministers, the MoCIT, the Ministry of Finance, and the Ministry of Education, Science and Technology as well as the Chair of the Nepal Telecommunication Authority, the CEO of the E-Governance Board, and three expert representatives from the private sector and academia, including at least one female representative. The chief of the National AI Center serves as the council’s member secretary, and the National AI Center functions as the council’s secretariat (Government of Nepal, 2025b). The council’s responsibilities include providing guidance on AI development and use with attention to fairness, transparency, accountability, IP protection, and human rights. It is also tasked with: (i) recommending national laws and standards consistent with international treaties and conventions; (ii) facilitating coordination across federal, provincial, and local levels and other relevant bodies; and (iii) ensuring compliance with approved AI-related policies and standards, and guiding effective policy implementation (Government of Nepal, 2025b).

The policy also envisions establishing a National AI Center under MoCIT to promote, encourage, facilitate, and regulate AI study, research, development, and use. The center would promote and oversee AI-related research and applications, serve as a focal point for coordination across institutions, and monitor and evaluate AI programs conducted at federal, provincial, and local levels. It would also collaborate with universities, public and private actors, and national and international organizations, and run communication, training, and capacity-building programs. In addition, it would set quality standards for AI-related goods and services, develop and periodically publish a National AI Index, and build a National AI Portal to provide AI-related information through a single-window platform. The center would publish periodic status reports, identify AI risks and implement risk-reduction frameworks, mobilize skilled human resources as needed, and act as the secretariat for the AI Regulation Council (Government of Nepal, 2025b).

Beyond national-level governance, the proposed AI excellence centers are to be established at federal, provincial, and local levels, including within universities and AI-related research and educational institutions. These centers are expected to conduct AI research and development (R&D), provide training and workshops to build AI skills among students and researchers, and manage data used in AI R&D in ways that prioritize privacy, ethics, and transparency. The centers would also provide recommendations to the National AI Center on policy design and ensuring quality and safety in AI use, and support capacity development for local researchers and institutions. They would promote AI applications across a wide range of sectors, including agriculture, education, health, finance, tourism, transportation, energy, public services, and security. They are also expected to collaborate with national and international research institutions in coordination with the National AI Center (Government of Nepal, 2025b).

For implementation, the policy assigns responsibility to relevant government ministries and agencies to ensure the necessary plans, programs, budgets, and manpower. It further specifies that the federal government of Nepal, provincial governments, and local levels should incorporate the policy into their annual budgets and programs. Implementation is also expected to involve mobilizing resources and

managing AI development programs through coordination and partnerships with national and international NGOs, the private sector, universities, and development partners (Government of Nepal, 2025b).

The policy additionally emphasizes promoting public–private partnerships, supporting start-up ecosystems, and encouraging localization of AI applications. Taken together, “National AI Policy, 2025,” represents a significant step toward aligning Nepal with broader global trends in AI governance and innovation. Its practical success, however, will depend on the clarity and enforceability of the legal framework, equitable deployment of infrastructure, adequate funding, and strong coordination across government, research institutions, and the private sector. Operational details, such as defining AI in ways that fit Nepal’s context, ensuring real and enforceable data privacy protections, calibrating incentives for start-ups, and building credible accountability mechanisms, will likely determine whether the policy produces durable outcomes or remains primarily aspirational.

Key Measures and Programs

ICT Policy 2015

The 2015 ICT Policy is one of Nepal’s key digital policy tools. It is designed to mainstream the use of ICT across all sectors of the economy, linking ICT strategy closely with national development. Key goals include achieving universal broadband access, enhancing digital literacy, and boosting the share of ICT industries in GDP (Government of Nepal, 2015). Although the policy does not explicitly mention AI, many of its provisions establish foundational elements for AI development. It places special emphasis on the expansion of broadband connections across the country, secure and interoperable infrastructure, digital literacy, and innovation in ICT industries; these are all elements essential to the adoption and integration of AI.

Digital Nepal Framework (DNF), 2019

The DNF launched in 2019 provides a roadmap for leveraging digital technologies for socioeconomic development (Government of Nepal, 2019). It structures 80 initiatives across eight core domains: digital foundation, agriculture, health, education, energy, tourism, finance, and urban infrastructure. The framework also outlines a governance structure for implementation and monitoring. It contains provisions that establish a national steering committee and a national implementation committee, supported by sector-specific subcommittees. Sector agencies (for each of the eight sectors) are required to embed their respective DNF initiatives in their strategic plans, annual work plans, and resource allocations (Government of Nepal, 2019). The government began drafting a second version (DNF 2.0) of the framework in 2025, and this revision is currently under consultation. It adds stronger emphasis on digital foundations, better alignment with AI policy, and provisions for improvements to key infrastructure, such as data centers, 4G/5G towers, and the digitization of postal services (Ministry of Communication and Information Technology (MoCIT), 2025a). DNF is thus a foundation for the development and integration of AI in Nepal.

Science, Technology, and Innovation Policy

The 2019 National Science, Technology, and Innovation Policy (NSTIP) aims to foster an ecosystem in which innovation, research, and science entrepreneurship can flourish in Nepal (Government of Nepal, 2019b). It does not explicitly include AI as a separate domain, but many of its strategic action plans provide the foundational infrastructure for AI development. It includes plans for improving scientific infrastructure, boosting human resource capacity in R&D, promoting technology commercialization, and enabling better coordination among major stakeholders (Poudel, 2021). These components are essential for supporting AI-driven innovation across sectors.

National Cyber Security Policy, 2023

The National Cyber Security Policy of 2023 provides a foundational framework to protect digital infrastructure amid growing cyber risks (Government of Nepal, 2023). As AI systems increasingly rely on large-scale data and cloud infrastructure, they are becoming more exposed to cyberattacks, data breaches, and opportunities for misuse. The policy aims to secure critical systems, ensure data

integrity, develop human capital with expertise in cybersecurity, and establish a National Cyber Security Center. It also emphasizes the need for stronger data protection, more secure infrastructure, and institutional oversight that reflects the requirements of AI systems.

Sixteenth Periodic Plan

The overarching vision of Nepal's Sixteenth Periodic Plan (2024/25–2028/29) is “Good Governance, Social Justice, and Prosperity.” It sets transformative goals for the country's infrastructure, economy, human capital, and digital innovation (National Planning Commission, 2024). The plan prioritizes IT use and the expansion of integrated infrastructure, both being prerequisites for AI applications. Other strategies focus on the adoption of advanced technologies, R&D, skill development, and inclusive employment, all of which contribute to the growth of an AI ecosystem.

Electronic Transaction Act (ETA)

Nepal's ETA of 2008 gave legal recognition to electronic records and digital signatures. This is the legal foundation that enables e-commerce, digital communication, and online services in the country (Government of Nepal, 2008). It also outlines cybercrime offenses and describes penalties for violations. The Act was a major step toward digital governance, but it is now seen as outdated because it fails to address contemporary issues, such as AI. The law does not cover AI-specific concerns, such as algorithmic accountability, automated decision-making, or data ethics. A new bill called the Information Technology and Cybersecurity Act has been proposed to replace the ETA with more up-to-date provisions, including regulations on AI misuse, data protection, and cybersecurity (Federal Parliament Secretariat, 2025b).

Key Stakeholder Mapping

Nepal's AI ecosystem is being shaped by a policy-led public sector agenda, an expanding base of university programs and research infrastructure, and a private sector that combines industry associations with a small set of firms delivering AI products and services. The ecosystem is anchored by the National AI Policy 2025 and related institutional mechanisms, alongside investment in digital government infrastructure and skills development that supports adoption across priority sectors, such as governance and financial services.

Private Sector

Nepal's private sector AI landscape includes industry associations that coordinate the ICT community, nonprofit research, and innovation organizations that build domestic capability, and a growing set of companies delivering applied AI solutions in areas, such as education and workforce development, fintech, robotics, and human-in-the-loop AI operations.

Major Players

Computer Association of Nepal (CAN) Federation

The CAN Federation is an umbrella organization representing ICT institutions, associations, and individual professionals. It promotes the development of IT, including AI, and represents the interests of Nepal's IT community in national and international settings. The CAN Federation also builds capacity through events, conferences, and training programs for ICT professionals.

Nepal Association for Software and IT Services Companies (NAS-IT)

The NAS-IT is a nonprofit industry body representing Nepal's software and IT services sector. It promotes innovation, entrepreneurship, and professional standards in the industry, facilitates collaboration among stakeholders, and advocates for policies that support growth in software, IT services, and AI-enabled business activity.

Nepal Applied Mathematics and Informatics Institute (NAAMII)

The NAAMII is a nonprofit research organization created by Nepali researchers to build a domestic foundation for scientific research in informatics, applied mathematics, and AI. It contributes to expanding AI research capacity and promotes a more decentralized and inclusive AI research ecosystem within Nepal.

National Innovation Center (NIC)

The NIC, established in 2012, is a nonprofit organization dedicated to strengthening Nepal's research and innovation culture. It connects innovators with resources needed to develop solutions with economic and social impact and incorporates AI into projects that aim to improve innovation processes and research outcomes.

Fusemachines

Fusemachines, founded in 2013, operates with headquarters in New York and a major office in Kathmandu. It develops AI products and solutions across sectors, including finance, healthcare, retail, and government, and places a strong emphasis on AI education and workforce development. It positions its mission around expanding AI access for developing countries and underrepresented communities and is recognized as the first Nepal-led AI firm listed on NASDAQ. Fusemachines continues to expand its AI platforms and education initiatives and invest in advanced AI research to support innovation in Nepal and other markets.

Paailla Technology

Paailla Technology, founded in 2016, is a robotics and AI start-up focused on humanoid service robots and applied AI solutions for business environments. It developed Naulo in Kathmandu as Nepal's first fully digitized robotic restaurant and combines software and hardware capabilities across areas, such as speech recognition, recommendation systems, image processing, natural language synthesis, computer vision, and robotics engineering. Its humanoid assistant robot, Pari 2.0, is designed to navigate autonomously and interact with customers using human-like gestures.

F1Soft International

F1Soft International, established in 2004, is Nepal's leading fintech company and a major contributor to the country's digital financial services ecosystem. It develops platforms across mobile banking, digital payments, and transactional banking products and extends into adjacent digital services, such as eHealth, EduTech, InsureTech, and eCommerce. F1Soft integrates AI into products, such as OrangeNXT, positioned as Nepal's first digital-only banking platform, and Fonepay, the country's largest interoperable payment network, to support customer-centric experiences, improve transaction speed, and enhance financial inclusion.

CloudFactory

CloudFactory, established in 2010, operates a human-in-the-loop AI platform that combines machine intelligence with structured human expertise. It provides services across data annotation, inference evaluation, error handling, and model monitoring to improve AI accuracy and reliability in real-world deployments. CloudFactory emphasizes operational scaling and sustained model performance management rather than experimentation-only workflows, enabling organizations to build and run AI systems at production scale.

Others

Nepal's AI ecosystem also includes firms, such as Leapfrog Technology, Nepal AI Tech, and Teqmint Innovations as well as additional software and IT service providers engaged in applied AI development and implementation across multiple sectors.

Public Sector and Parastatals

Nepal's public and quasi-public sector provides the core institutional framework for AI governance, digital government infrastructure, regulatory development, and sectoral adoption. Key institutions are centered around the MoCIT and the national bodies established or enabled through the National AI Policy 2025.

Major Players

Ministry of Communication and Information Technology (MoCIT)

The MoCIT is Nepal's lead federal institution for ICT policy, e-governance, cybersecurity, and AI governance. It was established in 1992 as the Ministry of Information and Communication and was renamed Ministry of Communication and Information Technology in 2018, with an expanded mandate that includes IT. MoCIT drafts laws, policies, and regulatory frameworks governing AI and digital technologies. It functions as a policymaker, regulator, infrastructure builder, coordinator, and monitor in supporting effective, ethical, inclusive, and secure AI adoption.

MoCIT developed the National AI Policy 2025 and is shaping associated institutional structures, including the AI Regulatory Council, the National AI Center, and AI Excellence Centers. In 2025, MoCIT submitted a new bill on IT and cybersecurity to the federal parliament.

AI Regulation Council

The AI Regulation Council was established in 2025 under the National AI Policy 2025 and is chaired by the Minister of Communication and Information Technology. It includes senior government officials and representatives from the private sector and academia, including at least one female representative, and it operates with the National AI Center as its secretariat. The council guides AI development and use, with a focus on fairness, transparency, accountability, and human rights. It also promotes the alignment of national laws with international standards and coordinates AI governance across federal, provincial, and local levels.

National AI Center

The National AI Center was established under MoCIT in November 2025 as part of the National AI Policy 2025. It leads national study, research, development, and regulatory work on AI and operates as the secretariat for the AI Regulatory Council. The center manages training programs, sets quality standards for AI-related goods and services, develops a National AI Index, and operates a National AI Portal for information dissemination. It also publishes periodic AI status reports, identifies and manages AI-related risks, and mobilizes skilled human resources to support national AI capacity building.

AI Excellence Centers

The National AI Policy 2025 establishes AI Excellence Centers across Nepal at federal, provincial, and local levels, including within universities and research institutions. These centers promote: (i) AI study, research, development, and application; (ii) conduct R&D activities; (iii) deliver training and workshops; (iv) manage data for AI projects with privacy and ethics safeguards; and (v) provide policy and quality advice to the National AI Center.

Department of Information Technology (DoIT)

The DoIT, under MoCIT, is a key implementation agency for AI and digital infrastructure development. It was established in 2012 by a cabinet decision and prepared Nepal's first AI concept paper, which set early priorities, such as cybersecurity, data protection, and regulatory frameworks and the National AI Policy 2025. DoIT oversees the Integrated Data Management Center, which operates the Government Integrated Data Center and a Disaster Recovery Center that host critical government services. DoIT's broader mandate in e-infrastructure development, e-governance support, and IT industry promotion directly supports AI deployment and research readiness.

E-Governance Board

The E-Governance Board, established in 2022 under the Office of the Prime Minister and Council of Ministers, provides cross-government direction for digital infrastructure and interoperability that underpins AI adoption in governance and service delivery. Through the E-Governance Blueprint, it advances secure data exchange and interoperability across government systems. It is also advancing institutional mechanisms, such as a Data Protection Authority and a National Data Exchange Platform to support privacy, security, and ethical governance for data-driven services, including AI-enabled public services.

Nepal Rastra Bank (NRB)

NRB regulates banking and financial institutions and is a central actor in shaping AI governance for the financial sector. In December 2025, it issued a draft AI guideline for banking and financial institutions and requested stakeholder feedback. The guideline establishes requirements for responsible and transparent AI deployment, including monitoring of AI systems, incident reporting, and annual compliance reporting, reinforcing the central bank's role in managing AI-related risk and financial stability.

Academia

Nepal's academic and research sector supports the AI ecosystem through degree programs, specialized graduate training, applied research laboratories, and emerging compute infrastructure that enables AI R&D.

Major Players

Tribhuvan University (TU)

Tribhuvan University's Institute of Engineering (IOE) was established in 1930 as Nepal's first technical school and reorganized in 1972. It provides engineering education and research facilities and maintains industry linkages. Its Department of Electronics and Computer Engineering has offered a four-year Electronics Engineering program since 1994 and a Computer Engineering program since 1998. It also operates graduate programs aligned with AI and data-driven systems, including Master of Science programs in Information and Communication Engineering, Computer System and Knowledge Engineering, Data Science and Analytics, and Network and Cybersecurity. IOE's Laboratory for ICT Research and Development conducts AI-related research, and the TU Supercomputing Center provides high-performance computing resources supporting AI research, big data analytics, and machine learning applications.

Kathmandu University

Kathmandu University's School of Engineering, established in 1994, offers dedicated AI degree programs, including a Bachelor of Technology in Artificial Intelligence and a Master of Technology in Artificial Intelligence, building foundational and advanced competencies in AI, machine learning, and neural networks. Its research infrastructure includes laboratories, such as the Information and Language Processing Research Lab and the Digital Learning Research Lab, which support work in natural language processing, software localization, learning analytics, and AI in education. Kathmandu University collaborates with industry partners, including Fusemachines and Dignep Group, to align curriculum with workforce needs, provide internship pathways, expand access to GPU-cluster resources, and accelerate applied innovation.

Purbanchal University

Purbanchal University, founded in 1993, supports AI capacity building through its Faculty of Science and Technology, established in 1994. It offers computing-related programs in which AI topics are increasingly integrated and provides a four-year Bachelor of Technology in AI program covering AI, machine learning, data science, and robotics.

Pokhara University

Pokhara University, established in 1997, offers undergraduate and graduate programs in computer science and computer engineering that include AI-related coursework. It launched a Bachelor of Artificial Intelligence and Data Science program in 2025, expanding dedicated AI education pathways within the university system.

Nepal Academy of Science and Technology (NAST)

The NAST, established in 1984 as an autonomous science and technology body, supports AI development through research facilitation, policy advocacy, and national capacity building. In 2025, it convened the AI for National Development seminar to bring experts together and provide strategic guidance on AI policy and regulatory frameworks, strengthening alignment between research priorities and national development goals.

Strategic Positioning and Recommendations

Nepal's AI ecosystem is entering a formative stage in which policy ambition is beginning to converge with enabling digital foundations. The National AI Policy, 2025 establishes new institutional mechanisms and frames AI as a driver of digital transformation across priority sectors while parallel advances in digital identity, digital payments, and public-service platforms create practical pathways for early deployment (Government of Nepal, 2025b). At the same time, Nepal's readiness remains constrained by gaps in implementation planning and resourcing, limited research and innovation capacity, uneven infrastructure and connectivity, and governance and data security limitations that will shape the pace and inclusiveness of adoption (Mahat et al., 2025; Timilsina, 2025; Karki & Karki, 2025).

SWOT ANALYSIS

Strengths

i) National AI Policy, 2025 and institutional mechanisms

The formal adoption of the National AI Policy, 2025 is one of Nepal's key strengths. The policy establishes institutional mechanisms, such as the AI Regulatory Council, National AI Center, and AI Excellence Centers, and it provides a clear governmental vision for digital transformation that positions AI as a catalyst for modernizing agriculture, healthcare, education, and governance (Government of Nepal, 2025b). Nepal's vision also emphasizes alignment with global technological trends and frames AI as part of a broader strategy for sustainable development and economic modernization (Mahat et al., 2025). Through focused investments in priority sectors, AI is expected to contribute to national development outcomes (Mahat et al., 2025; Government of Nepal, 2025b).

ii) Ethical deployment, data protection, and sector-specific guidance

Nepal's policy architecture also signals an emphasis on ethical AI deployment and public trust, including data protection and transparency mechanisms supported by a proposed AI Regulation Council (Government of Nepal, 2025b). The focus on accountability reflects the broader principle that algorithmic accountability is vital in preventing biased and unfair AI decisions (O'Neil, 2016). The AI Regulation Council and National AI Center are expected to support adherence to ethical standards and reduce harmful outcomes from AI misuse, particularly given the reliance of many AI systems on sensitive data (Mahat et al., 2025). In addition, NRB has issued AI Guidelines for the Banking and Financial System, creating a sectoral entry point for managed AI adoption in financial services.

iii) Digital public services and data foundations for scaling

Nepal has advanced its digital networks, particularly in digital identity and digital payments, creating foundations for scaling AI-enabled services. The integration of the National ID and Nagarik App with major public services has expanded service delivery through secure digital authentication. QR-based payments are also growing rapidly, indicating increased uptake of digital financial services. Nepal has strengthened communications infrastructure, including fiber optic backbone expansion and 4G broadband connectivity. Digital payment systems, such as Fonepay, have begun leveraging AI for security enhancements and transaction monitoring, contributing to more robust digital financial infrastructure and improved access to formal financial services in remote areas (FISoft International, 2024). The government has also prioritized implementation of the National AI Policy through the establishment of a National AI Centre and the allocation of necessary resources for AI development.

iv) Emerging academic programs, research environment, and innovation ecosystem support

Nepal's higher education institutions have begun establishing structured pathways for AI professionals. Tribhuvan University, Kathmandu University, Purbanchal University, and Pokhara University have developed undergraduate and graduate programs focused on AI, machine learning, data mining, and knowledge engineering. Private sector-led research institutions and associations further contribute to a more conducive environment for AI research. Nepal's National AI Policy also promotes the establishment of AI research centers and educational programs to foster innovation and build a stronger technological ecosystem (Mahat et al., 2025; Government of Nepal, 2025b). This focus aligns with the broader view that investing in AI education and research is important for competitiveness and long-term innovation capacity (Chui et al., 2018). Nepal's growing start-up ecosystem and incentives for ICT-based industries, together with public-private partnerships and foreign direct investment (FDI), are also presented as enabling conditions for broader AI diffusion.

Weaknesses**i) Implementation roadmap, timelines, and budgeting gaps**

A major weakness in Nepal's National AI Policy is the absence of a detailed implementation roadmap with clear timelines and budget allocations. Without an actionable plan with milestones, Nepal risks delays and inefficiencies in execution, and a clearer roadmap is necessary to support delivery and accountability (Mahat et al., 2025).

ii) Fragmented institutional landscape and limited coordination

Nepal's AI ecosystem is institutionally fragmented. Multiple agencies, including MoCIT, DoIT, IDMC, NAST, and the E-Government Board, operate in digital innovation, and limited coordination can create overlapping responsibilities and slower implementation. Strong institutional mechanisms and effective inter-agency coordination are described as necessary for successful AI initiatives (Timilsina, 2025).

iii) Low R&D investment and limited funding mechanisms for AI research

Nepal invests relatively little in R&D, limiting domestic innovation and patent activity. The National AI Policy lacks a dedicated government-backed research fund for AI, which may constrain the ability of research to scale sustainably and may reduce the production of locally relevant solutions. The lack of clear investment strategies also exacerbates this constraint, and agriculture, industry, and services are identified as sectors that lack investment needed to adopt AI effectively (Mahat et al., 2025).

iv) Human capital risks, brain drain, and uneven inclusion in adoption gains

Nepal faces risks related to human capital retention and inclusive adoption. Brain drain is a major problem, as graduates with valuable AI skills leave to work abroad due to limited domestic demand and weak retention incentives. The National AI Policy also lacks specific measures to mitigate job losses that may arise from automation through reskilling or upskilling programs, which can increase the risk of AI deepening socioeconomic disparities (Timilsina, 2025).

v) Infrastructure constraints, digital divide, and gaps in data governance and cybersecurity law

Nepal's infrastructure limitations include the lack of high-performance computing facilities and limited 5G coverage, which can constrain large-scale AI deployments (Brynjolfsson & McAfee, 2014). The digital divide remains a structural weakness, where urban areas benefit more from internet access and fintech adoption while rural regions face poorer connectivity, lower awareness, and limited digital literacy (Karki & Karki, 2025). Data governance and cybersecurity constraints also raise concerns. The Electronic Transactions Act is outdated and not fully responsive to modern AI-related privacy issues, and insufficient data governance may increase privacy breach risks and erode public trust as AI diffuses into critical sectors (Mahat et al., 2025).

Opportunities**i) AI adoption in priority sectors and expansion of digital public services**

Nepal has meaningful opportunities to deploy AI in priority sectors aligned with national development goals. In industry, AI is a pathway to productivity improvement, with early positive indications reported in the literature (Pandey et al., 2023). Financial services can use AI for decision-making, fraud detection, and social innovation, and NRB's draft AI guidelines provide a policy entry point for managed adoption. Healthcare can benefit from AI-enabled telemedicine and decision support, especially to expand access in rural areas while disaster management can use AI-driven robotics and multi-agent systems to enhance crisis response. Education has also begun integrating AI tools, such as chatbots and learning management systems (Mahat et al., 2025; Timilsina, 2025). These opportunities are reinforced by expanding digital public infrastructure and digital public services, alongside the expansion of AI education programs in universities.

ii) Economic modernization, startup growth, and e-governance improvements

Nepal's AI policy frames AI as a tool to promote productivity, reduce costs, create jobs, and support innovation across manufacturing, finance, and services (Mahat et al., 2025). The policy also emphasizes e-governance opportunities, including service automation, improved transparency, reduced corruption, and more data-driven decision-making, which together create a pathway for AI to contribute directly to economic modernization (Mahat et al., 2025).

iii) Regional collaboration and green AI infrastructure positioning

Nepal can deepen collaboration with regional partners and organizations, such as the Asian Productivity Organization (APO), the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC), and the South Asian Association for Regional Cooperation (SAARC), particularly to access technical expertise, research partnerships, and high-performance computing resources. Another opportunity is green AI infrastructure. Nepal's Himalayan climate and renewable energy potential are advantages for energy-efficient data centers, which could support positioning the country as a more sustainable AI hub. AI-enabled e-governance is also an opportunity to improve transparency and service efficiency, drawing on successful models in digitally advanced countries.

Threats

i) Cybersecurity, misinformation, and data exposure risks

AI-driven digital systems face rising risks from cyberattacks, hacking, and misinformation. The National AI Policy (Government of Nepal, 2025b) emphasizes that insufficient data protection laws and cybersecurity frameworks can leave sensitive government, financial, and personal data vulnerable, which could damage national security and erode public trust. The policy calls for stronger cybersecurity measures aligned with global data protection standards to safeguard citizens and critical infrastructure.

ii) Bias, unethical use, and weak enforcement capacity

While the National AI Policy recognizes fairness and includes provisions for an AI Regulation Council, Nepal lacks a sufficiently strong governance framework to regulate biased AI and unethical uses in practice. Without effective monitoring and auditing, AI systems could reinforce inequalities and exacerbate disparities, highlighting the need for credible oversight mechanisms (Mahat et al., 2025).

iii) Infrastructure shortfalls and reliance on foreign AI technologies

Threats to AI development include inadequate infrastructure, such as limited high-performance computing, cloud systems, and 5G connectivity, which are described as necessary for advancing AI. Reliance on foreign AI technologies is also identified as a threat, raising risks to data sovereignty and limiting local innovation. Mahat et al. (2025) notes dependence on global firms, such as Google, Microsoft, Meta, and OpenAI for models, cloud services, and algorithms, and argues that Nepal should prioritize domestic AI capacity building to reduce dependence and safeguard national interests.

iv) Implementation gaps, displacement risks, and resistance to adoption

The National AI Policy falls short of addressing job displacement caused by automation as it lacks comprehensive workforce retraining strategies. Resistance to AI adoption is also identified as a threat, driven by low digital literacy, technology gaps, and a widening urban–rural divide that can undermine inclusive AI growth. The risk of an implementation gap is highlighted by Nepal's experience with earlier policies, such as the ICT Policy (2015) and STI Policy (2019a; 2019b), which reportedly suffered from underfunding and weak monitoring. Similar delivery weaknesses could constrain the impact of the National AI Policy (Timilsina, 2025).

Summary

Nepal's AI readiness requires a balanced approach that leverages its strong policy foundation and emerging digital ecosystems while addressing infrastructural, educational, and regulatory gaps. Prioritizing the development of a clear, actionable implementation roadmap, investing in high-performance computing and telecommunications infrastructure, and enhancing AI education and reskilling programs will be critical. Strengthening AI ethics, data security, and local innovation ecosystems through funding and partnerships will be essential to harness AI's transformative potential effectively and equitably (Mahat et al., 2025).

Nepal should prioritize opportunities in data annotation, AI outsourcing, and applied solutions across sectors, such as agriculture, healthcare, and tourism where it holds clear contextual advantages in these areas. It can also position itself as a leader in ethical and inclusive AI by leveraging its emerging policy framework to attract responsible investment and strategic development partnerships. Active engagement with the APO and regional neighbors will be key to accessing advanced infrastructure, knowledge, and technical expertise. At the same time, Nepal should explore the development of environmentally sustainable data centers and AI infrastructure, capitalizing on its strong renewable energy potential.

Future Needs and Collaboration Pathways

Domestic Priorities

Labor

Nepal needs to expand AI-focused degree programs beyond the Kathmandu Valley and embed AI literacy in secondary education to strengthen the future talent pipeline (Timilsina, 2025). Government scholarships linked to AI-focused degree programs can further deepen the talent pool and improve retention (Mahat et al., 2025). Applied research capacity can be strengthened through partnerships among universities, start-ups, and government institutions, supported by seed funding for pilot AI projects in agriculture, health, and tourism.

Governance Capacity Building

Effective implementation of the National AI Policy, 2025 requires funding, coordination, and accountability. A near-term priority is to allocate sufficient financial resources and establish clear timelines to operationalize the AI Regulation Council, National AI Centre, and AI Excellence Centers, as specified in the National AI Policy, 2025. A detailed implementation plan is also needed that specifies budgets, timelines, milestones, and responsible agencies, with clear assignment of roles and accountability to enable monitoring, course correction, and sustained delivery (Mahat et al., 2025). Governance capacity should be reinforced through guidelines for algorithmic fairness, data privacy, and cybersecurity aligned with global frameworks while being customized to Nepal's context. Monitoring and evaluation should be institutionalized through a National AI Index and annual reporting to support accountability and transparent progress tracking.

Digital Infrastructure

Expanding broadband connectivity is a priority for closing the rural–urban divide and enabling more inclusive AI adoption (Karki & Karki, 2025). Nepal also needs pathways to develop and operate high-performance computing resources for advanced AI applications through collaboration with development partners, academia, and the private sector (Mahat et al., 2025). In parallel, Nepal can explore green data center investments that leverage the Himalayan climate to support more energy-efficient cloud infrastructure and reduce operating costs while improving sustainability.

Innovation Support and Private-sector Adoption

Nepal can strengthen innovation by expanding incubators and tax incentives for AI start-ups in areas, such as robotics, fintech, tourism, and agriculture. Establishing a national AI research fund and offering tax benefits can stimulate entrepreneurship and attract investment, supporting research and commercialization capacity (Mahat et al., 2025). SME uptake can be accelerated through AI adoption toolkits designed to raise productivity. Government procurement can also stimulate demand by expanding AI use in governance, public health, and service delivery, creating implementation pathways and early markets for domestic providers.

Collaboration Opportunities

Local Perspective

i) Applied research partnerships and demonstration pilots

Local collaboration can focus on applied research partnerships among universities, start-ups, and public institutions, reinforced through seed funding and pilot projects in agriculture, health, and tourism. These pilot project can generate reusable playbooks for adoption and help develop a pipeline of implementation-ready practitioners.

ii) Diffusion support for SMEs and public services

Collaboration among government agencies, business associations, and training providers can support SME toolkits and implementation assistance while public procurement can provide structured demand for AI solutions in governance and service delivery.

Global Perspective**i) APO-centered capacity building and technical support**

Nepal should deepen engagement with the APO in AI readiness initiatives through regional training, joint projects, and excellence centers. National Productivity and Economic Development Centre (NPEDC) can be developed as a National Excellence Center for AI research with the APO support, strengthening domestic coordination and delivery capacity. NPEDC and the Ministry of Communication and IT can also leverage expertise from other APO members through workshops, conferences, technical expert services, the development of demonstration companies, and other APO member programs.

iv) Regional and multilateral partnerships

Nepal can strengthen collaboration with South Asian neighbors and regional organizations, such as BIMSTEC and SAARC, on applied AI research for shared challenges, including agriculture and climate resilience. Partnerships with multilateral institutions, such as the UN, World Bank, and ADB can support technical assistance and policy benchmarking for governance and implementation.

APO Joint Initiatives**i) Regional training and joint projects under APO AI readiness**

Nepal can participate more actively in the APO regional training programs and joint projects that build practical implementation capacity, including curriculum development for AI literacy, applied certification, and trainer development aligned to domestic delivery needs.

ii) National excellence center anchored by NPEDC

NPEDC can be supported to serve as a national excellence center for AI research and capacity building, linked to the APO networks for technical assistance, shared training resources, and collaborative applied research.

iii) Demonstration companies and applied AI pilots

The APO-supported demonstration companies and applied pilot projects can accelerate diffusion by validating use cases in agriculture, health, tourism, and public service delivery while generating implementation toolkits for SMEs and government agencies.

iv) Policy benchmarking and governance capacity support

The APO and partner institutions can support Nepal in developing and operationalizing guidelines for algorithmic fairness, data privacy, and cybersecurity as well as monitoring structures, such as a National AI Index and annual reporting frameworks.

CHAPTER 12

PAKISTAN

Each member economy is assessed through a common analytical framework covering five core dimensions: (i) ecosystem baseline; (ii) policy and strategy; (iii) stakeholder landscape; (iv) strategic positioning; and (v) future pathways. This structure enables consistent cross-economy comparison while allowing for context-specific insights into how AI capabilities are developed, governed, and applied in practice.

AI Ecosystem Baseline Assessment

AI Adoption in Pakistan

Pakistan is still in the early stages of AI development, but progress is supported by growing government investments, a large body of academic research, and the commercial implementation of AI technologies (Asian Productivity Organization [APO], 2025). AI development in the country is governed by the National AI Policy 2025 (which has a 10-year roadmap) and the Digital Nation Pakistan Act 2024. The latter focuses on AI implementation in healthcare, agriculture, education, and governance (Ministry of Information Technology and Telecommunication [MoITT], 2024). Key challenges include a lack of infrastructure, a skills deficit (only 10% of IT graduates are employable), and underinvestment in research and development (R&D) compared with the rest of the world (Higher Education Commission, 2024; World Bank, 2025). The Government AI Readiness Index 2024 assigned Pakistan's government a score of 40.61. The country's technology score was 36.94, and its data and infrastructure score was 43.87. This places Pakistan in the developing ecosystem tier and points to a basic level of foundational capacity but very uneven diffusion at the enterprise level (Nettel et al., 2024). Current trends indicate that the market is poised to expand rapidly (projected at 22.3%–27.6% CAGR to 2030), and awareness is also markedly high; 76% of Pakistanis are aware of ChatGPT, ranking fourth globally (Stanford University Institute for Human-Centered Artificial Intelligence [Stanford HAI], 2024; Statista, 2025).

The following material presents key indicators and trends on Pakistan's AI readiness using the latest available data and assessments.

AI Adoption by Sector

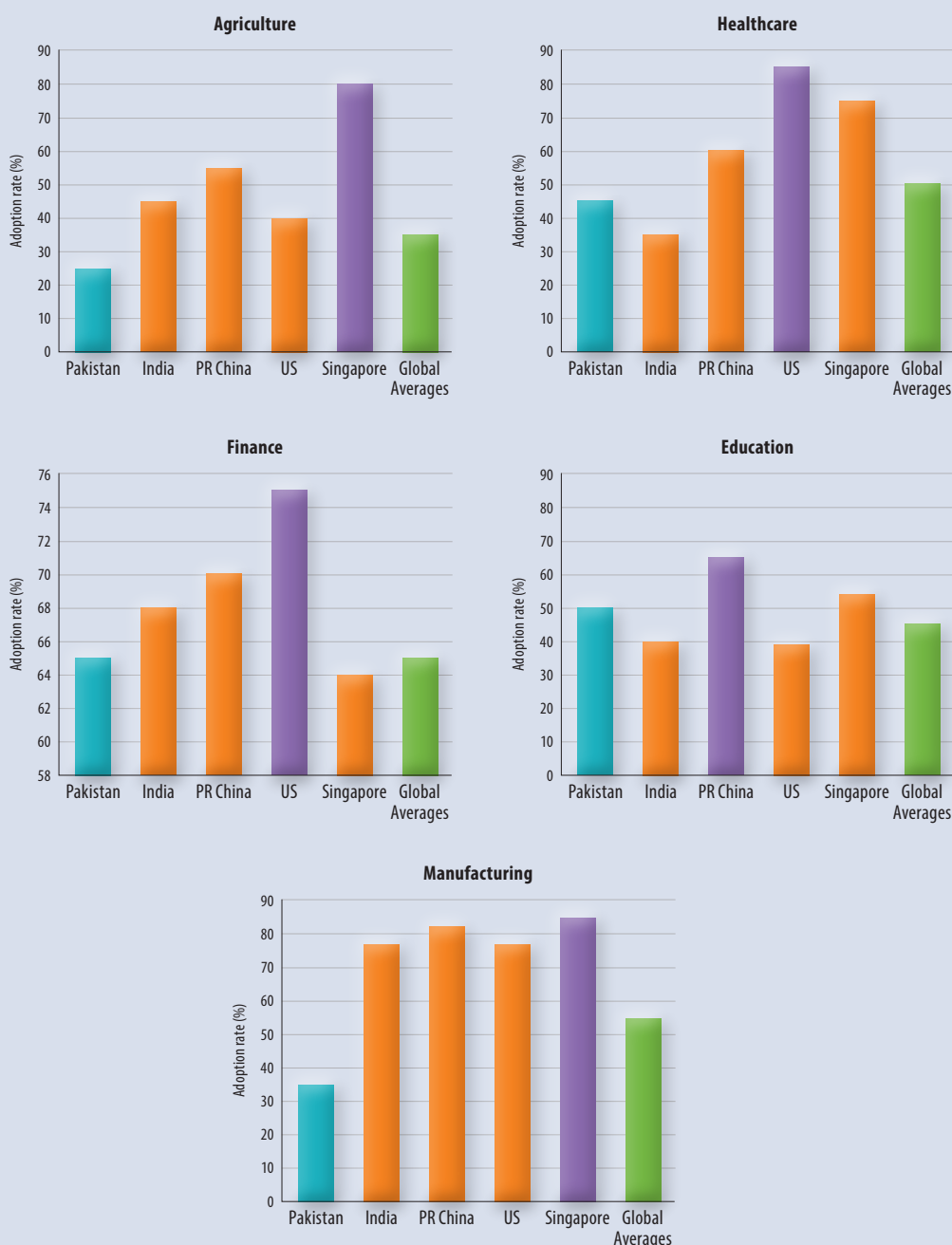
Overall, AI adoption in Pakistan is nascent but expanding, driven by public–private partnerships (PPPs) and policy frameworks (United Nations Development Programme [UNDP], 2025). Overall, AI utilization is not measured at the national level. However, case studies, such as Shui et al. (2025), suggest that Pakistani firms rank on the lower end of the spectrum for developing markets, at approximately 50%–60% in terms of AI adoption. By comparison, India's AI adoption stands at approximately 72%. However, as mentioned above, public awareness of AI tools like ChatGPT sits at around 76%, which means that people are largely familiar with GenAI (Maslej et al., 2025). As in other countries, however, Pakistani small and medium-sized enterprises (SMEs) lag behind due to inadequate high-speed internet and computing infrastructure (Cimino et al., 2025). Data from 2024 suggest that the size of the domestic AI market is valued at approximately USD861 million, with the GenAI segment standing at USD173 million. This market is projected to grow at a 27.6% CAGR from 2025 to 2030, reaching approximately USD3 billion as adoption accelerates (Statista, 2025).

By sector, the government is adopting AI rapidly, although the overall level of adoption remains modest. It is working to integrate AI into e-governance and public safety initiatives. Examples include

Punjab Safe City's AI-powered e-challan system for traffic violations, virtual police stations that can identify gender through voice recognition, and NADRA's AI-based eKYC (electronic Know Your Customer) for seniors. The GLOF-II project of the UNDP uses AI to conduct disaster simulation in climate-endangered zones, which helped to protect 421,232 individuals (UNDP, 2025).

FIGURE 12.1

AI ADOPTION RATES BY SECTOR, CROSS-COUNTRY COMPARISON



Source: Habib et al., 2024; IBS Intelligence, 2025; Kergroach & Héritier, 2025; National Centre of Artificial Intelligence [NCAI], 2025; Nettel et al., 2024; Singla et al., 2025; Tariq et al., 2025; United Nations Conference on Trade and Development, 2025; Yasin & Safdar, 2025.

Note: Pakistan vs. Global Peers in agriculture, healthcare, finance, manufacturing, and education.

The Digital Pakistan Policy 2024 and National AI Policy 2025 offer adoption strategies and implementation tools across the public sector. The current emphasis is on smart cities and public health (MoITT, 2024; National AI Policy 2025, 2025). The use of AI tools for smart cities, traffic and crime control, and efficient service delivery is intended to improve livability and enhance public welfare.

In Pakistan's healthcare sector, AI is beginning to reshape parts of the health system; for example, through Xylexa's AI-based image analysis for breast-cancer diagnosis and intelligent biomedical applications developed at the National Centre of Artificial Intelligence (NCAI) (E-Pakistan, 2024; Golra & Khalid, 2025; Xylexa, 2025). National reports such as E-Pakistan 2024 and the 2025 International Science Council highlight these projects as early examples of how AI is being embedded into healthcare and related services (E-Pakistan, 2024; Golra & Khalid, 2025; International Science Council, 2025). In a recent cross-sectional survey of 616 healthcare students and professionals in Pakistan, Habib et al. (2024) found that, although most respondents had not received formal AI training, 70.3% believed that AI would introduce ethical challenges in healthcare and 66.4% agreed that AI should be included in undergraduate medical and health science curricula (Habib et al., 2024). Akram et al. (2024) similarly concluded that AI has substantial potential to transform healthcare delivery in Pakistan by improving efficiency, accessibility, and quality of care while emphasizing the need to address knowledge gaps, data-protection issues, and regulatory concerns in parallel. Since its establishment in 2018, NCAI has supported 37 spin-off companies and more than 220 AI-based products, several of which aim to make diagnostics faster and more accurate through the commercialization of research-driven tools. In this context, a spin-off refers to a start-up originating from a research institution that uses AI to bring innovations, such as medical decision-support systems, to market (E-Pakistan, 2024; Golra & Khalid, 2025; International Science Council, 2025).

In the agricultural sector, AI adoption is gaining steam, with the AI-based tool Farmdar being increasingly used to forecast crop yields and to make irrigation more sustainable. Roughly, 37.4% of Pakistani workers make their living in the agricultural sector. This means that AI adoption here does risk some level of employment disruption, but also offers the possibility of major efficiency gains (Cerutti et al., 2025; UNDP, 2025). The current emphasis is on smart agriculture through NCAI (Golra & Khalid, 2025). Smart agriculture is defined as using AI-enabled precision farming to use resources more efficiently and productively. This has the potential to generate significant gains for Pakistan's largely agrarian economy.

In the finance sector, adoption remains at a modest scale but is growing. AdalFi offers AI-based lending, and the FikrFree platform, launched by Jazz in 2024, offers AI-powered insurance and healthcare. The firm sold 1.5 million policies within four months. Larger companies use AI to help manage their supply chains; the firm Khadi adopted AI tools that helped mitigate supply chain management costs by as much as 90% (Invest2Innovate, 2025; UNDP, 2025). The overall trend points to AI-driven financial inclusion and greater retail efficiency (Cerutti et al., 2025), as firms use AI to offer credit and other financial services to historically underserved populations.

In the education sector, AI adoption remains very limited overall but is being deployed creatively. The Happy Palace initiative introduced Pakistan's first AI robot teacher "Anny" in 2024, using NLP for personalized learning (Happy Palace Grammar School [HPGS], 2024). According to 2024 HEC statistics and a 2025 UNDP report, 47 universities offer Bachelor of Science in AI programs (E-Pakistan, 2024; UNDP, 2025). A recent survey of 215 university students in the twin cities (Rawalpindi and Islamabad) found that 86% of respondents were using AI in their fields of study to develop cognitive skills and creativity (Yasin & Safdar, 2025). A study of 237 university librarians found that few used AI technologies (text-to-speech, RFID-based self-checkout, Google Assistant, etc.) owing to weak infrastructure and a lack of training (Asim et al., 2023). Overall, AI uptake is increasing in the education sector, with the potential to help address learning gaps (HEC, 2024). AI robot teachers in particular could help improve student interaction process by employing adaptive learning strategies.

For Pakistani's exporters and SMEs, a recent study based on 2023–24 survey data suggests that the availability of advanced technology significantly influences sustainable performance and the adoption

of green AI (F. ul Haq et al., 2025; Seah et al., 2023). Energy-efficient AI models could reduce energy consumption and help develop more sustainable exports. Since 2018, AI adoption increased rapidly among Public Sector Development Programme (PSDP)-funded agencies and start-ups (including NCAI spinoffs), but a significant gap remains between urban and rural firms and between the public and private sectors. AI uptake is especially low among SMEs and in rural areas due to the digital divide (UNDP, 2025). Pakistan lags behind India in organizational AI adoption, but awareness and start-up use are similar (Shui et al., 2025). National policy is currently promoting AI integration and awareness, with specific objectives set for 2030. Future policies are a major focus and could increase GDP by 2%–5% through enhanced productivity driven by automation and data-driven decision making (World Bank, 2025).

AI R&D and Investment in Pakistan

In the global AI market, Pakistan lags behind, with minimal AI patenting activity. According to the World Intellectual Property Office's (WIPO) 2023 Generative AI report, Pakistan had no AI-specific patents on record. PR China is the global leader, having been granted 69.7% of AI-related patents in 2023 (World Intellectual Property Office [WIPO], 2023). However, total resident patent applications (not AI-specific) in Pakistan increased by 14% annually between 2010 and 2024 (Intellectual Property Organization Pakistan, 2024), and as of May 2024, patent activity was up 10% month-on-month (MoM). The NCAI promotes AI-related innovations and has developed more than 220 AI products since 2018, although most are not patented nationally and are instead licensed (Golra & Khalid, 2025). AI patents generally involve new algorithms, AI-enabled hardware, or novel data processing techniques. But in Pakistan, AI researchers focus primarily on applied research with tangible outputs.

TABLE 12.1

AI-RELATED PATENT TRENDS IN PAKISTAN

Year/Period	AI-related Patents/Trends	Source
2010–24	Limited data; focus on research output (18,365 AI-related papers, including 11,000 in computer science), rather than patents.	Web of Science (via ISC)
2016–20	2,600 AI-based publications, indicating active R&D ecosystem, but limited patent output.	HEC/MoITT
2023–24	Draft AI Policy proposes IP reforms for AI inventions; no quantified AI patents, but total patents up 10% MoM in May 2024.	IPO-Pakistan

AI-specific patenting activity remains very limited, although 200 Higher Education Commission (HEC)-funded projects are licensed under the domain of academia–industry collaboration (HEC, 2024). Internationally, the number of AI-related patents granted soared to 122,511 in 2023 (as compared to 3,833 in 2010); Pakistan has been at the fringes of this activity, with a minimal share of patents even within the South Asian region (WIPO, 2023). However, the advancements in the technologies and IP reforms have been observed through Inventor Assistant Program (IAP) and National AI Policy 2025. AI authorship (AI-based inventions can be patent or otherwise) remains a challenge (WIPO, 2023). It has been projected that in 2030, AI-specific patents will become increasingly common as funding emerges amid increased regulatory support (MoITT, n.d.).

Government and Private R&D Investment in AI

Investments in AI are increasing, albeit at a modest pace, with the government taking the lead through initiatives, such as the Public Sector Development Programme (PSDP) and grants from the Higher Education Commission (HEC). For the 2024–25 budget, the Ministry of Information Technology and Telecommunication (MoITT) has allocated PKR24 billion (~USD85.5 million) for AI and IT projects, which is a notable jump from the PKR723 million (~USD2.6 million) allocated in 2022–23 (Federal Budget, 2025). However, AI investment in the private sector remains limited. Existing funding primarily targets start-ups, with incentives, such as Google Cloud credits, reaching up to USD350,000

(Google, 2024). Overall, projections suggest that total investment in the AI market could reach between USD2.7 and USD3 billion by 2030 (Statista, 2025).

The basic trend in AI investment reflects a dichotomy, with public investment significantly exceeding private investment. But the government does seem to be aware of this; the 2025 National AI Policy states that the private sector requires strengthened incentives to spur AI investment (National AI Policy 2025). Compared to major international players in the AI space, private sector AI investment in Pakistan is limited; by comparison, AI investment in the United States of America (US) reached USD109 billion in 2024 (Maslej et al., 2025). However, the current trends point to the rapid development of infrastructure (e.g., 5G, cloud computing) and the formation of partnerships, and it is projected that the annual investment could reach USD200–USD300 million by 2030, assuming a successful policy implementation scenario (MoITT, n.d.; Shui et al., 2025). The government-funded PSDP will be critical to scaling the country's AI infrastructure.

AI Workforce in Pakistan

According to 2024 data, the number of workers with AI skills in Pakistan is estimated at about 15,000 professionals. These workers include AI and software engineers and data scientists. Every year, the country's universities produce about 25,000 IT graduates, but only 10% secure AI-related jobs due to mismatch with market demand (Rehman, 2024). As shown in Table 12.2, a relatively small number of researchers published 2,600 AI related papers between 2016 and 2020, and 18,365 papers over the longer period that covers 2000 to 2024 (Golra & Khalid, 2025). In addition, 2.37 million freelancers augment the AI workforce, making it one of the fastest growing labor segments globally. The country is also home to 2,000 IT companies (Finance Division Pakistan, 2024). These freelancers play a crucial role in the AI ecosystem, engaging in tasks, such as data annotation and model testing, often through international platforms.

TABLE 12.2

AI WORKFORCE IN PAKISTAN

Category	Number/Details	Trend	Source
AI Professionals	~15,000 (2024) (Over 600,000 total IT professionals, of which AI specialists form a subset (~2%–3% based on sector reports))	Growing 10%–15% YoY via training; 3.9 million DigiSkills.pk enrollments since 2018	DigiSkills.Pk, n.d.; National AI Policy 2025, 2025; The Virtual University, Pakistan, n.d.
Researchers	Low thousands; 5,000+ PhDs (2010–14), including AI; and 70 HEC PhD scholarships abroad	Upward trend; collaborations with PR China (Sino-Pak Center) and international publications are increasing	HEC, 2025; Pak-Austria Fachhochschule Institute of Applied Sciences and Technology, n.d.
Education Pipeline	47 Bachelor of Science in AI programs, 9 Master of Science in AI; Presidential Initiative for Artificial Intelligence and Computing (PIAIC) targets 100,000 trainees per year in AI/computing	Expanding since 2019; Google scholarships (45,000 in 2024) support upskilling	HEC, 2025; PIAIC - Training Report, 2024

The AI workforce is expanding at a robust clip (10%–15% year-on-year (YoY) growth). However, in terms of human capital quality, Pakistan lags behind. The Human Capital Index (HCI) stands at 0.41 for South Asia, indicating a serious shortfall in educational quality and health outcomes (World Bank, 2025). In addition, automation poses a risk to 17%–42% of jobs, particularly in the agriculture sector (Cerutti et al., 2025). Pakistan also faces significant brain drain, with many individuals possessing strong AI skills relocating to Europe and the US. Domestic talent retention remains weak due to limited opportunities for individuals with advanced AI skills (Rehman, 2024). Pakistan ranks behind India in

percentage talent growth (252% expansion from 2016 to 2024) (Stanford HAI, 2024). Future-oriented policies focus on reskilling, which may double the effective labor force by 2030 (MoITT, n.d.). The HCI evaluates future labor productivity in terms of education and health parameters, making it a critical factor for AI readiness.

TABLE 12.3
PAKISTAN'S GOVERNMENT AND PRIVATE R&D INVESTMENT IN AI

Investment Type	Details
Government	PKR24 billion (~USD85.5 million) (2024–25); PSDP for NCAI/Sino-Pak Center for Artificial Intelligence (SPCAI); Proposed AI funds
Private	Start-up funding (e.g., Google Cloud up to USD350,000); Data centers: 20 MW (4.4% growth)
Overall	AI market investment implied by growth to ~USD3 billion by 2030

Source: Federal Budget, 2025; Google, 2024; Ministry of Science and Technology [MOST], 2025; Statista., 2025.

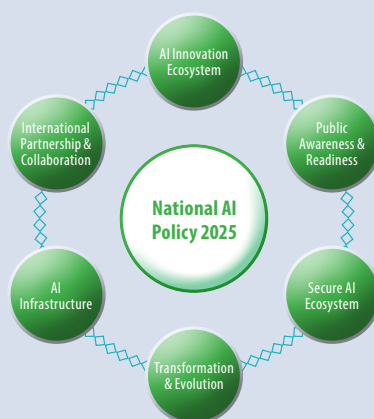
National AI Policies and Strategies

National AI Strategy of Pakistan

The National Artificial Intelligence Policy 2025 was approved by the Federal Cabinet on 30 July 2025 (National AI Policy 2025). The main objective of the strategy is to position Pakistan as a major player in the international AI market through research, innovation, ethical use, and broader adoption across the region (MoITT, n.d.). The policy is also aligned with the global initiatives, such as the UN's "AI for Good" program to promote sustainable development (United Nations [UN], 2025).

AI Policies in Pakistan

The National AI Policy 2025 describes a blueprint for building a knowledge-based economy in Pakistan by expanding democratic access to AI, improving social services, and establishing ethical governance. It emphasizes inclusive development, reducing geographic disparities, and building a comprehensive AI ecosystem that aligns technology toward Pakistan's socioeconomic needs (National AI Policy 2025, 2025). In this context, a "knowledge-based economy" is described as one that advances AI innovation by prioritizing intellectual capital over physical resources.

FIGURE 12.2
PAKISTAN'S NATIONAL AI POLICY MATRIX


The policy sets ambitious goals, including educating 1 million AI professionals by 2030, integrating 50,000 AI-powered civic initiatives, producing 1,000 PhD-trained AI professionals, and achieving 90% public awareness by 2026. It also aims to create new employment, strengthen the digital economy, and encourage secure and ethical AI systems. The policy highlights civic-facing AI integration through initiatives, such as smart traffic monitoring and e-governance.

The policy's priority areas are structured around six pillars. First, it promotes an AI innovation ecosystem by encouraging research, start-ups, enabling infrastructure, and industry applications. Second, it emphasizes public awareness and readiness by developing human resources and educating the public to build AI awareness. Third, it focuses on secure AI ecosystems by strengthening cybersecurity and data protection to support responsible AI use and protect human rights. Fourth, it targets transformation through the incorporation of AI into sectors, such as medicine, agriculture, academia, manufacturing, and community services. Fifth, it prioritizes AI infrastructure, including the development of high-performance computing (HPC) centers, AI hubs, and cloud-based data systems. Sixth, it advances international partnerships and collaboration to support knowledge sharing and growth.

Milestones and Achievements

The National AI Policy 2025 is described as Pakistan's first national AI policy. It was first issued as a 2023 consultation draft that was approved and published by the MoITT. The document was made public to the public in 2023 to solicit feedback, after which it was approved in 2025 and revised to constitute a national AI roadmap. The policy targets for 2026 include achieving 90% public awareness, establishing AI Centers of Excellence, and allocating initial AI funding. By 2030, it targets training 1 million professionals, developing 50,000 civic or community projects, and producing 1,000 PhD-level AI experts.

As the policy was recently approved, the achievements presented are characterized as foundational. Examples cited include the development of 221 AI products at NCAI and their application in areas, such as smart cities, agriculture, and healthcare, since 2018. The document also notes preliminary positive impacts in the form of stronger public-private partnerships and international collaborations, including AI training initiatives associated with Google. At the same time, the policy is described as being praised for its breadth but criticized for lacking detailed risk categories. For example, it fails to classify AI applications based on potential harms, and it also lacks detailed timelines (Google, 2024; Rehman, 2024; National AI Policy 2025, 2025). Some of these claims are attribution-based and may not be independently verifiable.

Key Measures and Policies

AI policy is centralized under the National AI Policy 2025, led by the MoITT, with other ministries playing supporting roles. The framework emphasizes cross-ministerial collaboration as the mechanism for coordinated implementation and for avoiding siloed approaches. What follows is a ministry-by-ministry description of standalone AI policies or AI components embedded within broader policy frameworks, reflecting the stated 2025 updates.

Ministry of Information Technology and Telecommunication (MoITT)

MoITT is the main executive agency responsible for implementing the National AI Policy. Its implementation objectives are to establish a holistic AI ecosystem that supports innovation, ethical use, capacity building, and intersectoral AI integration for economic development and job creation while applying principles, such as fairness and transparency to reduce bias in deployment.

Implementation measures include: (i) establishing AI Centers of Excellence in major cities; (ii) creating a national AI fund for start-ups and research; (iii) establishing a regulatory directorate focused on AI ethics; (iv) integrating AI into e-governance and community services; (v) collaborating with technology firms, such as Google, to expand skills through training, and (vi) running AI literacy campaigns. The policy also references NCAI expansion into healthcare, agriculture, and smart city applications as illustrative programs.

With regard to funding, the policy states that PKR24 billion (~USD85.5 million) was allocated in FY2024–25 through the federal budget, with additional funding expected through public–private partnerships and international grants, including UNDP support and Google credits of up to USD350,000 for start-ups. Details regarding AI-specific project funding remain unclear (E-Pakistan, 2024; Federal Budget, 2025). Responsible agencies are listed as MoITT (lead), alongside the Federal Cabinet, the HEC, and the private sector.

Ministry of Science and Technology (MoST)

MoST is linked to AI policy through the National Science, Technology and Innovation Policy (STIP) 2023, with AI R&D described as integrated through the National AI Policy 2025 (MOST, 2025). Its objectives focus on executing AI-related R&D to support economic development and industrial applications in areas, such as agriculture and health, including innovation in precision agriculture and automation.

Implementation measures include allocating 30% of Ignite R&D resources to NAIF (National AI Funds) to initiate AI projects, nurturing NCAI labs, supporting Pakistan Council of Scientific & Industrial Research (PCSIR) technology transfer, and applying AI in precision agriculture through machine-learning-based crop monitoring aimed at reducing waste. The framework also mentions 31 PSDP schemes, including six AI-targeted technology parks.

Budget figures are given at PKR500 million (~USD1.8 million) for AI R&D in 2024–25 and PKR1.5 billion (~USD5.4 million) for 2025–26, with funding released to the Public Sector Development Programme through Ignite and NAIF (Federal Budget, 2025). Responsible agencies are MoST (lead), with MoITT and PCSIR.

Ministry of Industries and Production (MoIP)

MoIP does not have a separate AI policy and instead incorporates AI into existing policies through the National AI Policy 2025 and industrial policy frameworks (MoIP, 2025). Its objective is to facilitate the integration of AI in the industrial sector to modernize the country's industrial base, improve supply-chain efficiency, and boost manufacturing exports.

Implementation measures include introducing AI in manufacturing. Potential tools include predictive maintenance and AI-enabled quality control using NCAI products. It also offers incentives for SMEs that choose to adopt AI and for firms that participate in AI hubs designed to form linkages between industry and universities. Funding is linked to NAIF and federal industrial incentives, with an emphasis on mobilizing private-sector investment. Responsible agencies are MoIP (lead), working with MoITT and provincial industrial departments.

Ministry of Federal Education and Professional Training and the Higher Education Commission (HEC)

Education-related AI policy is embedded in the National Education Policy, which is in turn linked to the National AI Policy 2025 (HEC, 2024; 2025). The objectives of the policy focus on introducing AI into the country's educational system to strengthen AI skills, expand research capacity, and modernize curricula.

Implementation measures include developing AI curricula for Bachelor of Science and Master of Science programs in 47 universities, conducting UNESCO-supported seminars to raise awareness of AI ethics, offering AI-related doctoral scholarships, including 70 overseas scholarships, and funding 100,000 AI trainees per year through PIAIC. The document also cites the availability of Google scholarships, including 45,000 in 2024, and emphasizes the importance of AI ethics workshops as part of developing moral and governance awareness (Google, 2024).

Funding comes from HEC resources, including PKR50 million (~USD179,000) for AI-related initiatives over three years, alongside the federal education budget and international collaborations with Google-supported programs. HEC is the lead agency, which works alongside MoITT and universities.

Ministry of Overseas Pakistanis and Human Resource Development (OPHRD)

The OPHRD does not have a separate AI policy and instead, incorporates AI into the Labor Export Policy based on the National AI Policy (Ministry of Overseas Pakistanis and Human Resource Development [OPHRD], 2025). The objectives focus on upskilling the workforce for AI-related roles, reducing exposure to automation risks, and promoting overseas employment opportunities in technology fields.

Implementation measures include workshops to enhance the skills of 1 million workers, leveraging DigiSkills.pk (with 3.9 million trainee registrations), and reskilling vulnerable groups, such as farmers, who face a 37.4% risk exposure. Funding is allocated through federal HRD mechanisms and linked to national AI training funds. OPHRD is the lead agency, working with MoITT and the National Vocational and Technical Training Commission (NAVTTTC).

TABLE 12.4

PAKISTAN'S AI-RELATED FUNDING FOR FY2024–25 AND FY2025–26

Ministry/Initiative	FY2024–25 (PKR 'million)	FY2025–26 (PKR 'million)	Notes & References
National AI Policy	2,000	5,000–7,000	NAIF core; 400 projects, scholarships (Source: MoITT Policy 2025)
MoITT	2,000	2,000+	Data centers, CoE-AI (Source: Finance PSDP 2025–26)
MoST	500	1,500	Ignite R&D (30% AI) (Source: Dawn, 2025)
MoIP	-	500	Manufacturing subsidies (Source: MoITT Policy, Profit Pakistan, 2025)
MoFEPT	100	262	AI curricula (Source: PSDF 2025–26, HEC)
OPHRD	-	1,000	Skilling via NAVTTTC (Source: MoITT, NAVTTTC Report)
Other Funding	500	2,000	PSDP slice, data centers. (Source: Finance Budget)

Key Stakeholder Mapping

Pakistan's AI ecosystem is characterized by a commercially oriented private sector focused on applied solutions with clear revenue pathways, alongside a public and quasi-public sector centered on policy, R&D, and institutional capacity building. Cross-sector networking is a key accelerator of adoption, linking private firms, universities, national programs, and development partners through implementation partnerships, training pipelines, and emerging governance frameworks.

Private Sector

Pakistan's private AI sector is concentrated in major urban hubs, such as Karachi, Lahore, and Islamabad, where firms have stronger access to international clients, partnerships, and export markets (APO, 2025; Invest2Innovate, 2025). The ecosystem includes an estimated 50–100 AI-related companies and start-ups, supported by a large freelance workforce and expanding IT exports (Garcia & Oliveira, 2025). Freelancers contribute to AI value chains through activities, such as data annotation and model development on global platforms.

Major Players

Invest2Innovate (2025) identifies a set of prominent private-sector organizations developing AI products and delivering AI-enabled services across key industries.

Binary Marvels

Founded in 2018, Binary Marvels develops AI-based solutions, including custom software and automation systems (Invest2Innovate, 2025).

Systems Limited

Founded in 1977, Systems Limited is one of Pakistan's oldest IT services companies and has expanded into AI-enabled enterprise transformation, including applications in banking software and related financial services workflows (Invest2Innovate, 2025).

10Pearls

Founded in 2004, 10Pearls develops engineering and AI-related products and is active in applied AI for commercial use cases, including education-oriented applications (Invest2Innovate, 2025).

Cubix

Founded in 2008, Cubix develops AI-based mobile and web applications and is active in applied AI deployments, such as recommendation engines in e-commerce contexts (Invest2Innovate, 2025).

Addo AI

Founded in 2018, Addo AI provides data and AI consulting services and supports finance-sector deployments, including fraud detection use cases (Invest2Innovate, 2025).

Xeven Solutions

Established in 2015, Xeven Solutions focuses on applied AI in healthcare and education technology, including diagnostic-oriented applications in the health sector (Invest2Innovate, 2025).

Revolve AI

Established in 2020, Revolve AI focuses on generative AI and machine learning (ML) and develops content generation and generative AI platforms for commercial deployment (Invest2Innovate, 2025).

Origami Studios

Founded in 2012, Origami Studios builds AI-driven applications and develops chatbot products for customer interaction and service automation (Invest2Innovate, 2025).

Data Pilot

Established in 2019, Data Pilot provides smart data solutions and predictive analytics and develops tools, such as sentiment analysis for customer and market intelligence applications (Invest2Innovate, 2025).

Pixelette Technologies

Established in 2013, Pixelette Technologies develops AI solutions with a focus on computer vision and immersive or metaverse-linked environments, including deployments in applied settings (Invest2Innovate, 2025).

Tezeract

Founded in 2019, Tezeract applies AI to automation and diagnostic problem-solving, including health-related diagnostic applications identified within the broader healthcare use-case cluster (Invest2Innovate, 2025).

Crop2X

Established in 2021, Crop2X is an agritech start-up applying AI to crop monitoring and yield prediction to support farm-level decision-making (Invest2Innovate, 2025).

Skimming AI

Established in 2022, Skimming AI develops AI for fintech and security, including fraud detection applications aligned with financial-sector risk management (Invest2Innovate, 2025).

Core Products and Services

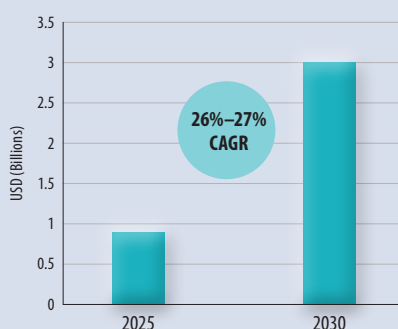
Private-sector activity spans recurring sectoral use cases, products, and service offerings identified by Invest2Innovate (2025). In healthcare, firms, such as Xeven Solutions and Tezeract deploy AI for diagnostic applications, supporting clinical decision-making and health service delivery (Invest2Innovate, 2025). In agriculture, Crop2X applies AI to yield prediction and monitoring, aligning deployment with productivity and resilience objectives in farming systems (Invest2Innovate, 2025). In finance, Addo AI and Skimming AI apply AI to fraud detection and security workflows, reflecting strong demand for AI-enabled risk management in financial services (Invest2Innovate, 2025). In education, firms, such as 10Pearls support personalized learning applications that adapt content and delivery to learner needs. In e-commerce, firms, such as Cubix implement recommendation engines that personalize product discovery and improve conversion through data-driven targeting (Invest2Innovate, 2025).

Across products, Origami Studios develops chatbots for customer interaction and service automation, Data Pilot develops sentiment analysis tools, Pixelette Technologies delivers computer vision solutions, and Revolve AI builds generative AI platforms for content and workflow augmentation (Invest2Innovate, 2025).

Service delivery in the private sector centers on custom ML model development, predictive analytics, natural language processing (NLP), and IoT integration for domestic and international clients, with outsourcing positioned around cost-effective delivery and applied implementation capability (Invest2Innovate, 2025). ML models are programs trained on data to generate predictions or classifications while NLP enables computers to process and generate human language and underpins applications, such as chatbots and document automation.

FIGURE 12.3

AI MARKET PROJECTED IN PAKISTAN



Source: Statista 2025.

Future Plans and Market Trends

Market forecasts project rapid growth in Pakistan's AI market, with estimates placing the 2025 market size between USD861 million and USD949 million and projecting expansion to approximately USD3 billion by 2030, driven by high compound annual growth rates and strong momentum in generative AI (Statista, 2025). Emerging trends include multimodal AI that integrates text, image, and audio, greater emphasis on ethical AI, and expanded use of AI in digital marketing and video content workflows (Maslej et al., 2025). Near-term ecosystem priorities include expanding high-performance computing capacity, developing locally grounded large language models (LLMs), and widening sectoral deployment into areas, such as election analytics, food supply chain optimization, and design automation in consumer industries (Invest2Innovate, 2025). The sector continues to face skill constraints while employment- and sustainability-focused AI applications remain a major opportunity area, including projections of significant net job creation by 2030 (World Bank, 2025).

Public Sector and Parastatals

Pakistan's public and quasi-public sector provides the core governance, R&D, and ecosystem-building infrastructure for AI, anchored by the MoITT and the National AI Policy 2025. Public entities focus on policy execution, research commercialization pathways, national hubs, and academia-industry coordination aligned with national development objectives, including the SDGs. Public funding mechanisms include the PSDP, which allocates resources for technology initiatives, including AI-related programs, with a cited allocation of PKR24 billion (~USD85.5 million) for FY2024–2025 (Federal Budget, 2025; National AI Policy 2025, 2025).

Major Players

National Center of Artificial Intelligence (NCAI)

Founded in 2018, the NCAI leads AI research, commercialization, and training through a national multi-university structure. NCAI has developed 221 AI products in areas, including healthcare and agriculture, and has trained more than 1,000 professionals. It operates in partnership with MoITT and collaborates with a network of universities, including the National University of Sciences and Technology and the University of Engineering and Technology, and works with the UNDP on AI-enabled disaster management initiatives (Golra & Khalid, 2025; National AI Policy 2025, 2025).

Association for Advancement of Artificial Intelligence Pakistan Chapter (AAAI)

Established in 2025, the AAAI Pakistan Chapter supports policy advocacy, research dissemination, and international integration of Pakistan's AI research community. It provides access to a large corpus of AI research papers and information on funding opportunities and maintains linkages with the global AAAI community, domestic universities, and start-ups (Association for Advancement of Artificial Intelligence - Pakistan Chapter, 2025).

Presidential Initiative for Artificial Intelligence and Computing (PIAIC)

Established in 2019, the PIAIC leads AI skills development and education programs at scale. It has trained more than 100,000 learners across AI and computing-related curricula and has expanded programming into adjacent areas, such as cloud and blockchain. It collaborates with Panacloud and MoITT on curriculum development and training delivery (Presidential Initiative for Artificial Intelligence and Computing [PIAIC] - Training Report, 2024).

National Center for Big Data and Cloud Computing (NCBC)

Established in 2018, the NCBC supports AI-enabled big data R&D and industry-facing solutions, including predictive modeling and cloud-based AI workflows. It collaborates with universities, such as the University of Engineering and Technology Peshawar and partners with industry on data pipelines and applied data infrastructure (Golra & Khalid, 2025).

National Centre of Robotics and Automation (NCRA)

Established in 2019, the NCRA conducts robotics and AI R&D with a focus on industrial upgrading and manufacturing automation. It works through a broad university network, with participation across multiple institutions, including the National University of Sciences and Technology, and collaborates with the MOST on technology transfer pathways (Golra & Khalid, 2025).

National Science and Technology Park (NSTP)

Established in 2019, the NSTP incubates AI start-ups and supports ecosystem-building through hubs, events, and engagement mechanisms that link university research, private firms, and policy actors. It maintains partnerships across universities and private-sector participants, including relationships with large technology firms, such as Google (Golra & Khalid, 2025).

AI-Sarosh

Established in 2022, AI-Sarosh develops AI tools for health systems in South Asia, with a focus on sexual, reproductive, and maternal health. It advances responsible AI approaches in health contexts and collaborates with regional health organizations and the UNDP (UNDP, 2025).

Sino-Pak Center for Artificial Intelligence (SPCAI)

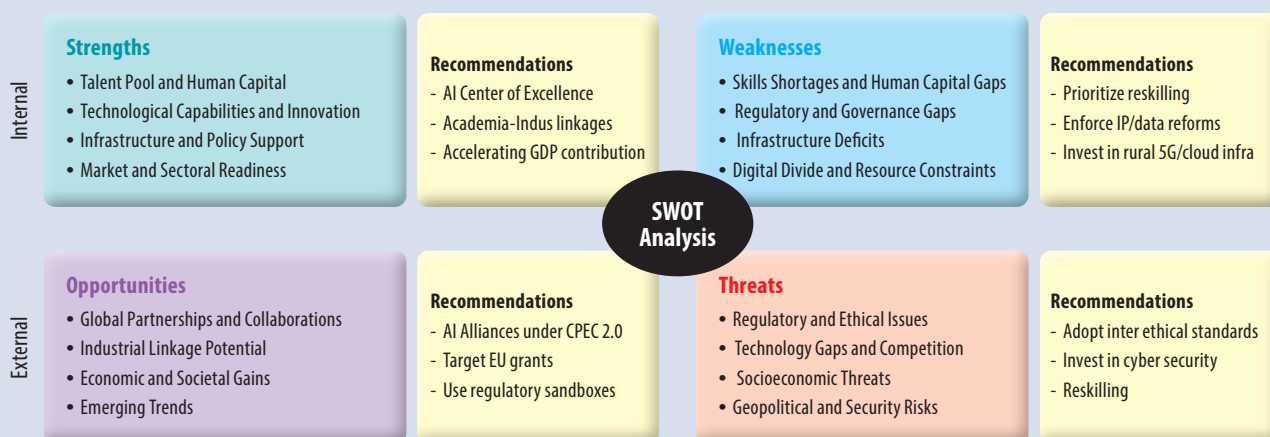
Established in 2019, the SPCAI conducts joint R&D in areas, such as biomedical AI and develops applications, including cancer diagnostics tools. It operates through partnerships with Chinese institutions, including the University of Electronic Science and Technology of China, and collaborates with Pakistani universities under the China–Pakistan Economic Corridor (CPEC), which supports joint technology ventures and applied research collaboration (Golra & Khalid, 2025).

Strategic Positioning and Recommendations

As of 18 August 2025, Pakistan’s AI ecosystem is at a pivotal juncture, bolstered by the National AI Policy 2025 (approved 30 July 2025), which introduces a six-pillar framework for innovation, awareness, security, transformation, infrastructure, and partnerships (National AI Policy 2025, 2025). This aligns with global initiatives, such as the UN’s “AI for Good” program, targeting the development of 1 million AI specialists by 2030 and a potential GDP increase of up to 12% through AI-driven productivity (National AI Policy 2025, 2025; UN, 2025). The AI market is projected to reach USD949.2 million by 2025, with the CAGR of 27.76% through 2030. The primary drivers for this growth is generative AI and its applications in agriculture, healthcare, and finance (Statista, 2025). However, major challenges affecting AI market growth include inadequate infrastructure and a shortage of skilled talent (World Bank, 2025). The SWOT analysis that follows is an assessment of both internal and external forces, and proposals on sustainable AI development. This analysis identifies strengths, weaknesses, opportunities, and threats, and informs the development of an action plan.

FIGURE 12.4

SWOT MATRIX: PAKISTAN



Source: The author.

SWOT ANALYSIS

Strengths

i) Demographic advantage and expanding entry-level talent supply

Pakistan's AI ecosystem benefits from a young demographic profile and policy attention that support its emergence as a regional AI player in South Asia (World Bank, 2025). More than 60% of the population is under the age of 30, creating a large potential labor pool for AI development and adoption (Ahmad, 2018; Statista, 2025). The pipeline is reinforced by the reported annual entry of 25,000 IT graduates into the labor market, indicating a steady supply of new talent for digital roles (HEC, 2024; Pakistan Software Export Board [PSEB], 2024).

ii) Large-scale upskilling initiatives and private-sector training pathways

Pakistan has launched multiple programs to expand AI-relevant skills at scale. The PIAIC that was established in 2018 aims to produce 100,000 skilled workers annually across AI, cloud computing, and blockchain, with training centers developed in major cities by 2025 and certifications aligned with industry needs (HEC, 2024; PIAIC - Training Report, 2024). DigiSkills.pk, launched in 2018, has reportedly registered 3.9 million learners and includes AI-adjacent modules, such as data analytics and robotics, with an emphasis on rural upskilling and inclusion by 2025 (National AI Policy 2025, 2025). Complementing domestic programs, Google's AI scholarships reportedly provided 45,000 recipients by 2024 and trained 15,000 AI specialists by mid-2025 (Google, 2024; Rehman, 2024). Pakistan's higher education system also contributes to supply through 47 universities offering Bachelor of Science and Master of Science programs in AI or related domains, such as computer science and data science (HEC, 2025).

iii) Freelance economy and early adoption in knowledge work

Pakistan is the third-fastest-growing freelance market globally, with 2.37 million freelancers active on platforms, such as Upwork and Fiverr, many of whom use AI tools for content creation, data analysis, and software development (Pakistan Freelancers Association, 2024). At the tertiary level, one survey of 215 university students in 2024 reported that 86% actively use AI tools, such

as ChatGPT and GitHub Copilot for academic work, with perceived benefits for problem-solving and creativity (Yasin & Safdar, 2025).

iv) Research institutes and applied innovation momentum

Pakistan's applied AI capacity is supported by national research and innovation institutions. The NCAI, established in 2018, reportedly produced 221 AI products by 2025 across domains, including smart cities, agriculture, and healthcare (Golra & Khalid, 2025). Examples include AI-based traffic management initiatives in Lahore and Islamabad, crop yield prediction models for farmers in Punjab, and diagnostic tools for early disease detection, such as tuberculosis, developed in collaboration with medical institutions (NCAI, 2025). The Sino-Pak Center of Artificial Intelligence (SPCAI) at Pak-Austria Fachhochschule is presented as advancing biomedical applications, such as automated medical imaging analysis and predictive healthcare models and as enabling international cooperation, particularly with Chinese organizations (Sino-Pak Center for Artificial Intelligence [SPCAI], 2025). Research output is also a strength, with 18,365 AI-related papers published by Pakistani researchers between 2000–24 (EduRank, 2025; data derived from Scopus database searches conducted in 2025), supported by international collaboration enabled through HEC programs and funding mechanisms (HEC, 2024).

v) Infrastructure and policy support for ecosystem building

Pakistan's ecosystem development is supported by Software Technology Parks (STPs) and national policy signals. The analysis identifies 17 STPs, of which 12 are fully equipped with high-speed internet connectivity, shared offices, and AI start-up incubation capacity, concentrated in major cities, such as Karachi, Lahore, and Rawalpindi, and hosting over 1,000 associated tech companies, many of which are introducing AI into their work (National AI Policy 2025, 2025; PSEB, 2025). Data center supports AI and cloud-based AI applications and is scheduled to reach 20 MW. National AI Policy 2025, approved in July 2025, sets out six pillars spanning innovation ecosystem development, public awareness, secure AI, transformation, infrastructure, and global collaboration, and it allocates 30% of the Ignite research fund to AI projects to support longer-term R&D investment (National AI Policy 2025, 2025). Budgetary commitment is also cited, with PKR24 billion (~USD85.5 million) allocated in the FY2024–25 federal budget for AI and IT-related projects (Federal Budget, 2025; MOST, 2025).

vi) Market readiness, awareness, and early public-service applications

There are indicators of favorable market readiness, including broad public awareness and early implementation in public services. A global survey showed that 76% of respondents in Pakistan are familiar with AI tools, such as ChatGPT, ranking the country fourth worldwide on this measure (Stanford HAI, 2024). In public services, AI-enabled eKYC systems based on biometric authentication have reportedly been introduced by the National Database and Registration Authority (NADRA), and the Punjab Safe Cities Authority uses AI-enabled surveillance technologies, including facial recognition and predictive policing (Stanford HAI, 2024). In healthcare, a study reports that 80% of medical specialists believe AI has a positive impact (Habib et al., 2024) while uptake in library systems is limited, with some use of RFID and voice search technologies (Asim et al., 2023).

Weaknesses

i) AI employability gap and limited advanced skills depth

Despite the reported annual flow of 25,000 IT graduates, only around one-tenth are described as AI-employable due to gaps in machine learning, data ethics, and advanced programming capabilities (PSEB, 2024). Broader human capital constraints are reflected in Pakistan's Human Capital Index (HCI) of 0.41, below the South Asia regional average of 0.48, implying lower

workforce productivity potential in technology-relevant sectors (Lire et al., 2023; World Bank, 2025).

ii) Brain drain and thin senior research capacity

Out-migration of skilled talent to countries, such as the US, the United Kingdom, and Canada is significant, creating persistent expertise shortages. While the National AI Policy 2025 aims to offer 1,000 PhD-level scholarships by 2030 in cooperation with the HEC, the current number of active researchers is low, only about 200–300 (HEC, 2024; National AI Policy 2025, 2025).

iii) Gender disparities and uneven inclusion in AI careers

Although women represent roughly 50% of STEM program enrollments, only 7%–10% hold AI-related roles. Cultural barriers, limited mentorship, and workplace bias are largely seen as contributing factors, implying a significant underutilization of potential talent.

iv) Sector-specific readiness gaps and shallow use of AI tools

In healthcare, respondents reportedly support integrating AI into undergraduate curricula to address capability gaps, yet only 62.2% advocate moderate readiness, and practitioners are described as having limited practical training (Google, 2024). Separately, although student AI tool use is high at 86%, reliance on superficial application without understanding underlying algorithms and ethical issues is identified as a concern (Yasin & Safdar, 2025).

v) Regulatory and governance fragmentation, including data protection and intellectual property (IP) gaps

Pakistan's AI governance is disconnected, and key legal frameworks for data protection, IP, and ethical use are presented as insufficient to build confidence among stakeholders. The Personal Data Protection Bill remained in draft as of 2025 and does not address AI-specific issues, such as authorship for AI-generated content, algorithmic bias, or liability for automated decision-making (International Comparative Legal Guides, 2025). Weak data protection and unclear IP treatment for AI-generated innovations are described as risks for misuse and as barriers to investment and innovation incentives (Legal500, 2025).

vi) Policy implementation risks and limited enforcement mechanisms

Although National AI Policy 2025 was approved in July 2025 and is presented as introducing meaningful reforms, the policy document describes it as lacking specific timelines and enforcement mechanisms, creating a risk that the policy remains aspirational rather than operational (National AI Policy 2025, 2025). It is also described as facing criticism for gaps relative to global standards, including the absence of high-risk AI audit mechanisms and limited alignment with international approaches, such as the EU AI Act (WIPO, 2023).

vii) Ethical concerns in high-stakes sectors

Ethical and trust constraints are described as particularly salient in healthcare, where 70.3% of professionals reportedly cite privacy risk, bias, and lack of transparency as significant obstacles, and where physicians are described as concerned about over-dependence and liability for diagnostic errors (Habib et al., 2024). Wider concerns about archaic enforcement and limited regulator capacity are described as creating risk in domains, such as finance and governance (Habib et al., 2024).

viii) Infrastructure constraints, power reliability, and connectivity limitations

Infrastructure deficits are described as a major bottleneck, including unstable power supply and uneven internet connectivity. Only about 40%–50% of the population has reliable broadband connections while rural areas average below 10 Mbps, which is insufficient for advanced AI

functions, such as real-time analytics. Power reliability is a constraint in some areas, with outages reaching 8–12 hours per day, which can disrupt data processing and model training.

ix) Data center capacity gaps and delivery bottlenecks

Although 2,000 MW of electricity had been earmarked to be allocated in 2025 for AI data centers and bitcoin mining, the actual allocated capacity is only 20 MW, indicating a large implementation gap relative to stated ambition (Finance Ministry, 2025; IEA, 2025). New collaborations, including an Indus Cloud partnership with Huawei in August 2025 to build a data center, are presented as potentially positive, but bureaucratic hurdles and land-ownership issues are described as slowing progress (Butler, 2025). These constraints are presented as pushing some use cases toward costly overseas infrastructure (Shui et al., 2025).

x) Administrative friction and uneven digitization in public and social sectors

Bureaucratic processes are described as slowing public-sector AI integration, with e-governance projects reportedly delayed by 6–12 months on average (World Bank, 2022). Libraries are described as underintegrated, with legacy systems and limited API compatibility, and only 20%–30% of university libraries are described as successfully digitized, limiting adoption of applications, such as automated cataloging (Habib et al., 2024).

xi) Urban–rural digital divide, SME lags, and macroeconomic constraints

Urban–rural disparities are significant, with rural internet penetration under 30% compared to 80% in urban areas, constraining agricultural AI applications, such as crop monitoring and market forecasting (Internet Society, 2025; PTA, 2025). SMEs comprise 90% of businesses and lag due to high costs and low awareness, with only 15%–20% reportedly using basic AI tools (Asian Development Bank, 2022; The Diplomat, 2024; Sánchez et al., 2025; Zeb et al., 2025). Economic instability degrades the viability of pilot programs, with inflation as high as 10%–15% in 2025 (State Bank of Pakistan (SBP), 2025), and vulnerable groups, such as women and low-income communities face compounded barriers to meaningful AI use (Cerutti et al., 2025).

Opportunities

i) Leveraging global investment momentum and regional digital growth

Pakistan can benefit from the rapid expansion in global AI investment, which exceeded USD252 billion by 2024, and from South Asia’s broader digital transformation, creating external tailwinds for capability building and adoption (Maslej et al., 2025).

ii) International partnerships for technology transfer, funding, and capacity building

International alliances present as major opportunities to accelerate AI development through technology transfer and financing. Under CPEC 2.0, USD2 billion is cited as allocated for 5G, AI, and SPCAI-linked initiatives, including AI-enabled tuberculosis diagnostics (CPEC Authority, 2025; SPCAI, 2025). Google support includes training of 5,000 AI professionals, USD350,000 in cloud credits, and scholarships that enabled AI-related initiatives, such as Crop2X (Google, 2024). EU-linked programs are described as supporting initiatives through Horizon Europe and Erasmus+, including training for AI ethics (EU Commission, 2025). The analysis also cites Romania’s EUR180 million investment in AI and green technology in 2025 as a comparative model for aligning policy to attract international funding.

iii) Sectoral transformation and export-oriented applications

AI adoption opportunities span agriculture, healthcare, finance, and IT exports. In agriculture, NCAI models improve yields by 15% in Punjab while Crop2X can reduce costs by up to 20% through satellite imagery-enabled precision farming (Crop2X, 2025; NCAI, 2025). In healthcare,

NCAI spin-offs improve detection of diabetic retinopathy in rural clinics by 30% (NCAI, 2025). In finance, MCB Bank's AI-based fraud detection reduced transaction fraud by up to 25% in 2025 (IBS Intelligence, 2025), and AdalFi's AI credit scoring has improved access to finance for unbanked populations (ProPakistani, 2025). On the export side, IT exports reached USD3.2 billion in 2024, supported by roughly 2,000 IT companies serving global customers and linked to broader South Asia digital economy growth (PSEB, 2024; World Bank, 2022).

iv) Economic and social gains aligned with policy objectives and SDGs

National AI Policy 2025 outlines objectives, including 3.5 million jobs by 2030 in the AI market, with 500,000 jobs already created through AI-based e-commerce by 2023 (National AI Policy 2025, 2025). Generative AI is cited as a USD173 million market supporting content creation (Statista, 2025). Civic applications, including traffic management in Lahore with congestion reductions of 12%, align with SDGs 9 and 11 (National AI Policy 2025, 2025) while high student usage of AI tools is relevant to SDG 4 (Yasin & Safdar, 2025). Inclusivity opportunities include AI empowerment for freelancers and women-led start-ups (R. Haq, 2024).

v) Emerging technology niches in cybersecurity and blockchain

There are emerging opportunities in cybersecurity and blockchain. Examples include quantum AI security solutions improving responses to cyberattacks in 2025 and the 2024 Cyber Security Policy reducing response times by 30%. In blockchain, AI-blockchain firms are described as reducing trade finance expenses by 15%, alongside a claim that global investments could reach USD19 billion by 2027 (Kumar, 2025).

Threats

i) Global compliance pressure, reputational risk, and sanctions exposure

Global scrutiny around AI bias, privacy, and safety could create reputational risks or sanctions exposure for countries perceived as having weak safeguards, particularly under strict regulatory regimes, such as the EU AI Act (EU, 2024). Pakistan's ethical pillar is not strongly enforced and there are privacy-risk concerns among medical workers in AI diagnostics (Habib et al., 2024; Tariq et al., 2025). Weak data protection can elevate criticism risk for surveillance-oriented deployments, such as facial recognition, particularly if safeguards are not credible or transparent.

ii) Regional competition and widening capability gaps

Pakistan faces competitive pressure from regional leaders. A simple comparison underscores the widening gap. Pakistan produced 18,365 AI publications between 2000–24 while India has achieved a 72% AI adoption rate and PR China has filed over 10,000 AI patents, highlighting how competitors are rapidly scaling both R&D and commercialization (National Association of Software and Service Companies, 2024; WIPO, 2023). This dynamic can reduce competitiveness in talent attraction, investment, and export markets.

iii) Foreign technology dependence and supply-chain vulnerability

Dependence on foreign AI tools and platforms, including American and Chinese products and cloud services, has created supply-chain and cost vulnerabilities as geopolitical disruption could cut access and come with potential cost increases from 15%–20% (WIPO, 2023). This dependency can also constrain sovereignty over data and critical infrastructure.

iv) Job displacement and rising inequality risks

Automation-related employment risk is substantial. Estimates suggest that 17%–42% of jobs in agriculture and manufacturing are at risk, and unskilled laborers saw wages fall by 5%–8% from 2018–21. Further deterioration in income is expected without reskilling (Akademos Research,

2025; ILO, 2020). Persistent gender gaps, with women representing 7%–10% of AI roles, and rural access constraints compound inequality risks (Cerutti et al., 2025).

v) Cyber vulnerability and destabilizing misuse risks

Cyberattacks are increasing, including in finance and governance, and weak cybersecurity structures amplify exposure. There are also risks tied to regional instability and AI-enabled misinformation campaigns, including claims about 2024 misinformation campaigns against Pakistan, which can erode trust and create policy backlash.

Summary

Pakistan's SWOT profile points to an AI ecosystem with strong adoption potential and early momentum, but with structural constraints that could prevent sustained scaling without targeted implementation capacity. The country's main strengths are its youthful demographics, growing talent pipeline, and broad public awareness of generative AI, reinforced by an expanding freelance economy and policy backing through National AI Policy 2025 (Stanford HAI, 2024; National AI Policy 2025, 2025; World Bank, 2025). Applied innovation capacity is also emerging through institutions, such as NCAI and early sectoral use cases, creating a base for wider diffusion if delivery bottlenecks are addressed (NCAI, 2025).

The main weaknesses and risks are concentrated in infrastructure and inclusion, governance and trust, and advanced skills depth. Rural connectivity gaps, limited domestic data center capacity, uneven SME adoption, gender disparities in AI roles, and weak enforcement of privacy and ethical safeguards could slow deployment and deepen inequality while dependence on foreign technology and cyber risks increases exposure to external shocks (Cerutti et al., 2025; Habib et al., 2024; PSEB, 2024; WIPO, 2023). The opportunity set is substantial, particularly through CPEC 2.0 investments and proven sectoral pilots in agriculture, fintech, and public services, but converting these opportunities into durable gains hinges on credible execution and assurance mechanisms, including a policy implementation unit, scaled workforce development, and enforceable data protection for high-risk applications (CPEC Authority, 2025; National AI Policy 2025, 2025).

TABLE 12.5

RECOMMENDATIONS: PAKISTAN

	Details	Recommendation – Strengthen & Scale
Strengths	Youthful Demographics & Talent Pool • 60 % under 30 • 2.37 million freelancers (3rd globally)	• Launch “AI Youth Corps 2026” - 50,000 paid internships in NCAI labs and start-ups (lead by MoITT and HEC) • Double NCAI PhD seats to 1,000 by 2027 via the China-Pakistan AI Talent Exchange (under CPEC 2.0)
	High Generative AI Awareness • 76 % know ChatGPT	• Develop an “AI Literacy Badge” - a free two-week micro-certificate for 1 million freelancers via Coursera-Pakistan
	National AI Policy 2025 approved on July 2035 (Framework 7 pillars)	• Establish an AI Policy Implementation Unit (APIU) under the Prime Minister Office with a KPI dashboard updated quarterly

	Details	Recommendation – Mitigate & Overcome
Weaknesses	- Infrastructure Gaps Rural vs. Urban - rural region has access to broadband is only 30% 20 MW data-center capacity - limited according to requirement	- Allocate 500 MW from CPEC 2.0 green energy for Tier 3 AI data centers in Karachi and Lahore (MoE should lead these projects) - Subsidize Starlink rural kits for 100,000 agri-SMEs to support the adoption of AI tools that enhance yields
	Skills & Awareness Deficit Only 15%–20% SMEs use basic AI, gender gap in AI roles	- Mandate a 40-hour AI module in all Bachelor of Science (Computer Science) programs from 2026 (HEC) - Women in AI Scholarship - 5,000 seat with a 50% quota (MoITT and HEC to lead implementation to improve women's participation in AI leadership roles)
	Ethical Pillar Enforcement Gap 70% healthcare pros flag privacy risks	- Pass an AI-specific Data Protection Ordinance in 2026 with mandatory Data Protection Impact Assessment (DPIAs) for healthcare AI (Ministry of Law) - Create an independent AI Ethics Board (none members) reporting to Parliament
	Details	Recommendation – Capture & Convert
Opportunities	CPEC 2.0 Digital Corridor USD2 billion for AI/5G (2025)	- Form Joint AI Lab with PR China in Gwadar (500 researchers, USD150 million co-funded) - Export AI services via CPEC fiber to Central Asia
	Sectoral Success Stories AI products by NCAI (e.g. enhance yield by 15% and cost reduction by 20 in agriculture, fraud reduction in MCB by 25%)	- Scale up to three proven pilots nationally via PPPs Punjab Agri-AI (potential savings of approximately PKR4 billion (~USD14.25 million) if 100,000 farmers adopt AI tools to boost yields and reduce costs) - Fintech Fraud Shield (extend practices similar to MCB to 10 additional banks with potential savings of PKR1 billion (~USD3.6 million))
	Global Models Romania EUR180 million AI/green	Apply for the EU Horizon Global Gateway (EUR50 million grant for AI-green twin projects, led by the Ministry of Foreign Affairs and the Ministry of Science and Education)
	Details	Recommendation – Capture & Convert
Threats	Data Misuse in Surveillance Punjab Safe Cities facial recognition	- Enforce “Privacy-by-Design” audits for all Safe City contracts (led by the Punjab Safe City Authority and the Personal Data Protection Board) - Open source anonymized datasets for research to reduce raw PII exposure
	Quantum-AI Cyber Risks Trillium counters 40% more attacks	Develop a National Quantum-Safe Migration Roadmap (2026), including pilot post-quantum encryption in three banks, led by the State Bank of Pakistan (SBP)
	Brain Drain & Funding Volatility	- Introduce AI Talent Retention Bonds - a five-year tax holiday and equity participation in local start-ups for returning PhDs (FBR) - Create a USD200 million AI Venture Fund (public-private, led by Ignite and SIDCL)

Source: Compiled by the author.

Future Needs and Collaboration Pathways

Pakistan's AI ecosystem is positioned for growth following the National AI Policy 2025 with a six-pillar framework. To advance AI readiness, Pakistan must address systemic gaps through targeted capacity building, institutional reforms, and strategic collaborations. This section details these needs and proposes cooperation avenues, including joint projects with APO member economies, to enhance sustainable productivity.

Domestic Priorities

Institutional Rollout

Pakistan's National AI Policy 2025, approved on 30 July 2025, establishes a six-pillar framework covering innovation, public awareness, secure systems, ethical governance, capacity building, and sectoral integration. The near-term priority is implementation at scale through clear institutional mandates, funded work plans, and delivery mechanisms that close gaps in human capital, infrastructure, and governance.

Labor

Pakistan's stated objective of developing 1 million AI professionals by 2030 will require training pathways that cover generative AI, ethics, and sector-specific applications, supported by national AI certification standards and integration of AI curricula across STEM programs in 47 universities. Institution-led certification models, including those at the National University of Sciences and Technology (NUST), provide a pathway for aligning training with industry needs through job-ready credentials. Partnerships with international learning platforms, such as Coursera and Google are also positioned as scaling mechanisms for skill delivery.

Digital Infrastructure

Pakistan's infrastructure priorities include expanding HPC capacity through facilities, such as a National Compute Grid, alongside expansion of data-center capacity and 5G coverage to reduce digital divides (Shui et al., 2025). These investments are prerequisites for training and deploying more complex AI systems and for widening access beyond major urban centers.

Governance Capacity Building

Pakistan's governance priorities include strengthening IP rules, data protection, and bias mitigation through an AI Regulatory Directorate, supported by regulatory sandboxes as controlled environments for testing innovations. Governance alignment with UNESCO's (2025) ethical AI guidelines serves as a benchmark for responsible development and oversight.

Funding and R&D Support

A financing priority is to allocate 30% of Ignite's R&D fund to AI and establish a national AI fund for start-ups, with PPPs positioned to support more than 200 projects (National AI Policy 2025). These measures aim to reduce early-stage financing constraints and accelerate the translation of pilots into scalable deployments.

Sectoral Integration and Inclusivity

Pakistan's sectoral priorities include applying AI in renewable energy and smart cities while addressing job displacement risk, which is estimated at 17%–42% of the workforce. Inclusion measures include gender-inclusive programs and rural AI hubs to broaden participation in adoption and workforce development (Cerutti et al., 2025).

Collaboration Opportunities

Local Perspective

i) Industry adoption and SME enablement

Domestic firms, particularly SMEs and start-ups, require financing and cloud access to adopt AI in production, logistics, and services. PPPs supported by tax incentives for R&D can help SMEs scale applied solutions, including agricultural yield prediction, and lower barriers to adoption for resource-constrained firms. Industry-academia incubators, including those associated with Lahore University of Management Sciences (LUMS), serve as a mechanism for technology transfer and commercialization.

ii) Applied research and university–industry linkages

Universities can be incentivized through research funding, industry exposure, internships, and joint laboratories with industry partners. Multidisciplinary research centers focused on applied AI can also strengthen the pipeline of implementation-ready graduates and improve match quality between training and employer needs.

iii) Public-sector leadership and procurement

The government of Pakistan acts both an enabler and an early adopter through e-governance, smart agriculture, and health applications. Strategic procurement can stimulate domestic demand for AI solutions while establishing scalable reference implementations. Coordination led by MoITT and HEC is central to maintaining policy cohesion and aligning ecosystem stakeholders. Platforms, such as AAAI Pakistan serve as coordination channels for multistakeholder collaboration.

Global Perspective**i) Bilateral and multilateral partnerships**

Partnerships with AI-leading economies, including PR China, the US, the European Union, the Republic of Korea (ROK), and Japan, serve as channels for access to technology, expertise, and investment. Examples noted include applied collaboration under the CPEC in energy, health, and agriculture, engagement through United Arab Emirates-linked start-up channels, and research and funding cooperation through international networks.

ii) International organizations and benchmarking

Engagement with organizations including the Asian Productivity Organization (APO), UNESCO, the International Telecommunication Union (ITU), and the OECD serves as a pathway for knowledge exchange and policy alignment. UNESCO guidance serves a reference for regulatory design (United Nations Educational, Scientific and Cultural Organization (UNESCO), 2025). APO programming serves as a platform for cross-member training and collaboration, including potential AI training workshops with Japan and the ROK.

iii) Shared infrastructure and open-source participation

Participation in international cloud ecosystems and HPC collaborations provides a cost-reduction pathway for domestic stakeholders, with examples, such as the USD350,000 in cloud credits in 2024 supporting a start-up use case and potential access to computing resources through international HPC networks, alongside open-source collaboration through platforms, such as TensorFlow.

iv) Global talent exchange

Scholarships, visiting researcher schemes, and joint academic programs serve as mechanisms to accelerate skills development and deepen international connectivity. For example, Erasmus+ trained 200 Pakistani researchers in AI ethics in 2024–25 as well as large-scale scholarship activity linked to Google. Expanding exchange programs to 500 annual exchanges with APO members provides a pathway for strengthening expertise in generative AI and cybersecurity while improving retention and reducing brain drain pressures.

APO Joint Initiatives**i) AI training and certification programs**

APO members can develop standardized, APO-certified modules for policymakers, industry leaders, and technical professionals to strengthen practical capacity in governance, deployment, and sector applications.

ii) Regional AI research network

APO members can establish collaborative research clusters focused on AI for agriculture, manufacturing productivity, energy optimization, and climate change adaptation, with shared methodologies and reusable implementation outputs.

iii) Shared data and simulation platforms

APO members can develop a regional framework for secure dataset sharing and simulation environments that supports mutual learning while respecting privacy and sovereignty constraints.

iv) Green AI initiatives

APO members can cooperate on energy-efficient computing, sustainable data centers, and AI-enabled environmental monitoring to align productivity growth with sustainability goals.

v) SME pilot projects and replication

APO members can develop SME-focused pilot projects that demonstrate measurable productivity improvements through AI, supported by regional case studies and replication toolkits that can be adapted across member economies.

CHAPTER 13

SRI LANKA

Each member economy is assessed through a common analytical framework covering five core dimensions: (i) ecosystem baseline; (ii) policy and strategy; (iii) stakeholder landscape; (iv) strategic positioning; and (v) future pathways. This structure enables consistent cross-economy comparison while allowing for context-specific insights into how AI capabilities are developed, governed, and applied in practice.

AI Ecosystem Baseline Assessment

AI Adoption in Sri Lanka

Sri Lanka made significant strides in its digital capabilities between the 1980s and early 2000s but has lagged behind regional peers more recently (Ministry of Technology, 2023). Over the past two decades, Sri Lanka’s ICT sector has become a pivotal part of the economy, supported by digitization initiatives from 1980 to 2000 and a growing talent pool. Notably, the World Bank-funded e-Sri Lanka program (2003–13) laid the groundwork for the nation’s digital transformation, improving infrastructure and e-government services (Committee to Formulate an AI Strategy for Sri Lanka, 2024; Silva, 2025). These factors placed Sri Lanka in a good position to explore AI, laying the groundwork for a major expansion of the country’s digital ecosystem (Upananda, 2024). Findings from public studies and the academic literature suggest that AI in Sri Lanka is steadily emerging and beginning to expand.

Global indices documenting national AI capacities paint a bleak picture of AI adoption in Sri Lanka. The Oxford Insights Government AI Readiness Index ranked the country 85th out of 188 countries in 2024. The IMF’s AI Preparedness Index (AIPI) assigned Sri Lanka a score of 0.44, and ranked it 92nd of 174 countries in 2024 (the first edition of the AIPI). Sri Lanka ranked 82 out of 83 countries in 2024 on the Tortoise Global AI Index. Considering Sri Lanka’s relatively low ranking (95th globally) in the UN E-Government Development Index, it is imperative to accelerate the digital transformation of the government (Asian Productivity Organization [APO], 2025).

TABLE 13.1

SRI LANKA’S AI READINESS, 2020–24

Year	2020	2021	2022	2023	2024
Rank	90	88	107	95	85
Score	38.655	41.12	36.23	41.89	45.29

Source: Oxford Insights Government AI Readiness Index (2020–2024).

TABLE 13.2

SRI LANKA TORTOISE GLOBAL AI INDEX SCORES

Pillars	Implementations			Innovation		Investment	
	Talent	Infrastructure	Operating Environment	Research	Development	Government Strategy	Commercial
Score	64	76	66	75	72	75	58

Source: Tortoise Global AI Index (2024).

AI Adoption by Sector

AI adoption in Sri Lanka remains at a nascent stage, and the government has no official statistics on record. However, the nation's degree of adoption and willingness to adopt can be reasonably inferred from findings in the academic literature, various public documents, and key informant interviews.

The literature suggests that in the financial sector, only a few licensed commercial banks currently deploy AI in their financial technologies, namely, Sampath Bank, NDB Bank, and DFCC Bank (Patrick et al., 2024). In addition, several banks have adopted AI for miscellaneous banking tasks, such as People's Bank in 2023 when it announced the launch of an AI-powered chatbot feature on its official website (DailyFT, 2023).

The apparel sector is one of Sri Lanka's most important industries and a major source of export revenue. Some reports suggest that firms in this key sector have adopted AI extensively in their supply chains (Prabodhani, 2025). Similarly, leading retailers and supermarket conglomerates are increasingly adopting available AI tools for their regular operations.

In the healthcare sector, the literature finds evidence that stakeholders in this industry recognize that AI could be a transformative business asset. Samarasinghe and Samarasinghe (2024) observed that healthcare professionals find AI to be a reliable tool for performing clinical diagnoses; AI-powered Clinical Decision Support Systems (CDSS) provide real-time, evidence-based recommendations for interventions. They also found organizations in the sector are deploying AI to perform repetitive administrative duties. In addition, several telemedicine platforms exist in Sri Lanka, such as oDoc, MyDoctor, and Doc990. These services provide a foundation for a transition to AI-powered healthcare provision.

In the agriculture sector, the government designated 100 Divisional Secretariats in 2024 for an agricultural modernization program that heavily features AI adoption (International Poverty Reduction Center in China, 2024).

In education, the government has launched an initiative to train teachers in AI and robotics, and schools are now seeing the formation of AI clubs (Education Times, 2024).

The body of literature also shows that while larger enterprises are strategically adopting AI, the overall rate of adoption in the private sector remains in its infancy. According to Y. Fernando (personal communication, November 16, 2025), the number of organizations that have strategically adopted AI into their operations does not exceed 10, and most of these are international conglomerates with a presence in Sri Lanka.

Sri Lanka has a relatively high Human Development Index score and a highly skilled IT labor force. The country has long been recognized as a competitive player in the outsourcing market. The IT and business process management (BPM) sectors are major industries in Sri Lanka and many firms are known for providing high-value services. According to the Export Development Board, Sri Lanka's services exports in 2024 amounted to USD3.47 billion, of which IT and BPM exports accounted for USD1.45 billion, or just about half of all service exports (Economynext, 2025). This positions the country to tap into the global demand for digital transformation services (Livera, 2025).

In terms of employment, the Sri Lankan IT sector employed 590,649 professionals in 2020, and has well-established undergraduate and postgraduate degree programs in the fields of IT and computer science. In the 2023–24 academic year, Sri Lankan public universities awarded undergraduate degrees in AI to 48 individuals and degrees in data science to another 48 individuals for the first time (University Grants Commission, 2023; 2025). The Director of the School of Computing at the University of Colombo noted in an interview with the author that the country’s institutions of higher learning are gradually adopting AI, and that IT-based academic programs, other STEM programs, and even liberal arts courses are embracing generative AI to varying degrees.

With regard to patenting activity and AI investment, Sri Lanka only accounts for one AI patent, and Sri Lankan investors made USD4 million worth of AI investments in 2024. Sri Lankan researchers published 66 AI research papers in 2025 (AI World, 2025). According to Dr. A. Atukorale, Director, School of Computing at the University of Colombo (personal communication, November 12, 2025), AI R&D in Sri Lanka remains in its infancy and has not yet made a significant impact. Y. Fernando (personal communication, November 16, 2025), similarly observed that several large enterprises in the private sector have invested in AI, and that private sector AI adoption currently focuses on creating value through quick-win projects instead of producing niche solutions.

AI adoption in the public sector is at a similarly low level, but uptake is gradually improving. According to W. S. Dhanapala, Secretary to the Ministry of Digital Economy (MoDE) (personal communication, November 15, 2025), middle managers and working-level employees throughout the government have adopted AI tools while strategic decision makers have been more cautious and slower to adopt. D. B. Atapattu, Director of Commercialization and Partnerships at the MoDE (personal communication, November 15, 2025) stated that AI adoption remains at a low level across public sector agencies. While generic AI tools are sparsely used by employees for personal convenience, organizational mandates encouraging AI use are sporadic. To address this gap, the MoDE has partnered with the Presidential Secretariat in an effort to train all public sector executive officers in creating an AI-enabled work environment. According to S. Wickramasinghe, Senior Assistant Secretary in the Presidential Secretariat (personal communication, November 19, 2025), 5,000 executive officers across ministries, departments, and SOEs have been trained on the use of AI tools for office work.

National AI Policies and Strategies

National AI Strategy of Sri Lanka

Before Sri Lanka adopted a formal National AI Strategy in 2024, it promulgated various digital policies and strategies, many of which were directly or indirectly related to AI. The following material describes these policies and the lead-up to the adoption of a full-fledged national strategy in 2024.

The 2023 policy document titled “Digital Sri Lanka 2030: National Digital Economy Strategy” was the first technology policy to openly acknowledge Sri Lanka’s readiness to adopt AI. It describes how new tools powered by emerging technologies, such as machine learning and AI can facilitate informed decision-making, generate new revenue streams, deliver personalized services, and create new markets opportunities (Ministry of Technology, 2023). It also represents Sri Lanka’s first budgetary allocation toward AI, earmarking LKR1 billion (~USD3.3 million) for the development of AI in 2024.

Despite lacking sector-specific AI policies, efforts were made to integrate AI across the economy. The Sri Lanka Digital Health Blueprint (DHB), which defines the strategic path of the Ministry of Health, emphasizes the significance of health informatics. Meanwhile, in 2023, the Ministry of Education announced that it would incorporate IT and AI into school curricula beginning 2024 (Adaderana, 2023). It also launched a pilot program with the goal of forming AI clubs at 100 schools across the country (Ministry of Digital Economy [MoDE], 2024).

The MoDE has also worked to build the foundational capacities essential for AI adoption, namely, digitalization, data analytics, and workforce development. Its diverse efforts range from health

informatics development, building a common ticketing window for all categories of public transportation, creating a single window for all government finance-related matters ranging from revenue administration to internal processes, Integrated Digital Agriculture Transformation (IDAT) for agricultural modernization, overall digitalization of land administration, unified system for citizen registration, to the rollout of a single access pass for tourists.

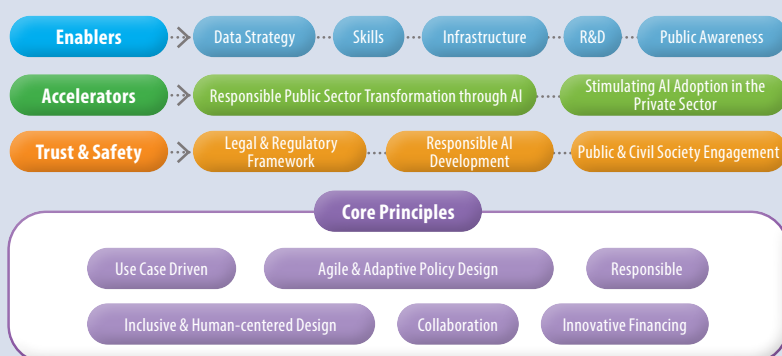
The Committee on Formulating a Strategy for Artificial Intelligence (CFSAI) was a multistakeholder entity established by then President Ranil Wickremasinghe in 2023 under the Presidential Secretariat to develop the National AI Strategy for Sri Lanka. CFSAI included representatives from government, academia, civil society, private sector, and industry. It received support from the UNDP and technical partners. The objective was to define a path for rapid, responsible AI development and adoption aligned with the Digital Strategy 2030 that fosters innovation, inclusion, social good, and sustainable growth (Committee on Formulating a Strategy for Artificial Intelligence [CFSAI], 2024). The strategy is based on seven guiding principles: (i) inclusivity and responsibility; (ii) trustworthiness and transparency; (iii) human-centricity; (iv) adoption focus and impact orientation; (v) agile and adaptive governance; (vi) collaboration and global engagement; and (vii) sustainability and future-readiness. Data, infrastructure, skills, and research and development (R&D) are identified as foundational enablers required to accelerate AI utilization across sectors, deliver quick wins, and ensure safe and ethical AI under robust governance. CFSAI conducted public consultations in January 2025 to incorporate citizen feedback and ensure that the strategy meets diverse national needs (Y. Fernando, personal communication, November 16, 2025; W. S. Dhanapala, personal communication, November 15, 2025). CFSAI was replaced in the second quarter of 2025 by an advisory committee on AI, which is a similar multistakeholder entity tasked with guiding AI development and adoption under the leadership of the Information and Communication Technology Agency of Sri Lanka (ICTA).

AI Policies in Sri Lanka

In 2024, Sri Lanka formally acknowledged AI as a national development and growth factor, and it did so through two closely linked policy documents issued in quick succession. The White Paper on AI, commissioned by the CFSAI and released in March 2024, established the conceptual and strategic foundation for national AI policymaking. Four months later, CFSAI published the "AI Sri Lanka 2028: National Strategy on AI," widely referred to as the National AI Strategy, or NAIS, which translated that foundation into an implementation-oriented national plan. Read together, the White Paper and NAIS represent sequential phases of the same policy trajectory: first diagnosing constraints and defining the enabling ecosystem, and then laying out a roadmap for operational rollout.

FIGURE 13.1

FRAMEWORK OF SRI LANKA'S NATIONAL AI STRATEGY



Source: CFSAI (2024).

The White Paper

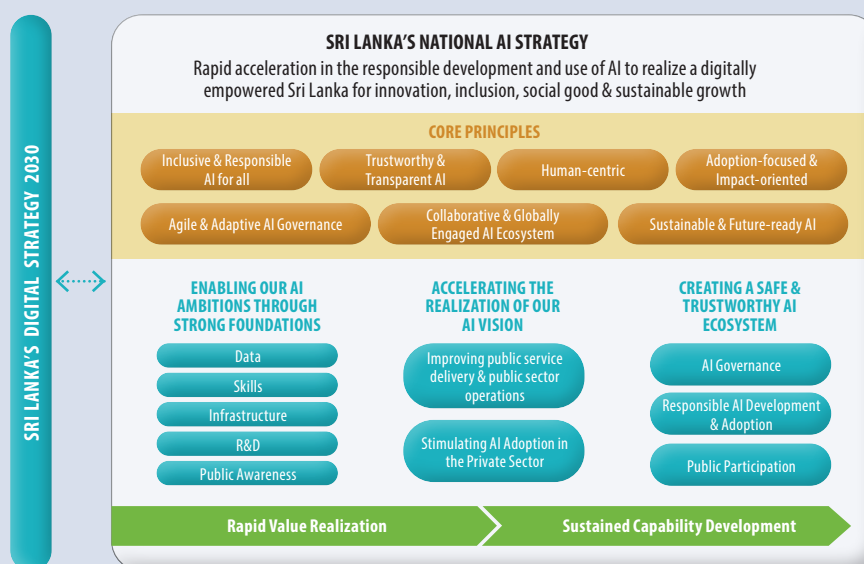
The White Paper set the strategic direction for Sri Lanka's AI agenda by arguing that national progress depends on building a safe, resilient AI ecosystem and investing in the capabilities needed to deploy AI for broad societal benefit. It identified prevailing barriers to AI introduction and diffusion, including gaps in infrastructure, digital literacy, and governance. It further framed AI as a tool for elevating living standards, strengthening national competitiveness, and modernizing both public administration and private-sector activity. A key contribution of the White Paper was its articulation of the “critical enablers” of an AI ecosystem, especially data strategy, skills development, infrastructure, R&D, and public awareness while emphasizing the need to ensure safety and trust. At the same time, the White Paper remained exploratory and advisory in posture. Although it proposed milestones and sequencing, it did not provide a comprehensive, institutionalized roadmap with binding timelines and implementing bodies.

AI Sri Lanka 2028: National AI Strategy

NAIS was designed to address this gap. Published in July 2024, it is presented as Sri Lanka's first national implementation plan for AI and as the government's formal commitment to becoming a digitally empowered nation and a regional AI hub by 2028. The strategy reaffirms the White Paper's emphasis on ecosystem building, but it shifts from diagnosis and guidance to directive planning. It lays out a five-year roadmap for institutionalizing AI across the economy, positioning the state not merely as an enabler but also as an active coordinator of adoption and governance. In doing so, NAIS also places Sri Lanka's AI agenda within a broader international framing by invoking the principle of *pacta sunt servanda* (Latin for “agreements must be kept”). It further links implementation to UN General Assembly Resolution 78/265 (2024) on safe, secure, and trustworthy AI for sustainable development, thereby presenting domestic AI policy as aligned with international governance expectations.

FIGURE 13.2

STRATEGIC FRAMEWORK FOR ADVANCING AI IN SRI LANKA



Source: CFSAI (2024).

Substantively, NAIS advances a vision of rapid but responsible AI development and adoption to promote innovation, inclusion, social good, and sustainable growth in alignment with the UN SDGs. It articulates outcomes that span both the public and private sectors. On the public side, it emphasizes using AI to design more proactive and tailored public services and to improve efficiency, quality, and inclusiveness in areas, such as education, healthcare, governance, and welfare. On the economic side, it aims to expand AI use in government and business to generate measurable economic benefits and enhance well-being while enabling SMEs and other sectors to use AI for innovation, problem-solving, productivity gains, and international competitiveness. The strategy also stresses collaboration among academia, industry, and government to deepen research, support technology transfer, and build shared infrastructure. Finally, it prioritizes responsible AI governance by calling for frameworks that protect privacy, fairness, and safety, and build public trust as a practical condition for adoption rather than a rhetorical add-on.

To execute these ambitions, NAIS adopts a two-track implementation approach. One track focuses on rapid value creation through “quick-win” projects that demonstrate tangible, near-term benefits and establish momentum for AI adoption. The other track focuses on capability development by investing in the critical enablers first identified in the White Paper (skills, data, infrastructure, research, and a conducive ecosystem), ensuring that early projects can scale into sustained national capacity. In support of early progress, the analysis notes that the 2024 budget allocated LKR1.5 billion (~USD4.886 million) for AI-related activities, intended to foster initial successes while strengthening foundational capacity. Beyond these early-stage efforts, NAIS organizes its deliverables across short-, medium-, and long-term horizons to ensure that near-term demonstrations are reinforced by sustained institution-building.

Institutionally, both documents treat the establishment of a National AI Centre as a central pillar of implementation and coherence. The White Paper recommended immediate steps, such as creating a Project Management Unit under the Presidential Secretariat to drive AI initiatives and coordinate implementation. It also proposed near-term arrangements to secure policy coherence and external expertise, including the establishment of an international advisory mechanism. NAIS carries forward the same logic, but it links execution more explicitly to the creation of new institutional vehicles and a governance architecture that includes the National Centre for AI (NCAI) and additional state-owned entities. Implementation is placed under the administrative umbrella of a forthcoming Digital Transformation Agency (DTA), underscoring NAIS’s reliance on government-led coordination and institution-building as the primary delivery mechanism.

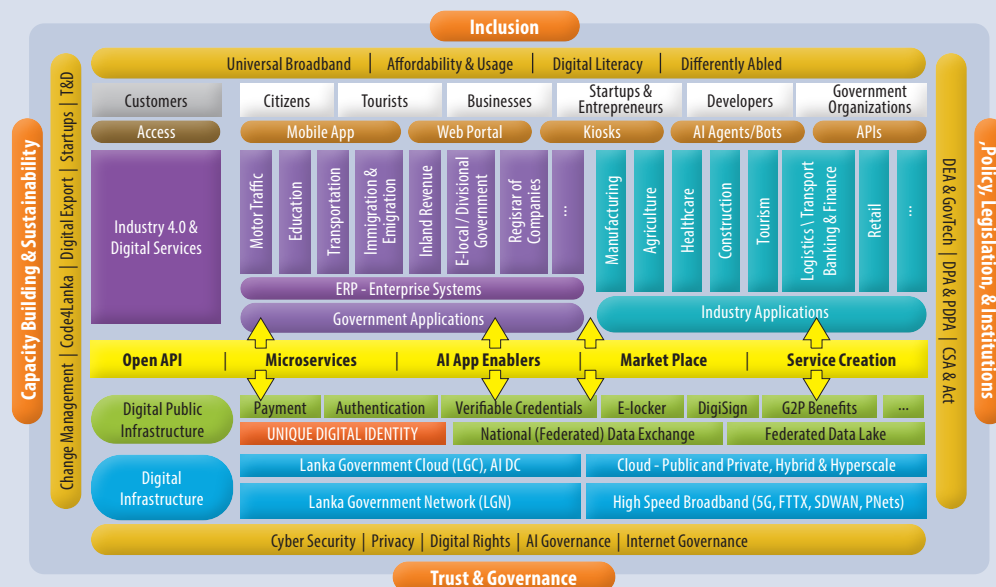
Digital Economy Blueprint 2025

Sri Lanka’s broader digital policy framework is outlined in the Digital Economy Blueprint 2025. It holds equal importance with the AI-specific policies described earlier and is broadly consistent with them. Approved by the Cabinet on 21 October 2025, the Digital Economy Blueprint is framed as the foundation for an integrated medium-term digitalization strategy covering 2025–30 and is aligned with earlier digital policy, including the Digital Sri Lanka 2030. It sets out national objectives centered on scaling the IT industry, expanding e-governance to improve integrity and service performance, increasing cashless transactions, and expanding the IT workforce, with implementation led by the MoDE in coordination with a range of state and non-state stakeholders.

Importantly, the Digital Economy Blueprint explicitly recognizes “next-generation technologies” as drivers of productivity, service innovation, and policy insight, and it includes AI-related provisions that echo the White Paper and NAIS emphasis on enablers. The analysis indicates the need for localized AI models in native languages and treats federated governance and a data classification framework as foundational requirements for AI. It also identifies the importance of trilingual datasets to support training for both local and global AI models. In that sense, the Blueprint extends the AI policy conversation into the broader digital economy agenda and reinforces the idea that data governance and language-capable AI are not peripheral concerns but structural prerequisites for effective national adoption.

FIGURE 13.3

DIGITAL ECONOMY BLUEPRINT



Source: MoDE (2025).

Across these documents, the underlying trajectory is clear: Sri Lanka's 2024 White Paper established the rationale and the enabling ecosystem for AI. NAIS converted that rationale into a directive national roadmap toward an "AI hub by 2028" objective and the Digital Economy Blueprint 2025 embedded AI adoption within a wider, integrated digital transformation program for 2025–30. The key difference lies not in their direction but in their level of operational specificity. The White Paper is best understood as an advisory framework for capability building and safe adoption while NAIS functions as the implementation plan that assigns timelines and institutional responsibilities, and ties the AI agenda to both domestic administrative reform and international governance expectations.

Key Stakeholder Mapping

Sri Lanka's AI ecosystem is shaped by strong government leadership in strategy and regulation, combined with private-sector implementation in commercially viable use cases. The core stakeholders cut across digital economy and ICT agencies, data protection and telecom regulators, public sector productivity bodies, universities and applied research institutions, professional associations, and investors and international partners as well as civil society groups focused on rights, governance, and accountability.

Private Sector

Sri Lanka's private sector is the most visible driver of AI adoption, with large corporations integrating AI into customer operations and efficiency programs, and a growing start-up segment developing specialized AI products and services (A. Atukorale, personal communication, November 12, 2025; D. B. Atapattu, personal communication, November 15, 2025; Y. Fernando, personal communication, November 16, 2025). Professional associations play an enabling role by expanding workforce readiness and strengthening industry participation in policy discussions.

Major Players

Dialog Axiata

Dialog Axiata is a leading telecommunications company that implements AI for customer service, marketing, and operational efficiency. It has also launched standalone AI platforms, positioning itself as a regional digital economy leader (Dialog Axiata PLC, 2025).

Virtusa

Virtusa develops AI-enabled solutions for local and global clients and contributes to the expansion of Sri Lanka's market for AI services through delivery capacity, R&D activity, and AI-focused hiring (Daily Mirror, 2025).

WSO2

WSO2 is a major enterprise software company with a growing focus on integrating AI into enterprise platforms and services. Its product and talent activity supports both domestic AI adoption and export-oriented delivery for global clients (WSO2, 2025).

99x

99x is an established technology firm that develops AI solutions for local and international clients and expanding Sri Lanka's service delivery footprint in AI-enabled software development (DailyFT, 2023).

Start-ups and SMEs

Veracity AI and Synapse AI Labs

Veracity AI, Synapse AI Labs, and other boutique consultancies provide specialized AI services across sectors, such as healthcare and finance, reinforcing the role of smaller firms as agile solution providers (DailyFT, 2020).

Articom.io and Ceylon Speechie

Articom.io operates as an agentic AI platform supporting business-facing automation and system-development workflows while Ceylon Speechie is a MedTech venture offering speech therapy services for children (Malik, 2025). Start-up adoption is increasingly embedded in mainstream entrepreneurship channels, including Disrupt Asia and international accelerator-linked programs (D. B. Atapattu, personal communication, November 15, 2025; Malik, 2025).

Professional Associations

Sri Lanka Association for Software and Services Companies (SLASSCOM)

The SLASSCOM supports AI adoption and workforce transition in the IT and BPM sector through reskilling and innovation programming. Its Future Skills Programme develops AI-ready talent and its Innovation and Entrepreneurship Forum promotes AI adoption among start-ups (Sri Lanka Association for Software and Services Companies, n.d.).

Computer Society of Sri Lanka (CSSL)

The CSSL advances AI awareness and capacity building across the ICT profession and engages in policy advocacy related to emerging technologies. CSSL's National IT Conference 2024 positioned AI as a major theme, strengthening the professional community's role in shaping standards and practice (Computer Society of Sri Lanka, 2024).

Investment and International Networks

AI investment remains at an early stage but is becoming more structured through domestic capital and international start-up networks (D. B. Atapattu, personal communication, November 15, 2025; W. S. Dhanapala, personal communication, November 15, 2025; Y. Fernando, personal communication, November 16, 2025). Domestic investors, such as BOV Capital and Browns Investments provide funding channels for digital start-ups while networks, such as Seedstars supply mentorship, exposure, and capital linkage (Economynext, 2016; Roar Media, 2017). International development partners, including the UNDP and the World Bank, support strategy development, pilot projects, and capacity building, providing both funding and benchmarking against global practice (CFSAI, 2024).

Public Sector and Parastatals

Sri Lanka's public sector sets national direction for AI through policy design, institutional coordination, regulatory compliance, and enabling infrastructure. The government's AI strategy work has been led through the MoDE and multistakeholder coordination bodies that developed the AI White Paper and the National AI Strategy (NAIS). A proposed National AI Centre is intended to serve as the coordinating platform across sectors and consolidate national implementation pathways.

Major Players

Ministry of Digital Economy (MoDE)

MoDE leads AI policy development and the national digital transformation strategy, building on the AI White Paper and the NAIS developed through cross-stakeholder coordination structures. Government commitment to digital transformation is reinforced by high-level political ownership of the digital economy portfolio and continued allocations for public sector modernization, including LKR1 million (~USD3,300) per district and divisional secretariat under the *Praja Shakthi* program and a pledged allocation of LKR25.5 billion (~USD84.15 million) in the 2026 budget speech.

Information and Communication Technology Agency of Sri Lanka (ICTA)

ICTA is the apex ICT institution responsible for government digital transformation under the Information and Communication Technology Act No. 27 of 2003. It anchors implementation capacity for digital government programs that enable AI adoption at scale.

GovTech Ltd

GovTech Ltd is positioned as ICTA's successor and is expected to spearhead AI initiatives across government, working with multiple actors and sectors to integrate AI solutions into Sri Lanka's digital economy agenda.

Data Protection Authority (DPA)

The DPA, established under the Personal Data Protection Act No. 9 of 2022, is central to privacy, compliance, and trust in data-intensive AI systems. Its enforcement role is critical to enabling responsible AI deployment across both public and private use cases.

Telecommunications Regulatory Commission of Sri Lanka (TRCSL)

TRCSL regulates communications infrastructure and connectivity. Its regulatory function underpins the availability and reliability of networks required for AI-enabled public services and digital business operations.

National Productivity Secretariat (NPS)

NPS advances the digital economy agenda through productivity-linked digital tools and AI-related innovation in public administration. It deployed the Divisional Productivity Index 1.0 in 2025 through the Citizen Mirror digital platform and plans to expand customized indices for other public sector

institutions. It is also digitizing processes for the National Productivity Award 2025/2026 and launched the ProYouth AI Competition as a national platform for AI-generated video and proposal development.

Academia and Research

Sri Lanka's universities form the backbone of the AI talent pipeline and a primary locus for applied AI research. Leading institutions deliver AI and computer science degrees, produce industry-ready graduates, and support research that can be translated into government and private-sector programs.

Major Players

University of Moratuwa

The University of Moratuwa is a leading institution for IT education and applied research and plays a central role in producing AI-capable graduates who transition effectively into industry and government programs.

University of Colombo School of Computing (UCSC)

UCSC is a national leader in IT education and AI-related research, providing degree pathways and applied research capacity that supports Sri Lanka's broader AI workforce and innovation pipeline.

Sri Lanka Institute of Information Technology (SLIIT)

SLIIT, a private institute for advanced studies, contributes through research initiatives and specialized courses that cover both technical and policy dimensions of AI, strengthening the link between engineering practice, governance needs, and market deployment.

Citra Social Innovation Lab

Citra is a policy innovation lab established through an agreement between the government of Sri Lanka and UNDP. It links research, design thinking, and pilot implementation and played a direct role in crafting the NAIS while continuing to support rollout and implementation (Citra, 2025).

Civil Society

Civil society organizations provide accountability by advancing evidence-based debate on governance, rights, inclusion, and safeguards for AI deployment.

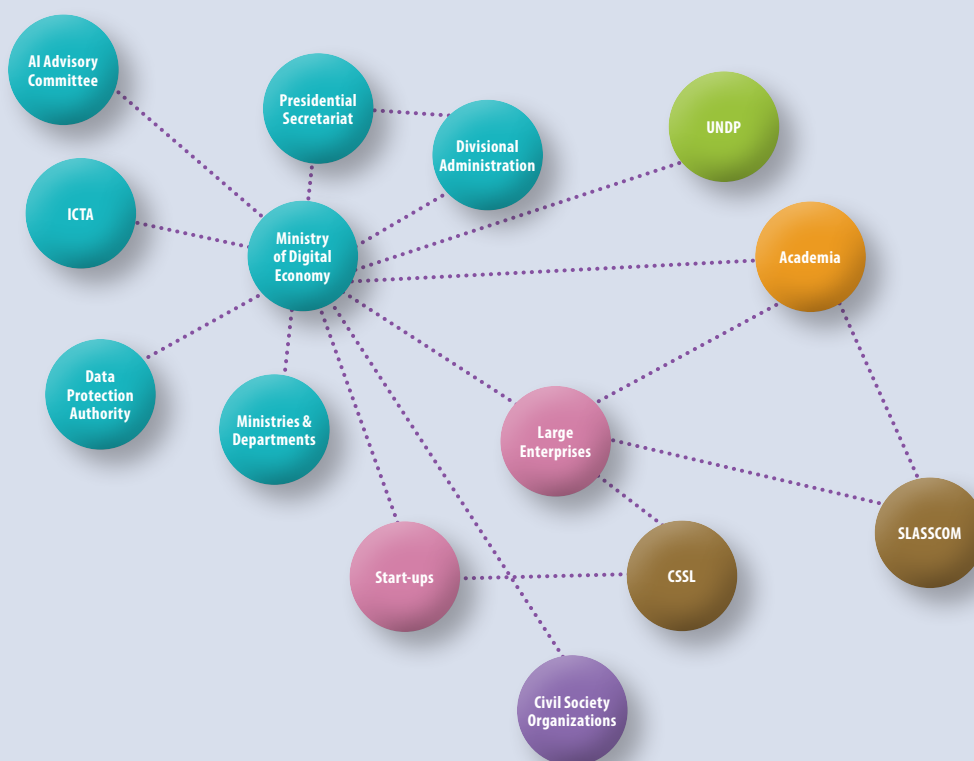
LIRNEasia

LIRNEasia produced early work on digital policy, data governance, and the social impacts of AI in 2022, contributing analytical inputs that support responsible policy design and capability building (Bandaranayake, 2022).

Access Now

Access Now has participated in consultations on the draft AI strategy and advocates protections related to human rights and misuse prevention in the deployment of AI systems (Access Now, 2025).

Taken together, Sri Lanka's AI ecosystem comprises three operational centers of gravity: (i) government-led strategy and regulation; (ii) private sector deployment through enterprise adoption and start-up experimentation; and (iii) a university-centered talent and applied research base reinforced by professional associations. The near-term priority is to keep these layers interoperable, aligning policy, implementation, talent, safeguards, and investment, ensuring that adoption scales without fragmenting into isolated initiatives.

FIGURE 13.4**KEY AI STAKEHOLDERS IN SRI LANKA**

Source: The author.

Strategic Positioning and Recommendations

Sri Lanka's AI ecosystem is anchored in strong human capital and a mature IT industry, supported by sustained government commitment and a multistakeholder approach to national strategy development (A. Atukorale, personal communication, November 12, 2025; D. B. Atapattu, personal communication, November 15, 2025; W. S. Dhanapala, personal communication, November 15, 2025; Y. Fernando, personal communication, November 16, 2025). With the Digital Economy Blueprint reinforcing continuity in the policy foundation laid by the NAIS, Sri Lanka has credible conditions to scale AI adoption across the economy, particularly if education-led reskilling continues and private-sector momentum translates into scalable use cases (APO, 2025).

FIGURE 13.5

SWOT MATRIX: SRI LANKA

Strengths

- Highly skilled IT workforce
- Government commitment
- Multistakeholder approach
- Strong IT industry

Weaknesses

- Lack of a robust and conducive foundation
- Lack of legal and policy frameworks
- Low AI-related skills
- Resistance to change

SWOT Analysis**Opportunities**

- Income generation avenue
- International partnership
- Private sector collaborations with international players

Threats

- Widening social divide
- Unethical and unprofessional use
- Global competition

Source: Compiled by the author based on author's interviews with A. Atukorale (2025); D. B. Atapattu (2025); W. S. Dhanapala (2025); and Y. Fernando (2025).

SWOT ANALYSIS

Strengths

i) **Highly skilled IT workforce and reskilling potential**

One of Sri Lanka's greatest strengths is its highly skilled workforce, particularly in the IT sector but also more broadly across the labor market (A. Atukorale, personal communication, November 12, 2025; D. B. Atapattu, personal communication, November 15, 2025; W. S. Dhanapala, personal communication, November 15, 2025; Y. Fernando, personal communication, November 16, 2025). This talent base enables comparatively rapid reskilling for AI adoption, especially if AI concepts and tools continue to be integrated into school, undergraduate, and graduate curricula (W. S. Dhanapala, personal communication, November 15, 2025). English language skills and multilingual proficiency also serve as practical assets for international collaboration and cross-border projects.

ii) **Government commitment and continuity in digital economy governance**

Sri Lanka's AI agenda is supported by continued government commitment from 2024 onward, particularly through the leadership of the MoDE, even amid regime changes (D. B. Atapattu, personal communication, November 15, 2025; W. S. Dhanapala, personal communication, November 15, 2025). The Digital Economy Blueprint is the latest policy framework and reinforces the foundation laid by the NAIS.

iii) **Multistakeholder approach to AI strategy development**

The use of multistakeholder and multidisciplinary governance mechanisms is a notable strength. The CFSAI and its successor, the AI Advisory Committee, have played a steering role in advancing national AI strategy. Public consultations on the NAIS supported principles of inclusivity and equality.

iv) **Strong IT industry and software capacity as a national advantage**

Sri Lanka's IT industry is well-developed and grounded in a skilled workforce produced through the tertiary education system. Global benchmarking exercises consistently highlight Sri Lanka's

software capacity as a national advantage (APO, 2025). Taken together, government leadership, collaborative strategy processes, IT industry maturity, and the domestic talent pool form the core strength supporting AI adoption.

Weaknesses

i) Foundational gaps in digitalization, data analytics, and data availability

The country's primary weakness is the lack of a robust foundation for AI adoption, especially in digitalization and data analytics (Y. Fernando, personal communication, November 16, 2025). Data immaturity is a major constraint, including a lack of datasets suitable for training AI models (A. Atukorale, personal communication, November 12, 2025).

ii) Incomplete legal and policy frameworks for AI governance and implementation

Sri Lanka lacks a full-fledged AI-specific governance and regulatory framework, which undermines the NAIS in practice. Legislation that would empower and operationalize the National AI Centre (listed as an early milestone in the NAIS) is not yet in place, and the status of the NAIS implementation as a national policy remains uncertain.

iii) Low AI-related skills beyond the core IT segment, including the public sector

Although Sri Lanka has strong IT talent, the broader workforce lack AI-related skills, especially in the public sector. This gap limits the speed and breadth of adoption.

iv) Resistance to change, public sector data silos, and limited data culture

Resistance to change among citizens and professionals is another constraint, particularly in the public sector, where long-standing rules and procedures act as barriers to digital transformation and where data silos persist. The government's open data portal is underutilized and outdated, reflecting a weak data culture and limited institutionalization of data sharing and reuse. Low digital and data literacy among citizens contributes to resistance to technology and limits uptake of AI-enabled solutions.

Opportunities

i) Income generation and private sector momentum, including start-ups

The private sector, including start-ups, views AI as a lucrative avenue for income generation and is beginning to integrate AI into operations. This commercial momentum provides a channel to build practical use cases, expand demand, and develop implementation capabilities.

ii) International partnerships for capability building and governance learning

Sri Lanka has initiated international collaborations with Singapore, the Republic of Korea, and India for capacity development. It has an MoU in place with AI Singapore on advisory support, knowledge exchange, and capacity building, with an emphasis on alignment with global best practices in AI governance (The Morning, 2025; D. B. Atapattu, personal communication, November 15, 2025; W. S. Dhanapala, personal communication, November 15, 2025). There is also interest from international AI players in establishing AI ventures in Sri Lanka (D. B. Atapattu, personal communication, November 15, 2025).

iii) Development-partner support and ecosystem building

The UNDP is a key stakeholder that has played a supportive role since national AI adoption became a policy issue. There is ample opportunity to deepen institutional capacity, accelerate practical deployment, and strengthen governance frameworks through partnership-driven learning and investment.

Threats

i) Risk of widening social divides and uneven inclusion

A key risk is that AI adoption could widen social divides, particularly given low digital literacy and uneven digitalization between urban and rural areas (W. S. Dhanapala, personal communication, November 15, 2025). Rural regions are at risk of being left behind as adoption accelerates, reinforcing existing inequality patterns.

ii) Unethical or unprofessional use and associated privacy and security risks

AI carries risks, particularly as many individuals adopt AI tools for personal convenience without clear norms, safeguards, or accountability mechanisms (D. B. Atapattu, personal communication, November 15, 2025). These risks often intersect with cybersecurity and data privacy concerns.

iii) Falling behind in regional competition

Sri Lanka lags behind neighboring countries in AI uptake and risks losing competitiveness if rapid interventions are not taken. One interviewee emphasized the need to move quickly to avoid further slippage (Y. Fernando, personal communication, November 16, 2025). In combination, the central threats are widening inequality, harmful or irresponsible use, and competitive disadvantage if execution stalls.

Summary

Sri Lanka's strongest advantages lie in its skilled workforce, strong English and multilingual capabilities for collaboration, durable government leadership on the digital economy, and a well-developed IT industry recognized in global benchmarking exercises (APO, 2025; A. Atukorale, personal communication, November 12, 2025; D. B. Atapattu, personal communication, November 15, 2025; W. S. Dhanapala, personal communication, November 15, 2025; Y. Fernando, personal communication, November 16, 2025). The binding constraints are foundational: (i) limited digitalization and data maturity; (ii) gaps in AI-specific legal and regulatory frameworks; (iii) uneven AI skills across the broader workforce and the public sector; and (iv) resistance to change reinforced by siloed data practices and low digital literacy. Sri Lanka's opportunity is strengthened by growing private-sector interest in AI-driven income generation and active international collaborations, including its MoU with AI Singapore, alongside support from development partners such as UNDP (The Morning, 2025; D. B. Atapattu, personal communication, November 15, 2025; W. S. Dhanapala, personal communication, November 15, 2025). Managing the risks of widening social divides, unethical use, and competitive slippage requires decisive action to expand inclusive digitalization, strengthen governance and assurance mechanisms, and build a stronger national data and implementation base (W. S. Dhanapala, personal communication, November 15, 2025; Y. Fernando, personal communication, November 16, 2025).

Future Needs and Collaboration Pathways

Domestic Priorities

Sri Lanka is at a technological juncture, shaped by both emerging strengths and enduring challenges. Workplace environments require transformation across economic sectors. For instance, there are currently no targeted programs in any economic sector (other than the ICT/ITES industry) for mainstreaming AI tool adoption. Only a few conglomerates have consciously and strategically adapted AI to further their strategic objectives. Sri Lanka's full adoption of AI depends on effective change management. Therefore, Sri Lanka requires assistance in change management in both public and private sectors. Sri Lanka's AI capabilities remain underdeveloped due to foundational gaps. AI adoption requires digitalization and data maturity, and Sri Lanka lags behind on both fronts. Without strengthening them, AI capacity cannot be developed in Sri Lanka. Strengthening these foundations is

essential in public and private sectors to ensure the robustness of the AI ecosystem. Sri Lanka has secured capacity-building support from international partners, including governments, donor agencies, and private ventures. However, Sri Lanka requires further assistance in developing change agents that could promote AI adoption across sectors and societal segments. Tactical-level managers in government organizations and large- and medium-scale enterprises are well suited to act as change agents. They are both tech-savvy and well-placed within the hierarchy to ensure a smooth change management. The Asian Productivity Organization (APO) can support Sri Lanka in developing AI capabilities by empowering tactical-level managers in both the public and private sector managers to function as change managers.

Gaps in governance mechanisms for AI adoption require urgent intervention. Some professionals use AI tools without safeguards, creating risks to data security and responsible use. For example, most operational level public employees risk data security through unintended disclosure as they use freely available large language models (LLM) for convenience. Developing comprehensive AI governance frameworks is time-consuming. Therefore, institutions must develop policies to promote and govern AI use in support of institutional mandates. Hence, Sri Lanka requires capacity development for strategic and tactical managers to formulate and lead institutional policy development on the same.

Public skepticism toward technological advances, including AI, is another factor affecting adoption in Sri Lanka. Skeptics of AI may discourage adoption and impede broader application. Most skeptics are concentrated at the operational level, followed by the strategic level. Reducing skepticism in the public sector is essential. This too is a phenomenon that can be gradually redressed through successful change management. Stakeholder groups should be equipped to convince the skeptics, or at least surpass their influence on the general public. The strategic-level managers must be exposed to the productivity gains of AI in APO member economies. Large-scale, context-specific training programs have become a timely requirement. In sum, training the tactical-level managers as change managers will permit them to successfully overcome the mistrust of AI. Public awareness and promotion are also necessary to improve public participation, and an area in which the APO can assist Sri Lanka.

Collaboration Opportunities

Sri Lanka currently lacks successful models of AI adoption. Several APO members have achieved outstanding success in AI adoption in specific sectors. Knowledge transfer from such nations will improve Sri Lanka's AI adoption rate. Solution-based AI applications tailored to specific industries could improve Sri Lanka's AI landscape and also improve the public acceptance of AI.

APO Joint Initiatives

In conclusion, Sri Lanka requires assistance in developing the capacity, primarily at the tactical level for managing the significant paradigm shift required for successful AI adoption. Digitalization must be further promoted across Sri Lanka. Finally, introducing solution-based AI tools successfully deployed and practiced by the APO members will bridge current capability gaps.

CHAPTER 14

TURKIYE

Each member economy is assessed through a common analytical framework covering five core dimensions: (i) ecosystem baseline; (ii) policy and strategy; (iii) stakeholder landscape; (iv) strategic positioning; and (v) future pathways. This structure enables consistent cross-economy comparison while allowing for context-specific insights into how AI capabilities are developed, governed, and applied in practice.

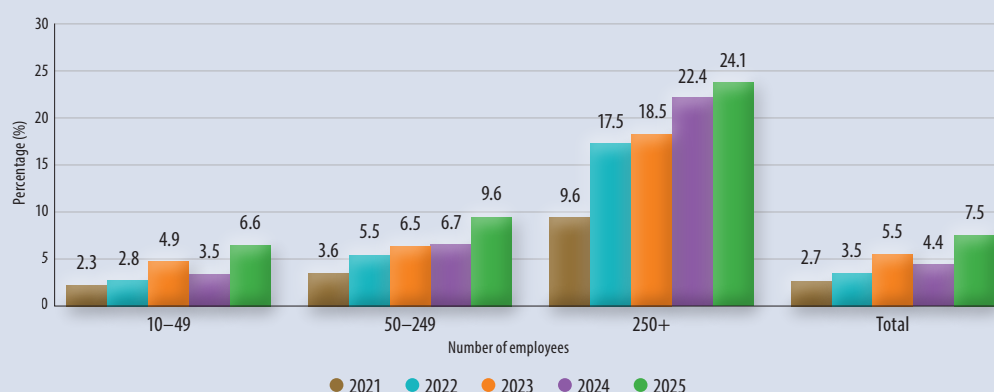
AI Ecosystem Baseline Assessment

To assess Türkiye's level of readiness for AI, it is essential to examine key indicators related to development and adoption. This section presents data on enterprise-level AI adoption rates, AI-related innovation activities (patents and start-ups), the size of Türkiye's AI workforce and talent pool, and AI-related R&D investments.

AI Adoption in Türkiye

Although AI adoption among enterprises in Türkiye remains at an early stage, it has shown an overall upward trend in recent years. According to the Information and Communication Technology (ICT) Usage in Enterprises Survey conducted by the Turkish Statistical Institute (TurkStat), about 5.5% of enterprises with 10 or more employees reported using some form of AI technology in 2023, up from 3.5% in 2022. While the 2024 survey shows a decline to 4.4%, the 2025 results indicate a strong rebound, with the overall AI usage rate rising to 7.5%. The decline observed in 2024 is largely driven by a drop among small enterprises (10–49 employees). However, given the limited detail available on changes in the measurement methodology and the sampling frame, this trend should be interpreted with caution; it is unclear whether it reflects a structural break or a temporary fluctuation. The increase recorded across all firm-size categories in 2025 suggests that the 2024 decline may represent a temporary deviation rather than a persistent trend. Overall, adoption rates remain relatively low, indicating that most enterprises have not fully integrated AI into their operations. At the same time, adoption is substantially higher among large enterprises. AI use among firms with 250 or more employees increased from 22.4% in 2024 to 24.1% in 2025. As of 2025, the rate stands at 6.6% for small enterprises (10–49 employees) and 9.6% for medium-sized enterprises (50–249 employees), underscoring that AI adoption rises markedly with firm size and that the gap favoring large enterprises continues to persist (Turkish Statistical Institute [TurkStat], 2024a; 2025).

TurkStat (2025) data indicate that Türkiye still has substantial scope for wider diffusion of AI among enterprises. When asked about reasons for not using AI, firms predominantly reported internal capacity and implementation-related barriers. As shown in Figure 14.2, the most frequently cited obstacle is the lack of relevant expertise within the enterprise (74.2% overall), followed by high costs (67.4%). Uncertainty about legal consequences (62.4%), concerns regarding data protection and privacy (61.8%), and incompatibility with existing equipment, software, and systems (61.7%) are also reported at similarly high levels. These patterns suggest that AI uptake is constrained primarily by capability gaps and cost pressures, compounded by compliance and integration risks rather than by a perception that AI is not useful for the enterprise (16.1% overall).

FIGURE 14.1**AI ADOPTION BY ENTERPRISE SIZE IN TURKIYE**

Source: TurkStat (2025).

At the same time, TurkStat (2025) provides an encouraging signal on future adoption. Among enterprises that do not use AI technology, 9% reported that they are considering adopting AI. This intention varies by firm size, rising from 8.4% for enterprises with 10–49 employees to 10.4% for those with 50–249 employees, and reaching 18.2% among enterprises with 250+ employees. The comparatively higher adoption intention among larger firms suggests that as workforce skills improve and financial, legal, and system-integration barriers are reduced, AI diffusion may accelerate. This is particularly true among enterprises with greater organizational and investment capacity.

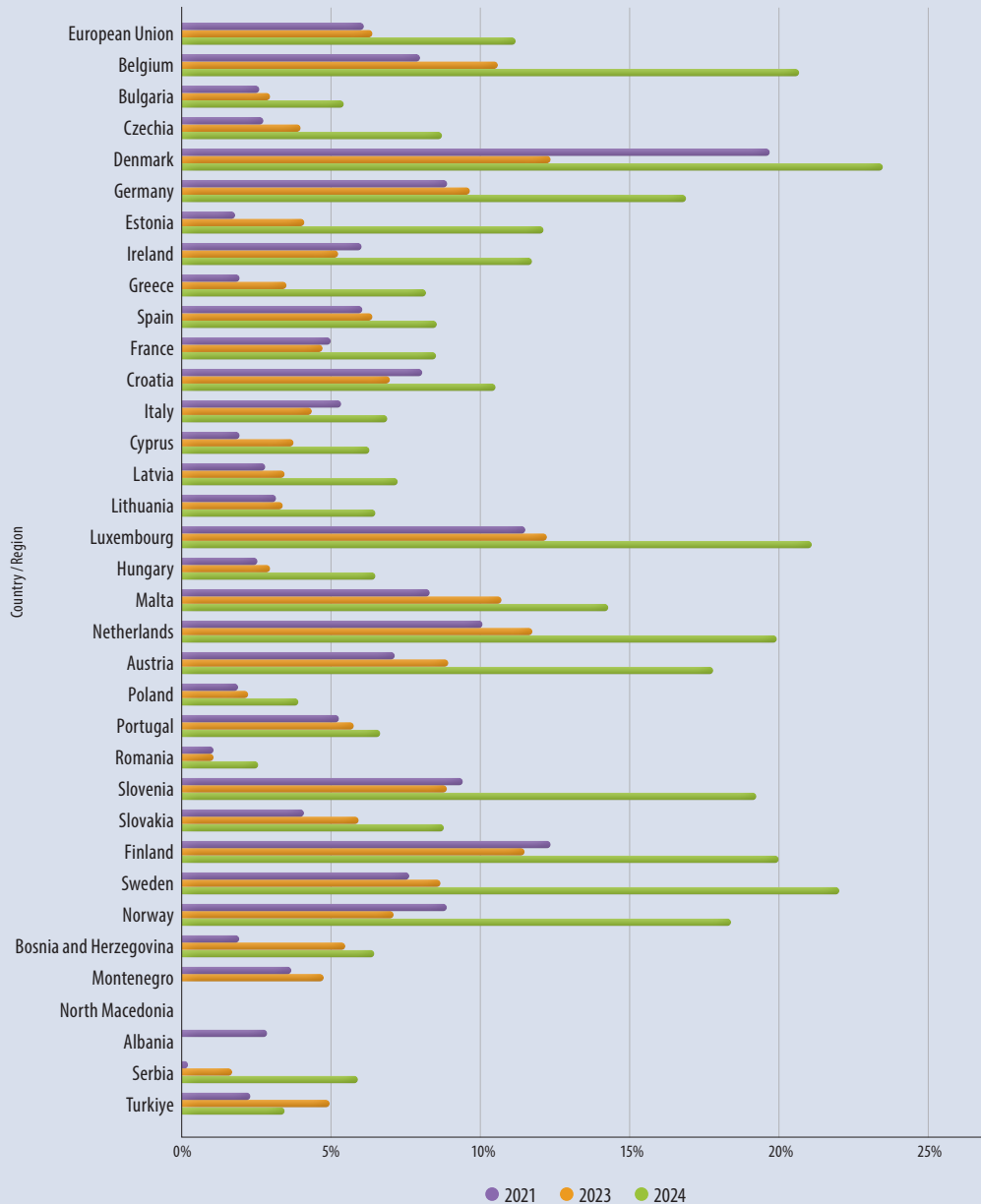
FIGURE 14.2**REASONS FOR NON-ADOPTION OF AI BY ENTERPRISES, 2025**

Reasons not to use AI	Size class					
	Total	10–49	50–249	250+		
Lack of relevant expertise in the enterprise	74.2	76.0	68.8	65.0		80
Too high costs	67.4	67.8	66.2	65.5		70
Lack of clarity about the legal consequences	62.4	62.3	62.3	65.0		60
Concerns regarding violation of data protection and privacy	61.8	62.8	56.6	63.4		50
Incompatibility with existing equipment, software, or systems	61.7	62.1	61.9	56.0		40
Difficulties with availability or quality of the necessary data	54.7	55.3	52.1	54.0		30
Ethical considerations	43.6	44.1	41.6	42.1		20
Not being useful of AI technologies for enterprise	16.1	17.2	12.9	10.4		10

Source: TurkStat (2025)

Note: As multiple options could be selected, percentages do not necessarily sum to 100.

As illustrated in Figure 14.3, from 2023 to 2024, enterprises across Europe began to rapidly adopt AI technologies. Northern and Western European economies, such as Denmark, Sweden, Belgium, Finland, Luxembourg, and the Netherlands consolidated their lead, with adoption rates exceeding 20%. Central European countries, including Germany, Austria, and Slovenia, achieved moderate progress, reaching 10%–15% adoption rates.

FIGURE 14.3**ENTERPRISES USING AI TECHNOLOGIES BY COUNTRY AND REGION, 2023–24**

Source: Eurostat (2024).

By contrast, Southern and Eastern European countries, including Türkiye, posted much lower adoption rates in the 5%–7% range, suggesting a much weaker level of AI integration. The overall increase in the European Union (EU) average reflects the effectiveness of EU-wide policy frameworks and support mechanisms that promote AI adoption.

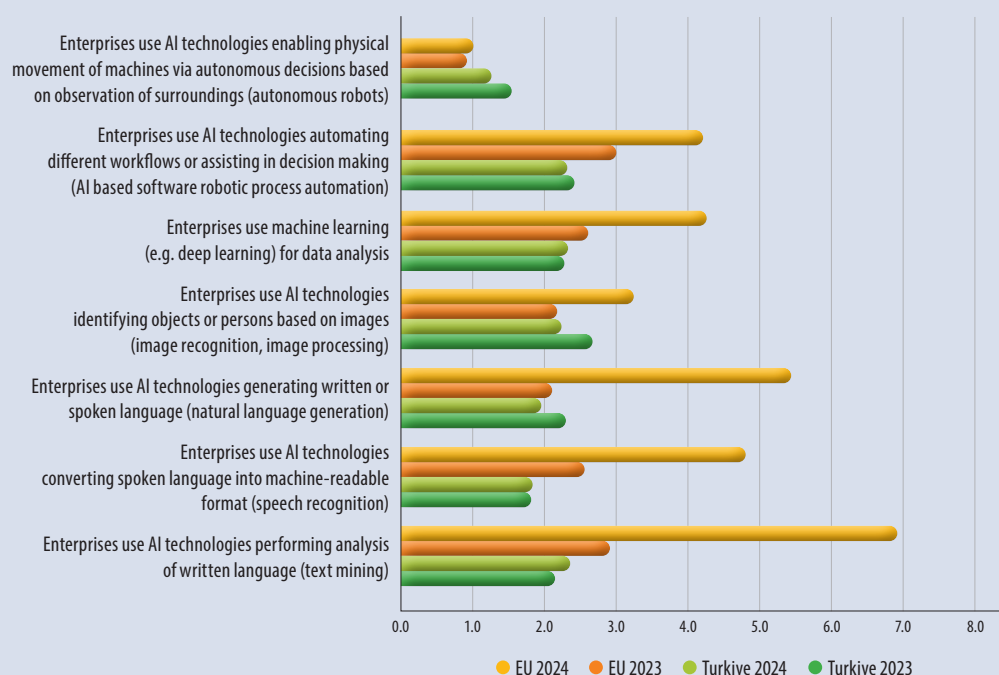
Türkiye's relatively low level of enterprise adoption points to a need for stronger national policies, targeted incentive schemes, and dedicated capacity-building programs to accelerate the diffusion of AI technologies among businesses.

According to Eurostat (2024), only 3.9% of SMEs in Türkiye (firms employing between 10 and 249 workers) used at least one AI technology in 2024, a rate significantly below the EU average of 12.6%. While the AI adoption rate among EU SMEs doubled between 2021 and 2024, Türkiye experienced a decline after 2023. Türkiye ranks among the lowest-performing countries in Europe in terms of AI use, alongside Romania and Poland.

As shown in Figure 14.4, AI technologies are more widespread among enterprises in the EU than in Türkiye. The most common AI applications among EU firms in 2024 were text analysis (6.9%), natural language generation (5.4%), and machine learning (4.2%). In Türkiye, these levels were 2.9%, 2.3%, and 2.3%, respectively. However, adoption levels in Türkiye for more application-oriented technologies, such as image recognition (2.7%) and speech recognition (2.4%), were comparatively closer to the EU averages.

FIGURE 14.4

AI APPLICATION AREAS AMONG ENTERPRISES IN TURKIYE: 2023 VS. 2024



Source: Eurostat (2024).

Overall, AI adoption in Türkiye has lagged behind the EU average. These results indicate that while awareness of AI technologies among Turkish enterprises is gradually increasing, their use, particularly in data-intensive domains, such as analytics, natural language processing, and text mining, remains

underdeveloped. Overall, cost barriers, skill shortages, and inadequate data infrastructure continue to constrain AI diffusion in Türkiye, suggesting that the country retains substantial potential but remains at an early stage of AI adoption.

It is useful to compare Türkiye's AI adoption with global indicators. According to OECD data, in 2024 an average of 13.5% of enterprises across various countries reported using AI technologies while in many EU economies, this rate ranged between 5% and 15% from 2021 to 2022. Türkiye's rate of 5%–6% (2022–23) places it among the lower-performing digitally advanced economies, although it remains comparable to rates in several emerging economies. However, large firms in Türkiye report relatively high adoption rates, which aligns with the global trend. Large enterprises typically possess more resources to invest in advanced technologies, such as AI (Organisation for Economic Co-operation and Development [OECD], 2025b).

TurkStat (2025) data show that, among AI-using enterprises, the most common purpose of AI use is marketing or sales (46.5%). This is followed by production or service processes (41.1%), R&D or innovation activities (41.0%), and business processes and management or organizational functions (40.0%). More limited areas include accounting, controlling, or financial management (33.7%), ICT security (22.6%), and logistics activities (13.6%). Overall, this pattern suggests that enterprises prioritize AI in functions directly linked to market-facing value creation, customer engagement, and operational efficiency.

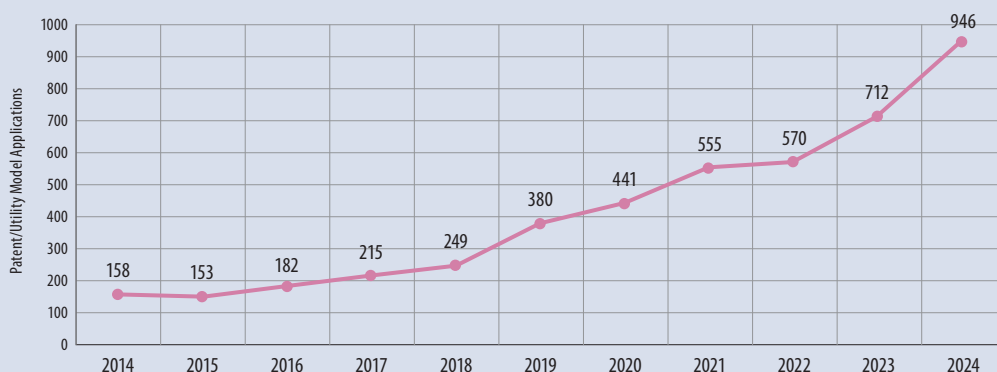
At the sector level, AI adoption appears more intensive in certain industries. The Investment Office of the Presidency identifies financial services and retail as leading sectors in AI use (Invest in Türkiye, 2024b). In addition, a sectoral study covering 101 companies from manufacturing, ICT, finance, and asset management reports that around 45% of firms plan to allocate more than 10% of their IT budgets to AI. Most of these planned investments focus on operational processes, customer services, and product/service development (Turkish Industry and Business Association [TUSIAD], 2025). Taken together, these findings align with TurkStat evidence and indicate that near-term AI investment is likely to concentrate on operational excellence and customer-driven growth.

AI R&D and Investment in Türkiye

Innovation in AI can be measured through patent activity and the emergence of AI-oriented start-ups. As illustrated in Figure 14.5, the number of patent and utility model applications related to AI technologies in Türkiye has shown a clear upward trend over the past decade. The number of applications increased from 158 in 2014 to 946 in 2024, exhibiting a sixfold increase.

FIGURE 14.5

NUMBER OF PATENT AND UTILITY MODEL APPLICATIONS RELATED TO AI IN TÜRKİYE, 2014–24



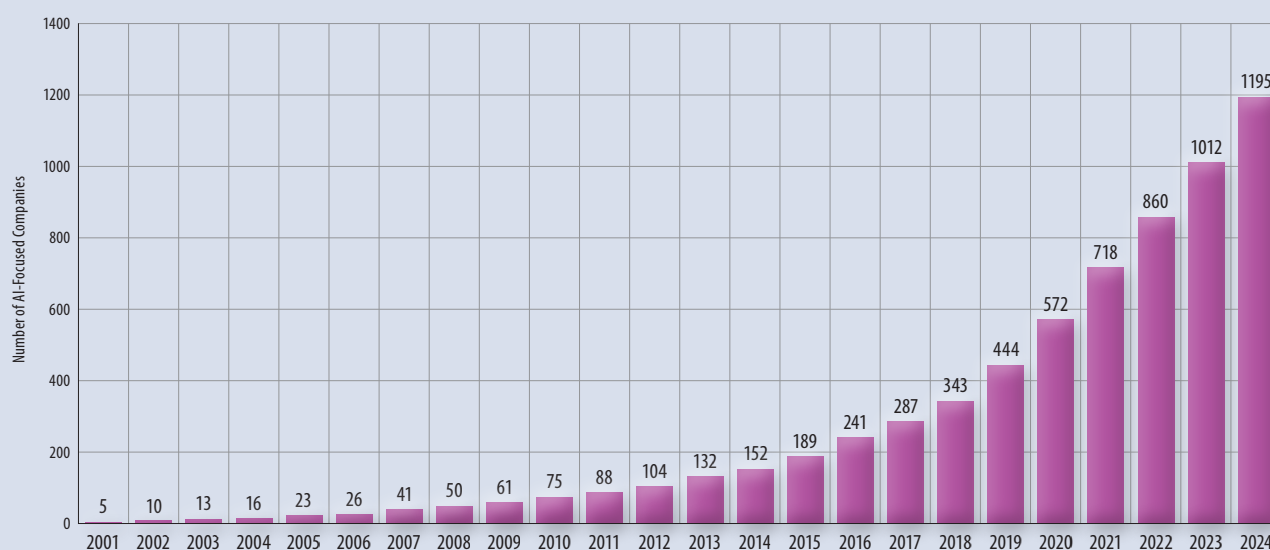
Source: Ministry of Industry and Technology (2025b).

Another key indicator of innovation is the emergence of AI-focused start-ups. According to a 2024 report by the Istanbul Chamber of Commerce (ITO), the number of Türkiye-based AI-focused companies has increased significantly, from just five in the early 2000s to 1,195 by 2024 (Figure 14.6). This expansion demonstrates the rapid growth of Türkiye's AI start-up ecosystem over the past two decades.

This growth has accelerated in recent years. The number of AI companies rose from about 1,012 in 2023 to 1,195 in 2024, marking one of the fastest annual increases in the sector.

FIGURE 14.6

GROWTH IN THE NUMBER OF AI-FOCUSED COMPANIES IN TURKIYE



Source: Istanbul Chamber of Commerce Strategic Research Center (ITOSAM) (2024).

Between 2022 and 2023, Türkiye's start-up ecosystem entered a phase of maturity. In 2023, rapid delivery services dominated investment volumes, attracting funding of USD500 million. The software-as-a-service (SaaS) (USD41 million), AI (USD36 million), gaming (USD31 million), and RetailTech (USD30 million) sectors also attracted considerable attention. In terms of the number of investment deals, AI ranked first with 47 transactions, followed by gaming (41), SaaS (34), financial technology (fintech) (33), and climate technologies (25).

This pattern indicates that, although most capital was concentrated in delivery-based businesses, the most dynamic and innovation-driven sectors include AI and gaming (Invest in Türkiye, 2024b). Furthermore, the sectoral diversity of AI-based service providers demonstrates that AI entrepreneurship in Türkiye is increasingly reaching various segments of the economy.

In addition to start-ups, large technology firms and conglomerates in Türkiye have been investing in AI R&D. In recent years, the country has produced seven unicorn technology companies, defined as firms valued at over USD1 billion, mainly in the e-commerce and gaming segments. Several of these unicorns actively employ AI technologies, such as recommendation engines and dynamic pricing. While not all unicorns are pure-play AI companies, their success stories reveal a rapidly expanding national capacity for innovation with a strong AI component.

Supported by technoparks (industrial complexes for technology firms) and incubation centers, Türkiye's entrepreneurship ecosystem continues to generate new AI ventures. According to data from the Ministry of Industry and Technology (2025b), as of the end of 2023, more than 2,300 companies located in 89 technoparks were engaged in AI-related projects or business areas. By September 2025, this number had risen to 6,001, indicating a vibrant and expanding AI innovation environment, even though many of these firms remain small in scale.

Scientific publications serve as another indicator of AI capacity. Türkiye maintains a moderate level of research output in AI and machine learning. In 2020, Türkiye ranked 13th globally in the number of AI research papers published, which is a solid position and points to the existence of an active research community. This however indicates that Türkiye trails far behind global leaders, such as PR China and the United States of America (US). Turkish researchers produced 1,523 AI-related publications in 2024, compared with 13,132 in the US, 12,666 in PR China, and 10,205 in India (Elsevier, 2025).

Employers in Türkiye anticipate that 44% of job skills will change by 2030, exceeding the global average of 39%. AI, digital security, and cybersecurity are among the top priority skill areas, with the potential to create an estimated 8.9 million new technology jobs. Coursera data indicate that Türkiye has 1.6 million learners, with an average age of 33, 39% of whom access courses via mobile devices. Women constitute 43% of all learners, but represent 29% of AI learners, 26% of enrollees in courses for professional certificates, and 35% of learners in Science, Technology, Engineering, and Mathematics (STEM) disciplines. Participation in AI (GenAI) courses has recently doubled while enrollment in professional certificate programs has increased by 25%.

The International AI Maturity Index evaluates countries' readiness for AI adoption using multidimensional indicators that combine Coursera learning data with external metrics from institutions, such as the IMF and the OECD. According to this assessment, Türkiye ranks 50th globally in AI maturity. These data underscore that investment in AI and cybersecurity skills is critical for Türkiye's digital future and that the pace of workforce transformation is accelerating (Coursera, 2025).

Complementary evidence from population-level indicators points to uneven diffusion. According to OECD (2025c) data, the share of individuals in Türkiye who used generative AI tools in the last three months varies markedly by age: 38.5% among those aged 16–24, 17.2% among the 16–74 population, and 1.8% among those aged 55–74. This gap suggests that diffusion is shaped not only by enterprise capacity but also by user-side digital skills and access.

AI R&D Expenditures

There are currently no official statistics in Türkiye that isolate AI-specific R&D expenditures. However, the overall increase in national R&D spending indicates a growing financial capacity to support advanced technologies, including AI. Thus, AI-related expenditures can be tracked indirectly through general R&D indicators.

R&D investment is a key indicator of AI capacity. Türkiye's total R&D expenditure rose by TRY178.9 billion (~USD4 billion) in 2023 compared with the previous year, reaching TRY377.5 billion (~USD8.4 billion). Over the past 22 years, R&D spending has increased 13-fold, from USD1.2 billion in 2002 to USD16.1 billion in 2023. The share of R&D expenditure in GDP rose from around 0.5% in the early 2000s to 1.42% in 2023 (TurkStat, 2024b). Although AI-specific allocations are not separately monitored, both public and private spending show clear signs of acceleration.

Public R&D Funding

The Scientific and Technological Research Council of Türkiye (TUBITAK) has significantly increased its support for AI-focused research projects. Since 2002, TUBITAK's academic and public-sector support programs have funded 3,876 AI-related projects and 2,389 researchers, amounting to TRY14.3 billion (~USD318.3 million) in grants (Grand National Assembly of Turkey, 2024).

In 2024, TUBITAK launched the dedicated funding program AI Ecosystem to promote collaborative projects and establish centers of AI excellence. Furthermore, in 2021, the TUBITAK AI Institute was

established to coordinate national AI R&D efforts and facilitate collaborations between higher learning institutions and private-sector firms. The organization's focus is on strategic AI research, but it is also built to serve as a hub for incubating human capital with AI skills and developing technology.

Private Sector R&D and Investment

In 2023, private sector R&D spending reached TRY245.97 billion (~USD5.48 billion), of which 53.2% was conducted in officially recognized R&D centers. Notably, 88.3% of the R&D expenditures in these centers were carried out by large-scale enterprises (TurkStat, 2024b).

According to the 2024 Türkiye Startup Ecosystem Investment Report, AI start-ups attracted more investment than any other type of firm in the technology space. A total of 91 AI start-ups held funding rounds, with total capital raised amounting to USD715.8 million. AI marketing start-up Insider AI was a major contributor, having led the largest round of funding, and propelling the AI segment to the top position in terms of investment volume. In addition, 68 other start-ups secured new investments during the year, demonstrating strong interest from both investors and corporations in AI-based solutions.

The manufacturing sector, which accounts for approximately 24% of total firm net sales in Türkiye (Ministry of Industry and Technology, 2025b), is considered a priority area for productivity gains through advanced Industry 4.0 (Fourth Industrial Revolution) technologies and AI integration. Traditionally concentrated in automotive and electronics, manufacturing R&D is increasingly shifting toward predictive maintenance, quality control, and robotic applications. In large-scale enterprises, AI-based quality control and predictive maintenance systems have improved productivity by 25%–30% while AI-powered image processing systems have achieved 96.5% accuracy in defect detection and an 85% increase in processing speed. According to Deloitte, the integration of big data analytics and machine learning has yielded an average 27% improvement in manufacturing productivity.

While AI adoption among SMEs remains below 5%, this rate is expected to rise in the coming years with government incentives and expanding university–industry collaborations (Independent Industrialists and Businessmen's Association (MUSIAD), 2025). Between 2021 and 2022, industrial robot installations in Türkiye increased by 22%, representing the second fastest growth rate globally after Singapore's 68% (Stanford University, Institute for Human-Centered AI, 2024).

Türkiye's core AI indicators show that the country is in an early-to-intermediate stage of AI development. Enterprise-level adoption is growing slowly and unevenly while innovation through start-ups and academic research is improving but has yet to match global frontrunners. The manufacturing sector, however, has already managed to achieve measurable AI-driven gains (e.g., increased robotization and predictive analytics), which warrants further support for the diffusion and adoption of AI applications across all industries. These statistics form the empirical foundation of Türkiye's strategic approach to AI development.

AI Support Mechanisms

To ensure that AI R&D investments generate effective outcomes, Türkiye has implemented a variety of national and regional support mechanisms. TUBITAK supports AI-focused research projects through the Scientific and Technological Research Projects Support Program and the AI Ecosystem Call Program. In addition, TUBITAK promotes researcher specialization in this field through fellowship initiatives, such as the National Leading Researchers Program.

The Small and Medium Enterprises Development Organization (KOSGEB) provides R&D and product development grants for AI-based start-ups as well as funding and favorable financing opportunities for digital-transformation projects. Regional Development Agencies contribute financially to locally implemented AI and digital-transformation initiatives, thereby strengthening regional ecosystems. The Technology-Oriented Industry Move Program offers various incentives to companies investing in AI, big data, cloud computing, and other high-technology areas.

Beyond financial mechanisms, the National High-Performance Computing Center (TRUBA) provides researchers with GPU/TPU-enabled computing infrastructure while an Open Data Portal platform

(acikveri.gov.tr) facilitates R&D processes through open data sharing. At the ecosystem level, the Türkiye Artificial Intelligence Initiative (TRAI), along with technoparks and incubation centers, offers entrepreneurs mentorship, investor access, and collaboration opportunities.

Moreover, international funding programs, such as Horizon Europe provide additional financial opportunities for Turkish researchers engaged in AI projects. Collectively, these support mechanisms complement the growing AI investments in both the public and private sectors, aiming to accelerate Türkiye's early-to-intermediate stage of AI development and ensure the sustainable growth of its AI ecosystem.

National AI Policies and Strategies

Türkiye has taken significant steps to develop a national AI policy framework. The government recognizes the need for a coordinated strategy to harness the economic and social benefits of AI while addressing ethical, legal, and workforce-related challenges.

This section summarizes the National Artificial Intelligence Strategy (2021–25), the accompanying AI Action Plan (2024–25), and other relevant policy documents within Türkiye's AI policy framework. It discusses the strategy's vision, goals, priority areas, key policy measures, and institutional arrangements for implementation.

Türkiye's AI policy governance model is state-led and development-oriented. The country's policies are aligned with the ethical, trustworthy, and human-centered AI principles of the EU and the OECD while the policymaking process is shaped by national objectives and strategic priorities.

Türkiye's policy planning system is designed to ensure complementarity among long-term, medium-term, and annual strategies. The 12th Development Plan (2024–28) provides the country's overarching strategic framework while annual and thematic policy documents translate its priorities into concrete actions.

The National Artificial Intelligence Strategy (2021–25) is Türkiye's first and still active national AI plan. It was prepared under the coordination of the Presidency's Digital Transformation Office (CBDDO) and the Ministry of Industry and Technology, with the CBDDO's responsibilities transferred in 2025 to the Presidency Cybersecurity Directorate. The strategy aligns with the 11th Development Plan and the 2021 Presidential Annual Program, integrating the "Digital Türkiye" and "National Technology Initiative" visions into the national AI agenda.

The Medium-Term Program (2025–27) and the 2026 Presidential Annual Program serve as implementation tools for the 12th Plan, translating macro-level goals into annual actions. These documents envision the effective use of AI across key sectors, including justice, education, health, trade, agriculture, and defense.

The 2030 Industry and Technology Strategy presents a long-term roadmap integrating industrial transformation, the digital economy, and strategic technologies, such as AI, semiconductors, mobility, and energy.

National AI Strategy of Türkiye

The first iteration of Türkiye's National Artificial Intelligence Strategy was published in August 2021 under the coordination of the CBDDO. This office was later dissolved by Presidential Decree No. 183 and its cybersecurity and AI coordination functions transferred to the Presidency Cybersecurity Directorate and the Ministry of Industry and Technology. The strategy aims to ensure that by 2025, Türkiye becomes one of the countries deriving the greatest possible benefit from AI technologies and playing a leading global role.

Prepared in line with the Digital Türkiye and National Technology Initiative visions, the strategy defines six strategic priorities, 24 objectives, and 119 actions. Its overarching goal is to develop

Turkiye's human capital, enhance research and entrepreneurial capacity, improve access to data and infrastructure, implement ethical and legal frameworks, reinforce international cooperation, and accelerate structural transformation across the public and private sectors.

The first priority focuses on developing and employing AI experts. This includes opening or expanding AI programs at universities, establishing occupational standards to clarify AI-related roles and competencies, and implementing international talent-attraction schemes, such as TechVisa, to draw qualified professionals to Türkiye.

The second priority targets research and entrepreneurship. Under this pillar, the strategy aims to expand the number and capacity of AI-based start-ups through support programs operated by institutions, such as TUBITAK and KOSGEB, while also promoting R&D in areas of national relevance, including Turkish-language natural-language processing and generative AI.

The third priority addresses data and technical infrastructure as prerequisites for scaling AI adoption. The strategy proposes creating a Public Data Space and an open-data portal to improve access to data while also ensuring that researchers can use high-performance computing resources needed for advanced AI development and experimentation.

The fourth priority centers on ethics and regulation. Here, the strategy calls for building a trustworthy and accountable AI framework, with the intent of enabling faster and safer socioeconomic adaptation by clarifying responsibilities, expectations, and safeguards for AI deployment.

The fifth priority emphasizes international cooperation. This pillar aims to align Türkiye's approach with OECD and EU frameworks and to pursue joint projects through EU programs, positioning international collaboration as a tool for capability building, interoperability, and policy learning.

The sixth priority focuses on structural transformation through concrete deployment mechanisms. The strategy proposes establishing a Public AI Platform, creating sector-specific laboratories to support applied development, and scaling AI-based applications in public services, ensuring that AI adoption produces measurable improvements in how government operates and how services are delivered.

The strategy sets concrete targets to be achieved by 2025. These included increasing AI's contribution to GDP to 5%, creating 50,000 jobs, employing 1,000 AI experts in the public sector, and positioning Türkiye among the top 20 countries in global AI indices.

To reach these targets, the strategy establishes a robust institutional governance structure. Since 2019, Türkiye's AI ecosystem has been strengthened through new administrative and technical bodies. Within the CBDDO, the Department of Big Data and AI Applications was responsible for advancing AI adoption in the public sector, promoting data-driven decision-making, and coordinating open-data policies. Its responsibilities were transferred in 2025 to the Presidency Cybersecurity Directorate.

The Ministry of Industry and Technology's Directorate General of National Technology and Artificial Intelligence is responsible for developing policies and strengthening national capacity in critical areas, such as big data, AI, and cybersecurity. At the core of the scientific and technical ecosystem, the TUBITAK AI Institute plays a central role in research, talent development, and sectoral applications. In addition, several ministries, including Justice, Health, and National Defense, and some local administrations have established AI units. The Institute for Health Data Research and AI Applications within Health Institute of Türkiye (TUSEB) focuses on health-related data analytics and decision-support systems. This institutional framework reflects Türkiye's adoption of a multistakeholder, holistic approach to AI governance.

In conclusion, the National Artificial Intelligence Strategy (2021–25) occupies a central role in Türkiye's digital transformation process, with concrete actions, a strong governance structure, and measurable goals. It provides a comprehensive policy framework aimed at enhancing domestic technological capacity and leveraging AI for economic growth, competitiveness, and public-sector efficiency.

The strategy's implementation phase was operationalized through the National Artificial Intelligence Strategy Action Plan (2024–25), which encompasses over 70 actions across the six strategic priority axes. The plan focuses on areas, such as talent development (e.g., TechVisa and industrial PhD programs), research and entrepreneurship (e.g., Turkish large language model (LLM) and generative AI calls), data governance (e.g., establishment of a Central Public Data Space), ethics and legal frameworks (e.g., Trustworthy AI Label and Algorithmic Accountability Guideline), and AI awareness and literacy initiatives.

Action plans are reviewed and updated annually following a monitoring and evaluation process, ensuring that the strategy remains dynamic and responsive to emerging technological developments.

Through this adaptive framework, the strategy has evolved from a guiding policy document into an operational roadmap with measurable targets and a clearly defined implementation timeline.

Key Programs and Measures

The 12th Development Plan (2024–28)

The 12th Development Plan (2024–28) (Presidency of Strategy and Budget, 2023) defines the country's five-year national development vision and sets medium-term economic, social, and technological objectives. Prepared under the office of the Presidency of Strategy and Budget, the plan identifies AI as a strategic technology for Türkiye's economic and social development and positions it as a core component of the green and digital transformation. The plan considers AI not merely as a technology but as a horizontal policy domain that accelerates transformation across all sectors, from production to public administration.

The plan also acknowledges the potential challenges associated with AI, such as job displacement, ethical dilemmas, and risks of income inequality. It emphasizes the need for the systematic monitoring of AI's impacts and their alignment with national strategies. The National Artificial Intelligence Strategy (2021–25) is referenced as the key framework ensuring policy continuity in this area. Furthermore, the plan stresses that the rapid development of AI requires strengthening both national and international regulatory frameworks.

The plan sets out a series of goals intended to steer AI's transformative impact across the economy and public sector. A central theme is human capital and workforce transformation. It emphasizes lifelong learning and the expansion of upskilling and reskilling programs enabling workers to adapt to changing job roles and work models shaped by digital technologies. In practice, this also implies integrating AI- and data-oriented content into education curricula and placing greater emphasis on analytical and critical thinking as foundational skills.

In the area of justice and public administration, the plan calls for wider use of AI-assisted decision support systems within judicial processes, alongside stronger ethical and legal frameworks to govern their use. It also promotes the development of data-analytics-based decision mechanisms in public institutions, reflecting a broader goal of making public-sector decision-making more evidence-driven and responsive.

The plan also highlights sector-specific applications where AI is expected to generate concrete gains. In healthcare, it supports public–private partnerships aimed at developing AI-based medical devices and diagnostic technologies while also encouraging the establishment of smart supply chain systems to improve reliability and efficiency. In agriculture and food, it prioritizes digitalization and data-driven smart farming, with an emphasis on developing domestic software and equipment capabilities. It also identifies precision agriculture and biotechnology as key areas for agricultural R&D, suggesting a push toward higher productivity and more advanced innovation pathways in the sector.

Cybersecurity is treated as a strategic domain in its own right. The plan seeks to develop AI- and big data-based threat intelligence and cyber defense mechanisms. It also aims to strengthen the technical capacity of relevant security institutions so they can detect, prevent, and respond to evolving threats.

more effectively. In trade and e-export, the plan aims to help exporters access global markets by expanding AI-driven training platforms and by strengthening digital trade infrastructure. This positions AI as a tool to lower barriers and improve competitiveness in international commerce.

Beyond sectoral rollout, the plan underscores the importance of governance and enabling conditions. It calls for preparing regulations tailored to AI technologies and for strengthening international cooperation, implying that domestic capability building should proceed in parallel with alignment and partnerships abroad. It also links AI to improved monitoring and compliance, particularly in tackling informality. The proposal includes a public data-space infrastructure and AI-powered risk analysis systems to enhance the state's monitoring and control capacity.

Overall, the 12th Development Plan provides high-level strategic direction for Türkiye's AI agenda and complements the National AI Strategy by reinforcing core objectives, such as strengthening human capital, establishing ethical and legal standards, supporting R&D and innovation, and enabling cross-sector integration. In doing so, it frames AI not only as a technology policy concern but as a driver of development, productivity, and competitiveness, placing it among the key policy instruments shaping Türkiye's digital transformation.

Medium-Term Program (2025–27)

The Medium-Term Program (OVP) (Presidency of the Republic of Türkiye, 2024), coordinated by the Presidency of Strategy and Budget and the Ministry of Treasury and Finance, is updated annually and serves as the main framework for determining Türkiye's macroeconomic balance, investment priorities, and reform policies. The program is based on the priorities of the 12th Development Plan and defines AI as a strategic tool within the broader theme of digital transformation.

The OVP aims to accelerate Türkiye's transition toward a green and digital economy and to position technological transformation as a fundamental driver of sustainable growth. Within this framework, AI applications are regarded as critical instruments for enhancing efficiency across a wide range of domains, from public services and the defense industry to healthcare technologies and agriculture.

Aligned with the objectives of the National Artificial Intelligence Strategy, the program includes actions to strengthen R&D and innovation capacity, expand thematic research centers, improve access to data and computing infrastructure, prepare legislation consistent with the EU Artificial Intelligence Act, and promote the widespread adoption of AI-based sectoral applications. It also emphasizes developing qualified human capital in strategic fields, such as defense, cybersecurity, clean energy, and space technologies.

Overall, the OVP treats AI as a horizontal component of Türkiye's national transformation agenda. Through technological innovation, human-capital development, and regulatory reforms, it functions as a complementary policy instrument designed to enhance Türkiye's competitiveness in the digital economy.

2026 Presidential Annual Program

The 2026 Presidential Annual Program (Presidency of Strategy and Budget, 2025), aligned with the 12th Development Plan and the OVP (2025–27), functions as Türkiye's primary annual instrument for implementing national economic, social, and technological priorities. Prepared jointly by the Ministry of Treasury and Finance and the Presidency of Strategy and Budget, the program places AI at the center of digital transformation and data-driven public governance. It treats the strengthening of the digital state strategy, the expansion of data governance capacity within public institutions, and the adoption of ethical and trustworthy AI applications as core priorities.

A major emphasis of the program is digital government and institutional transformation. It presents a vision of public digital services that are holistic, user-centered, and participatory, and it proposes the development and implementation of a Digital Government Strategy and Action Plan to clarify Türkiye's overall digital transformation direction. In addition, it calls for the design of a Corporate Digital Transformation Maturity Model, intended to measure digital transformation across public institutions and guide further reforms based on consistent benchmarks.

The program also advances a data governance and infrastructure agenda designed to make public sector data a foundation for high-value creation. It proposes preparing a National Data Strategy and Action Plan and strengthening interagency data-sharing mechanisms, alongside improvements to open-data infrastructures. As part of this effort, the Data Governance Working Group is tasked with preparing a report that includes needs assessments and policy recommendations, with a focus on expanding advanced analytics and AI applications across government.

Ethical and trustworthy AI is positioned as a practical requirement for public sector adoption rather than a purely aspirational principle. The program highlights ethical standards, transparency, and data security in the deployment of AI within public services, and it calls for applying trustworthy AI principles to AI systems developed or procured by public institutions. It also proposes establishing a certification mechanism for AI governance systems while emphasizing measures to protect personal data and strengthen cybersecurity standards.

Overall, the 2026 Presidential Annual Program frames AI as a strategic lever for Türkiye’s digital transformation. It aims to reinforce the institutional infrastructure of the digital state, expand data-driven decision-making across public administration, and build an ethics-based AI ecosystem. In doing so, it positions itself as a comprehensive policy framework aligned with the National Artificial Intelligence Strategy (2021–25) and the broader Green and Digital Transformation Agenda.

2030 Industry and Technology Strategy

The 2030 Industry and Technology Strategy, prepared by the Ministry of Industry and Technology (2025a), is Türkiye’s primary strategic document defining its industrial vision for 2030. It integrates industrial policy, technology development, and innovation within a single framework. The strategy positions AI at the core of Türkiye’s digital transformation and high-technology advancement agenda.

Through the TUBITAK BILGEM AI Institute, the strategy aims to foster collaboration between the public sector, academia, and industry, promoting the development of AI-based solutions across key domains, such as finance, manufacturing, agriculture, and education. The Turkish Large Language Foundation Model Project, led by the Institute, seeks to enhance Türkiye’s technological independence by developing generative AI models tailored to the Turkish language.

The strategy also targets the establishment of advanced computational and data infrastructures, including the MareNostrum 5 supercomputer and the BSC AI Factory, to provide researchers with high-performance computing resources. It further envisions the creation of a Public Data Space and open-data ecosystems to enable more effective use of public sector data.

In addition, the strategy emphasizes the creation of regulatory frameworks for the safe, ethical, and fair use of AI, and the strengthening of national policy mechanisms to address deepfake and disinformation risks. It also aims to reinforce Türkiye’s technological sovereignty by expanding national R&D capacity in emerging domains, such as quantum technologies and semiconductor production.

AI-related projects in Türkiye are funded through various programs implemented by the Ministry of Industry and Technology, TUBITAK, KOSGEB, Development Agencies, and the Presidency Cybersecurity Directorate. However, as these expenditures are integrated within broader R&D and digital-transformation budgets, specific financial data on AI-related policies are not publicly disclosed.

Key Stakeholder Mapping

Türkiye’s AI ecosystem spans government strategy and implementation bodies, research funders and institutes, universities, large enterprises, start-ups, and sector associations. The ecosystem is anchored by the Ministry of Industry and Technology as the central technology and industrial policy actor, TUBITAK as the primary R&D funding and applied research institution, and presidency-level coordination structure responsible for digital transformation, cybersecurity, and AI policy alignment.

Private Sector

Turkiye's private sector drives most large-scale AI deployment, particularly in telecommunications, finance, manufacturing, and defense. Large enterprises lead adoption in core operations while start-ups provide specialized solutions, and technoparks and ecosystem platforms support commercialization, talent matching, and diffusion.

Major Players

Turkcell

Turkcell integrates AI into network operations and customer-facing digital services, using AI-enabled tools to improve service delivery and operational efficiency. The company also acts as an adoption channel for AI applications that require large-scale connectivity and data-driven service management.

Turk Telekom

Turk Telekom deploys AI in network optimization and customer service automation, positioning telecommunications infrastructure and customer interaction as early, high-impact adoption domains for AI.

Isbank

Isbank applies AI to financial risk analysis, customer analytics, and operational automation, reflecting the banking sector's focus on efficiency, security, and improved decision-making in high-volume environments.

Akbank

Akbank uses AI for risk management and customer relationship management, strengthening digital banking workflows and expanding automated analytics across core financial services.

Arcelik

Arcelik deploys AI for predictive maintenance, quality control, and production optimization, applying machine vision and analytics to reduce downtime and improve manufacturing consistency.

Ford Otosan

Ford Otosan uses AI in industrial operations, particularly for predictive maintenance and production-line quality processes, reinforcing AI's role in productivity and reliability improvements in automotive manufacturing.

ASELSAN

ASELSAN develops AI-enabled capabilities for defense applications, including intelligent systems and advanced sensing and image processing functions that support autonomous and decision-support use cases.

HAVELSAN

HAVELSAN develops AI-based systems for defense and security domains, including intelligent software and decision-support capabilities that strengthen operational performance in complex environments.

Roketsan

Roketsan develops AI-enabled technologies for defense systems, contributing to Türkiye's applied AI capacity in high-reliability, mission-critical contexts.

Baykar

Baykar develops AI-enabled autonomous and semiautonomous systems, positioning defense as one of Türkiye's most visible applied AI development pathways.

Koc Holding

Koc Holding coordinates group-level digital transformation initiatives, guiding enterprise AI adoption through internal transformation structures and strategic implementation across portfolio companies.

Sabancı Holding

Sabancı Holding advances enterprise AI deployment through dedicated digital transformation initiatives, supporting scaled adoption and organizational integration of AI across business units.

Microsoft, Google, and IBM

Global technology companies support Türkiye's AI ecosystem through cloud-based AI services, developer tools, training programs, and start-up enablement, expanding access to scalable infrastructure and implementation resources for both enterprises and smaller firms.

Others***Start-ups***

Türkiye's start-up ecosystem includes firms, such as Insider, Artiwise, Falcon AI, Tazi.ai, CBOT, Virasoft, Tarla.io, and Sensemore, which develop applied AI solutions across marketing, customer engagement, healthcare, finance, agriculture, and industrial monitoring. Many of these firms commercialize through technopark-based incubation and benefit from public funding instruments, including TUBITAK-linked support.

Technoparks and Semi-public Innovation Hubs

METU Technopolis, ITU ARI Technopark, and Teknopark Istanbul provide infrastructure, commercialization support, and networks that help start-ups and corporate innovation teams move from R&D to market deployment.

Ecosystem Platforms and Business Associations

The TRAI convenes stakeholders through ecosystem mapping, working groups, and summits that connect private-sector demand with suppliers, talent, and policy forums. Business associations, such as TUSIAD and TOBB support SME digital transformation and encourage AI diffusion into business processes through advocacy and coordination.

Core Products and Services

Private-sector AI activity concentrates on customer-facing automation and personalization in telecommunications and finance, industrial optimization in manufacturing through predictive maintenance and machine vision-based quality control, and applied AI development in defense, including autonomous and intelligent systems. Across these domains, private firms also deliver enabling services, such as AI integration, analytics and decision-support systems, conversational interfaces, and sector-specific automation products.

Public Sector and Parastatals

Türkiye's public and quasi-public institutions set the national direction for AI through strategy, funding, regulation, and digital transformation programs. Public institutions also act as anchor adopters by integrating AI into education, health, justice, security, and statistical systems while regulators shape responsible deployment through privacy and competition oversight.

Major Players

Ministry of Industry and Technology

The Ministry of Industry and Technology leads national technology policy and industrial development and coordinates the preparation and implementation of the National AI Strategy and related action planning. It oversees Türkiye's technopark and R&D center network and supports innovation funding through affiliated mechanisms, including TUBITAK programs. The ministry also played a central role in establishing the National AI Institute under TUBITAK's umbrella. Under Presidential Decree No. 191, the Ministry's Directorate General of National Technology was renamed the Directorate General of National Technology and Artificial Intelligence. Accordingly, the Ministry's coordination role in AI policy and capacity-building was strengthened and its mandate was expanded (Presidency of the Republic of Türkiye, 2025a).

Digital Transformation Coordination Office

Established in 2018, the Presidency's Digital Transformation Office coordinated national digital transformation, cybersecurity, and AI policy alignment, co-led the National AI Strategy, and chaired the National AI Steering Committee to align public institutions with strategic goals. Following Presidential Decree No. 183, these functions were transferred to the Presidency Cybersecurity Directorate, which assumed responsibility for cybersecurity and AI coordination (Presidency of the Republic of Türkiye, 2025b). Under Presidential Decree No. 192, the Directorate General of Public Artificial Intelligence was established under the Presidency's Directorate of Cybersecurity to strengthen governance and coordination of AI in the public sector, including regulatory and policy-support functions for the use of AI in government (Presidency of the Republic of Türkiye, 2025c).

TUBITAK (Scientific and Technological Research Council of Türkiye)

Founded in 1963, TUBITAK is Türkiye's principal science and technology institution and the primary public engine for AI R&D funding and program implementation. It funds AI-related projects across universities and industry through instruments, such as the 1001 Scientific Research Projects Program and Technology and Innovation Support Programs Directorate (TEYDEB). TUBITAK also provides technical capacity through specialized centers, including its Informatics and Information Security Research Center (BILGEM) for applied technology development in areas, such as cybersecurity and defense and National Academic Network and Information Center (ULAKBIM) for national research infrastructure, including supercomputing capacity.

TUBITAK AI Institute

Established in 2021, the TUBITAK AI Institute conducts applied AI research and strengthens academia–industry collaboration, supporting translation of research into deployable systems and ecosystem programs.

Others

Ministry of National Education (MoNE)

MoNE advances AI literacy and workforce preparation by updating curricula and vocational training programs and deploying AI-enabled tools to support digital learning and administrative processes.

Ministry of Health

The Ministry of Health deploys AI-enabled decision support systems and medical image analysis tools and integrates AI into national digital health services to improve diagnostic and treatment workflows.

Ministry of Interior

The Ministry of Interior deploys AI-enabled systems to improve operational efficiency and public safety service delivery across policing and citizen support functions.

Ministry of National Defense and the Presidency of Defense Industries (SSB)

These institutions support AI development and adoption through defense-sector programs aligned with the National Technology Initiative, accelerating AI-enabled capabilities in autonomous systems and advanced sensing and image processing.

Ministry of Justice

The Ministry of Justice develops and deploys AI-enabled systems to reduce judicial workload and improve case processing efficiency, including AI-supported routing and prioritization tools linked to the national judicial informatics platform.

Turkish Statistical Institute (TurkStat)

TurkStat functions as both a strategic data provider and an institutional adopter. It uses AI tools in statistical processes and supplies datasets that support AI model development and evidence-based policy analysis, including surveys that track sectoral AI adoption.

Personal Data Protection Authority (KVKK)

KVKK provides privacy and data protection oversight that shapes responsible AI deployment and trust in data-intensive applications across both public and private sectors.

Competition Authority

The Competition Authority enforces market fairness and competition principles that influence how AI-enabled services and platform-based deployments evolve, supporting responsible growth of AI markets.

Academia and Research

Universities provide Türkiye's talent pipeline and core research capacity for AI, data science, and machine learning. Leading institutions run undergraduate-to-doctoral programs and maintain specialized labs and research centers that increasingly translate into applied collaborations with industry and public-sector partners.

Major Players***Bilkent University***

Bilkent University contributes AI research and training through specialized programs and research centers, supporting both talent formation and applied research outputs.

Middle East Technical University (METU)

METU is a central node in Türkiye's AI talent and research ecosystem and strengthens commercialization pathways through METU-linked innovation infrastructure and industry collaborations.

Bogazici University

Bogazici University advances AI research and education, including specialized work in areas, such as natural language processing (NLP) through dedicated laboratories.

Koc University

Koc University supports AI research and application through specialized AI centers and industry-linked research projects, including TUBITAK-funded collaboration pathways.

Istanbul Technical University (ITU)

ITU contributes AI research and technical training and supports commercialization through ITU ARI Technopark and related innovation networks.

Hacettepe University

Hacettepe University is a major contributor to AI training and research and is associated with applied collaborations that link universities, healthcare institutions, and technology firms.

Sabancı University

Sabancı University contributes to AI research and talent development through interdisciplinary programs and applied research collaborations with industry.

Bahcesehir University

Bahcesehir University supports AI engineering education and applied research, contributing to the expansion of specialized AI training pathways.

Ecosystem Events and Professional Associations

National conferences, such as IDATA and Turkish Symposium on Artificial Intelligence and Neural Networks (TAINN) convene researchers and practitioners, supporting coordination across the AI community. Professional bodies, such as the Informatics Association of Türkiye (TBD), strengthen knowledge sharing and stakeholder coordination.

Ecosystem Dynamics

Türkiye's AI ecosystem is organized around sustained interaction among public funding and coordination, university research and talent development, and private sector deployment and product development. TUBITAK funding instruments connect universities and firms through applied R&D projects while technoparks provide commercialization infrastructure and access to networks. National platforms, such as TRAI and large-scale innovation events, like TEKNOFEST, connect government, academia, and industry through programs that promote adoption, showcase applied solutions, and strengthen youth engagement in AI and advanced technologies. International collaboration channels include participation in European research frameworks, such as Horizon Europe and engagement in multilateral knowledge exchange through initiatives associated with Global Partnership on Artificial Intelligence (GPAI) and OECD AI workstreams.

Strategic Positioning and Recommendations

Analyzing the strengths, weaknesses, opportunities, and threats (SWOT) of Türkiye's AI ecosystem provides insight into both internal and external factors shaping its development. Internal factors highlight the areas in which Türkiye performs well or faces challenges while external factors reveal potential opportunities and future risks.

This strategic positioning assessment identifies Türkiye's competitive advantages to be leveraged, obstacles that must be overcome, emerging global trends that can be capitalized on, and risks that need to be mitigated to sustain long-term growth in AI.

The SWOT analysis is based on the evidence and contextual findings presented in the preceding sections, combined with additional strategic and environmental considerations.

SWOT Analysis

Strengths

i) Policy and strategic vision

One of Türkiye's primary advantages in AI is the strong strategic vision established at the highest levels of government. The coordination of the National AI Strategy through relevant Presidential bodies, along with TUBITAK's funding programs, has created strong governance and institutional ownership. This demonstrates that AI is not treated as a temporary agenda item but as a national priority within Türkiye's long-term digital transformation framework.

ii) Defense industry expertise

In recent years, Türkiye's technological capabilities in the defense industry have become a strategic source of strength for its AI ecosystem. Technologies developed in areas, such as autonomous vehicles, radar image processing, electronic warfare systems, and sensor networks provide a solid foundation for high-value-added AI applications in civilian sectors, such as agriculture, transportation, energy, and healthcare.

Analyses by Kasapoğlu (2022) and Bozbaş (2025) emphasize that Türkiye's AI-based defense technologies are dual-use, enabling the transfer of know-how and innovation to the civilian economy. This experience not only supports defense technology exports but also accelerates the maturation of domestic AI infrastructure, contributing to nationwide innovation capacity and technological autonomy.

iii) Young and dynamic talent pool

Türkiye's young and dynamic population, supported by an expanding number of university programs, hackathons, and technology competitions, provides strong potential for learning and practical application in AI. High societal interest in technology and an entrepreneurial mindset creates favorable conditions for the commercialization of innovative ideas.

According to data from the Stanford University Institute for Human-Centered AI (2024), Türkiye ranks among the top three European countries in terms of graduates in computer science, engineering, and information technology, offering a significant human-capital advantage for the AI ecosystem.

iv) Digital infrastructure

Türkiye possesses a strong digital foundation, characterized by extensive internet and mobile penetration and a highly developed e-government infrastructure, which facilitates rapid deployment of AI applications (OECD, 2023b; Usta & Bilici, 2022). High levels of adoption in automation, robotics, and digital banking indicate that Türkiye's infrastructure is well positioned for technological transformation and integration with AI.

v) Entrepreneurial ecosystem

The start-up ecosystem centered in Istanbul has demonstrated rapid growth, particularly in gaming, fintech, and e-commerce sectors (Invest in Türkiye, 2024a). The increase in AI-based start-ups and the emergence of unicorns illustrate the private sector's dynamism and innovation capacity.

Moreover, large-scale enterprises in traditional sectors, such as automotive, finance, and electronics are investing in R&D and forming partnerships with start-ups, fostering a strong environment for AI-driven innovation. For instance, defense companies, such as ASELSAN stimulate local innovation by creating a domestic market for advanced AI applications, like autonomous systems and radar image analysis.

Technoparks and incubation centers spread across Türkiye, from Istanbul to the Anatolian cities, help decentralize innovation and activate diverse regional talent pools, strengthening the inclusivity of the ecosystem.

vi) **International positioning**

Türkiye's geostrategic location between Europe and Asia, coupled with its membership in international networks, such as the OECD, GPAI, and the APO, enables multilateral cooperation in AI research and policy. In addition, Türkiye's ongoing alignment with EU standards facilitates the international acceptance and competitiveness of its AI products in global markets.

Weaknesses

i) **Talent gap and brain drain**

Despite growing educational capacity, the number of industry-ready AI professionals in Türkiye remains limited, and brain drain is a major drag on the country's prospects, as graduates in engineering, computer science, and AI-related disciplines leave the country at ever-higher rates. According to TurkStat (2023a), between 2021 and 2023, approximately 2% of university graduates were residing abroad long-term, with higher rates among graduates in high-technology fields.

The migration of experienced researchers and PhD-level experts creates a lasting gap in the national ecosystem. Survey data show that nearly 74% of firms identify the lack of qualified experts as the primary barrier to AI adoption (TurkStat, 2025), further underscoring Türkiye's talent shortage.

ii) **R&D and funding constraints**

Türkiye's R&D expenditure as a share of GDP remains well below that of advanced economies. The R&D-to-GDP ratio stands at 1.42%, significantly lower than the OECD average of 2.7%, indicating a persistent funding gap (OECD, 2025a). Although the start-up ecosystem experienced a surge in investment volume in 2024, the fragmented structure of funding mechanisms and the limited resources allocated to high-cost model development continue to hinder Türkiye's full potential in research-intensive domains, such as AI (KPMG, 2024).

iii) **Data challenges**

Although the volume of data in Türkiye is increasing rapidly, data silos, quality inconsistencies, and limited sharing remain major obstacles to scaling AI projects. The lack of effective interagency data-sharing mechanisms leaves most large datasets isolated within institutional boundaries (Şahbaz, 2019).

In the field of Turkish natural language processing (NLP), similar constraints persist: available corpora, labeled datasets, and pre-trained models remain less developed than those in English (Altınel Girgin et al., 2024; Coltekin, 2023).

Low digitalization levels in sectors, such as agriculture and manufacturing further restrict data-driven innovation. Moreover, Türkiye has yet to establish an institutional data-monitoring mechanism capable of systematically tracking AI-related R&D spending. Collectively, these structural limitations constrain the country's capacity to develop domestic AI models.

iv) **Regulatory uncertainty**

Türkiye has not yet established a comprehensive legal framework for AI. Existing regulations include only limited provisions specifically addressing AI systems, and many obligations remain unclear (Yönt, 2024).

Such regulatory uncertainty poses risks for companies and complicates start-ups scaling, particularly in public procurement contexts. The application of data protection laws (e.g., KVKK) without clear implementation guidelines has made many firms hesitant to use data resources extensively.

v) Digital divide

Technology and innovation activities in Türkiye remain highly concentrated in major cities, such as Istanbul and Ankara, while SMEs in Anatolian regions lag in digital maturity. This regional imbalance limits AI's potential to generate broad-based economic impact.

Public awareness and trust in AI remain limited. AI adoption by SMEs is below 5%, and represents one of the ecosystem's most critical weaknesses.

vi) External dependence

AI research and development in Türkiye remain dependent on external resources for data storage, model training, and computational capacity. At the geopolitical level, global supply chain fluctuations and semiconductor shortages may indirectly affect Türkiye's progress in AI (OECD, 2023a).

Although TUBITAK ULAKBIM's TRUBA system has reached a capacity of 312 GPUs, Türkiye continues to rely heavily on foreign suppliers for GPUs, high-performance computing (HPC), and cloud infrastructure. This dependency creates vulnerabilities to geopolitical risks and supply constraints, posing a significant challenge for long-term AI resilience.

Opportunities

i) Leveraging international partnerships and funding programs

Through cooperation with platforms, such as the APO, European Union programs Horizon Europe, Digital Europe, GPAI, and the OECD, Türkiye can access international funding, expertise, and knowledge transfer opportunities. In addition, foreign investment by global technology companies provides an avenue to strengthen Türkiye's research and innovation ecosystem.

ii) AI in manufacturing and export industries

AI adoption in the country's major export sectors (automotive, electronics, and textiles) can enhance efficiency, quality control, and supply chain optimization, thereby boosting Türkiye's global competitiveness. With its strong industrial base and growing automation, Türkiye has the potential to achieve regional leadership in Industry 4.0.

Government support for smart factories and accelerated robotization further reinforces the country's potential to serve as a regional model for AI-driven industrial transformation.

iii) Untapped data potential and localized AI solutions

Unique datasets in the Turkish language and local sectors (e.g., agriculture, healthcare) present opportunities for developing domestic AI solutions. Localized applications have commercial potential in both the domestic market and culturally or geographically similar regions.

The government's goal of developing Turkish LLMs represents an opportunity to develop AI tools tailored to local linguistic and contextual needs, particularly in domains where foreign models face limitations, such as Turkish legal texts and historical documents.

In healthcare, AI models trained on local population data, such as including genetic and lifestyle characteristics, can deliver more accurate and relevant outcomes than imported systems. Such

localized applications could also be exported to markets in Central Asia and the Middle East, where linguistic and demographic similarities create natural synergies.

iv) Youth population and start-up dynamism

With an average age of around 32, Türkiye has a young, adaptable population well positioned to adopt emerging technologies. The country's strong entrepreneurial culture and growing participation of youth in hackathons, technology festivals (e.g., TEKNOFEST), and start-up ventures are accelerating AI-driven innovation.

Success stories among Turkish unicorns further stimulate the ecosystem while the ability to develop and test products rapidly and at relatively low cost strengthens Türkiye's competitiveness in the AI start-up landscape.

v) Regional leadership in AI ethics and standards

Türkiye has the potential to become a regional leader in AI ethics, safety, and transparency by establishing a robust and trustworthy governance framework. Alignment with EU and OECD standards would not only build trust among users and institutions but also facilitate international market acceptance of Turkish AI products.

Given that global AI governance mechanisms are still evolving, Türkiye has an opportunity to shape regional norms and standards. For instance, by developing a strong framework for AI safety and reliability, Türkiye could serve as a model for neighboring countries that have yet to formalize their own regulatory frameworks.

Threats

i) Intensifying global competition

The growing investments of major global actors, such as the US, PR China, and the EU increase the risk that Türkiye will fall behind in the global AI race. If these countries continue to dominate research output and patent generation, Türkiye may face challenges in maintaining originality and competitiveness in innovation.

The rapid expansion of cloud-based AI services by global tech giants could constrain the growth potential of local firms. In domains, such as autonomous vehicles and robotics, early market dominance by foreign players could limit Türkiye's ability to capture market share. This competitive pressure, combined with brain drain and rising costs for critical computing resources, poses a significant constraint on Türkiye's long-term AI capacity.

ii) Economic and political instability

AI investments require a stable macroeconomic and political environment. In Türkiye, currency volatility and high inflation rates risk reducing both public budgets and private-sector investment capacity. Political changes or bureaucratic restructuring could disrupt the continuity of AI policy implementation.

Moreover, geopolitical tensions may impede international collaboration and restrict access to advanced technologies, including semiconductors and high-end chips. These factors can indirectly slow down AI project development and implementation across key sectors.

iii) Ethical, social, and workforce challenges

Rising levels of automation may lead to job displacement among low-skilled workers, potentially exacerbating social inequality and fueling public resistance to AI. Risks, such as deepfakes, fraud, and disinformation threaten public trust.

Bias or algorithmic errors, particularly in sensitive areas, such as healthcare, can result in serious harm and legal liabilities. If these ethical and social risks are not effectively managed, they could undermine both the social acceptance and sustainability of AI in Türkiye.

iv) Cybersecurity and reliability risks

AI systems are increasingly vulnerable to cyberattacks. The hacking of AI systems used in critical infrastructure, or excessive dependence on foreign cloud providers poses security and continuity risks.

Failure to update AI models regularly can lead to accuracy degradation, especially in high-stakes domains, such as finance and healthcare, resulting in both financial and social harm. Without strong cyber defense capabilities and the development of domestic AI security solutions, these vulnerabilities could pose serious national risks for Türkiye.

v) Superficial AI initiatives undermining investor confidence

Some start-ups in Türkiye seek funding or visibility by labeling themselves as “AI-based” without possessing genuine technological capabilities. The absence of robust technical verification mechanisms and the prevalence of hype-driven market dynamics erode investor confidence and push qualified, research-intensive ventures to the margins.

Such superficial initiatives risk distorting the AI investment landscape and undermining the credibility of the broader ecosystem.

Summary

Türkiye’s SWOT profile shows an AI ecosystem with clear scaling potential, built on: (i) strong top-level policy intent; (ii) a capable defense industrial technology base with civilian spillovers; (iii) a young and expanding talent pipeline; and (iv) robust digital infrastructure and entrepreneurship anchored in Istanbul’s start-up ecosystem (Bozbaş, 2025; Invest in Türkiye, 2024a; Kasapoğlu, 2022; OECD, 2023b; Stanford University Institute for Human-Centered AI, 2024; Usta & Bilici, 2022). The main constraints are structural: (i) persistent talent gaps and brain drain; (ii) R&D and funding intensity below advanced economy benchmarks; (iii) data quality and sharing bottlenecks that limit domestic model development; (iv) regulatory uncertainty that slows scaling; (v) a pronounced regional digital divide, with SME adoption below 5%; and (vi) continued reliance on foreign compute and cloud resources despite expanding national capacity (Altinel Girgin et al., 2024; Coltekin, 2023; KPMG, 2024; OECD, 2023a; Şahbaz, 2019; TurkStat, 2023a; 2024a; Yönt, 2024).

The opportunity set centers on : (i) partnerships and funding platforms; (ii) accelerating AI deployment in export-oriented manufacturing under Industry 4.0 pathways; (iii) building localized Turkish-language and sector-specific AI solutions, including Turkish LLMs; and (iv) positioning Türkiye as a regional leader in AI ethics and standards through alignment with EU and OECD frameworks. Key risks stem from: (i) intensifying global competition and platform dominance by major powers and global tech firms; (ii) macroeconomic and geopolitical instability that could disrupt investment and access to critical chips, ethical and labor market pressures that could weaken public trust; (iii) rising cybersecurity and reliability threats in critical domains; and (iv) hype-driven “AI washing” that can undermine investor confidence and distort the ecosystem’s capital allocation.

Future Needs and Collaboration Pathways

Domestic Priorities

Labor

Turkiye's most binding constraint is the shortage of AI professionals who can translate theory into industry-ready practice. University programs should place greater weight on mandatory internships, industry collaboration projects, and hands-on modules to produce job-ready graduates. Interdisciplinary programs co-designed with sectors, such as healthcare, manufacturing, and finance can help graduates build applied problem-solving capabilities and strengthen employability in the AI labor market. Workforce reskilling needs to scale through public–private programs designed with industry and supported by government funding, with priority for IT professionals and workers in automation-prone occupations.

To reduce barriers for SMEs and start-ups, shared expert pools and publicly supported advisory mechanisms can broaden access to expertise in AI ethics, data governance, and social impact. AI literacy programs for decision-makers in government, business, and civil society should be institutionalized to improve policy capacity and risk management. Complementary population-level evidence underscores the urgency of inclusive AI literacy, as OECD (2025c) data point to a pronounced age gap in Türkiye's use of generative AI. Therefore, scalable AI literacy and lifelong learning programs that target adult and older cohorts (e.g., modular training, on-the-job learning, local training centers, and online/blended delivery) should be implemented and scaled through coordinated government–private sector–civil society partnerships.

R&D and Innovation Capacity

Turkiye's shift from dependence on imported AI technologies toward innovation leadership requires stronger R&D intensity and clearer prioritization of strategic domains. Public R&D expenditure should increase gradually, with a defined portion dedicated to AI. TUBITAK and related institutions can expand AI-focused grants while the private sector can be incentivized through tax instruments and faster, more digitalized grant administration. Long-term flagship projects developed through university–industry partnerships can serve as commercialization anchors, including use cases, such as autonomous systems and smart agriculture.

Compute and Data

Turkiye should establish national high-performance computing (HPC) capacity to reduce reliance on commercial cloud services. Domestic model development also requires large-scale open datasets, including medical imaging, agricultural satellite data, and Turkish-language labeled corpora. A National Open Data and AI Resource Platform, aligned with broader digital transformation objectives, can improve data accessibility and support collaborative innovation.

Embodied AI and Robotics

Turkiye's manufacturing and defense-industry base provides a competitive pathway in embodied AI, defined here as AI-integrated robotics and physical systems. Strategic investment can improve productivity, quality control, and cost efficiency in manufacturing while strengthening technological sovereignty in defense, logistics, and industrial automation. A focused push in embodied AI can also create export-oriented opportunities in advanced industrial technologies.

Governance and Standards

AI adoption at scale requires improved data accessibility, higher data quality, and stronger governance capacity. Strategic public datasets, including anonymized health statistics, traffic data, and agricultural data, can be released more systematically to stimulate innovation. In the private sector, sectoral data partnerships and data trust arrangements can support responsible sharing in noncompetitive domains, such as agriculture and manufacturing while protecting commercial interests. Under the Personal Data Protection Law (KVKK), technical guidelines tailored to AI systems can clarify privacy requirements. The law can also offer incentives for privacy-preserving techniques, such as federated learning, to

support sensitive data use cases. AI-ready data standards should be developed to improve interoperability across institutions and sectors, particularly in healthcare, transportation, and energy.

SME Adoption and Diffusion

Widespread SME adoption will determine Türkiye's productivity impact from AI. Digital transformation vouchers, implemented through collaboration between the Ministry of Industry and Technology and KOSGEB, are positioned as mechanisms to help SMEs access AI solutions and consulting services, particularly given the large share of SMEs in Türkiye's enterprise base (TurkStat, 2023b). Test and demonstration capacity can be expanded through AI test and demonstration centers embedded in existing model factory infrastructure, enabling low-risk experimentation and applied process optimization. Sectoral consortia led by TUBITAK and relevant ministries can codevelop open source solutions and best-practice guides for domains, such as smart manufacturing and precision agriculture. Public procurement can support diffusion through a catalog of domestic AI solutions and appropriately designed tender mechanisms that strengthen domestic providers.

Ethics and Regulation

A trustworthy AI ecosystem requires a strong ethical and legal foundation. Türkiye can finalize a risk-based national AI regulation aligned with the European Union AI Act, clarifying transparency and human oversight requirements for high-risk systems and defining legal liability for system errors and harms. Independent oversight capacity can be strengthened through a National AI Ethics Board with representation from academia, industry, and civil society, supported by a certification mechanism, such as an AI trustmark. Workforce transition management should be assigned clear responsibility, with reskilling programs for displaced or transformed roles and incentives that encourage retraining rather than layoffs.

Ecosystem Monitoring and Performance Tracking

To improve accountability and evidence-based adjustments, Türkiye should publish regular statistics on AI firms, including R&D expenditures, expert employment, and sectoral activity. Progress against national targets should be tracked and reported using clear performance indicators, such as publications, patents, and commercialized products, reinforcing results-oriented funding and encouraging broader private-sector participation.

Collaboration Opportunities

Local Perspective

i) University–industry partnerships and commercialization pathways

Domestic collaboration should prioritize applied commercialization through university–industry partnerships, technopark linkages, accelerators, and venture funding that connect research outputs to markets. AI Factory-style models and model factory infrastructure can provide practical diffusion channels, especially for SMEs, by packaging solutions, implementation support, and demonstration environments.

ii) Shared expertise for SMEs and responsible deployment

To reduce adoption barriers for smaller firms, shared expert pools and advisory mechanisms can expand access to ethics, governance, and impact expertise. This can complement voucher-based demand stimulation and help SMEs implement AI responsibly without requiring full in-house governance capacity.

Global Perspective

i) Strategic partnerships and policy learning

Türkiye can strengthen policy and implementation capability through structured knowledge exchange with leading AI economies, including Japan and the Republic of Korea, supported

through platforms, such as the APO and the OECD. Observation missions and policy exchange programs can accelerate learning on governance design, productivity-oriented adoption, and diffusion mechanisms.

ii) Multinational R&D and standards participation

TUBITAK can expand participation in multinational R&D projects, including those under the EU Horizon Europe program, to raise scientific visibility and support globally competitive solution development in areas, such as agriculture, health, and climate. Universities and the Council of Higher Education (YOK) can scale international exchanges that place graduate students in global laboratories and centers of excellence. The Turkish Standards Institution (TSE) can also play a more active role in international AI standards development to reinforce interoperability and global compliance pathways.

APO Joint Initiatives

i) Policy exchange and implementation learning program

The APO can support structured exchange programs and observation missions with selected member economies to transfer implementation knowledge in AI governance, productivity-centered adoption, and SME diffusion models.

ii) APO-aligned open data and AI resource platform collaboration

Turkiye can align a National Open Data and AI Resource Platform with APO digital transformation objectives, enabling shared methods for dataset governance, access protocols, and collaborative innovation practices.

iii) Model factory-based SME demonstration program

Turkiye can partner with the APO to operationalize demonstration projects through model factories and test centers, translating applied AI use cases into replicable SME adoption playbooks and training modules.

iv) Embodied AI collaboration track

Turkiye can propose an APO collaboration track on embodied AI and industrial robotics, leveraging Turkiye's manufacturing strengths while pooling applied testing, safety practices, and sector deployment knowledge across member economies.

CHAPTER 15

VIETNAM

Each member economy is assessed through a common analytical framework covering five core dimensions: (i) ecosystem baseline; (ii) policy and strategy; (iii) stakeholder landscape; (iv) strategic positioning; and (v) future pathways. This structure enables consistent cross-economy comparison while allowing for context-specific insights into how AI capabilities are developed, governed, and applied in practice.

AI Ecosystem Baseline Assessment

AI Adoption in Vietnam

In Vietnam, AI has emerged as a key driver of digital transformation and economic growth, with adoption accelerating across Vietnamese businesses and society. In 2024 alone, approximately 47,000 Vietnamese businesses adopted AI solutions, which equates to roughly five new AI adopters every hour. As a result, 18% of Vietnamese businesses had adopted AI by 2024, up from 13% in the previous year, representing a 39% year-on-year increase (VietnamPlus, 2025). This surge reflects strong AI investment and a broader shift toward automation and data-driven tools. Surveys also show that around eight in 10 Vietnamese enterprises have experimented with AI within a 12-month period. This figure exceeds the regional average of approximately 69%, highlighting a highly receptive market. On the consumer side, the use of AI is becoming mainstream: 78% of Vietnamese internet users report using at least one AI platform in the past three months, with one-third of all users reporting daily AI use (National Innovation Center [NIC], 2025). This widespread adoption, from enterprise use in seeking efficiency to consumers application, such as AI assistants, indicates that AI has become embedded in daily life in Vietnam.

Vietnam's AI market and economic potential are likewise expanding. In 2022, the Vietnamese AI market was valued at about USD470 million; it is projected to soar to USD1.52 billion by 2030 (Vietnam News, 2024). This reflects rising investor confidence, supported in part by government efforts to position AI as a new engine of economic growth. According to Google projections, if AI technologies are broadly adopted, they could contribute as much as VND1,890 trillion (~USD79 billion) to Vietnam's GDP by 2030, accounting for roughly 12% of the economy.

Early evidence of AI's economic impact is promising: over 60% of AI-adopting businesses report increased revenues (averaging 16%) and significant cost savings (Organisation for Economic Co-operation and Development [OECD], 2023). However, most firms continue to use AI at a basic level, primarily for process automation rather than innovation. This indicates significant headroom for AI to deliver greater economic value.

AI R&D and Investment in Vietnam

Vietnam has also made notable strides in AI research and innovation. Between 2010 and 2018, Vietnamese researchers produced nearly 2,500 AI-related publications, ranking Vietnam fifth among ASEAN countries in terms of AI research volume. In terms of intellectual property (IP), Vietnam filed 372 AI patent applications during that period, ranking second among the Association of Southeast Asian Nations (ASEAN) countries after Singapore. Vietnam's global standing in AI readiness has likewise improved: the country moved up to 55th place globally (sixth in ASEAN) in the 2022 Government AI Readiness Index, with a score of 53.96 (above the world average of 44.61) (Oxford

Insights, 2023). This marks a notable improvement from a few years prior, where Vietnam ranked 62nd in 2021. This progress is partly driven by government efforts to strengthen digital infrastructure and strategic coordination. Nonetheless, certain capacity indicators do lag behind peer countries. For instance, Vietnam scores lower on measures of AI talent and scale, pointing to areas for improvement despite the overall upward trend. Notably, over 50 universities and institutes now offer AI-related programs, and this educational infrastructure constitutes the country's pipeline of AI-skilled graduates; an estimated 1,600 Vietnamese researchers specialize in AI (including those now working abroad). However, fewer than 300 are considered high-level AI experts, which is a gap that Vietnam is working to close through education and training initiatives (Asian Productivity Organization, 2024; World Intellectual Property Organization, 2023).

AI Ecosystem

The Vietnamese AI start-up ecosystem has expanded rapidly, with firms beginning to realize the outcomes of earlier innovation efforts. Back in 2021, only around 60 AI start-ups operated in Vietnam; by 2024 this number had surged to around 300 firms, a 4.5-fold increase in three years (VNEconomy, 2025). This growth positions Vietnam as home to the second-highest number of AI start-ups in Southeast Asia, after Singapore. Homegrown AI companies are active in diverse fields, such as computer vision, natural language processing (NLP), fintech, healthcare, and education technology. Domestic start-ups are also attracting foreign venture capital and partnerships. For example, Vietnam's fintech AI start-up Trusting Social now provides credit scoring services to 85+ financial institutions across Vietnam and other Asian markets, and ELSA Speak, a Vietnamese AI-powered English learning app, has attracted a global user base. This ecosystem is supported by incubators and initiatives, such as the National Innovation Center's accelerator programs, alongside increasing participation from global technology firms (NIC, 2025). Global companies have started investing in Vietnam's AI potential, too. For example, NVIDIA announced plans to collaborate on an AI R&D center in Vietnam, Qualcomm opened an AI Hub in Hanoi, and Google has been supporting Vietnamese AI start-ups and digital skilling programs. These trends indicate that Vietnam is becoming a magnet for AI innovation and investment in the region.

AI Adoption by Sector

AI adoption is evident in multiple sectors of the Vietnamese economy, with early successes providing proof-of-concept for wider implementation. In the public sector, authorities have piloted AI to streamline administrative services. For example, an AI-powered virtual assistant system developed by Vietnam Posts and Telecommunications Group (VNPT) was tested in Ho Chi Minh City's digital government center. The platform is designed to automate citizen service delivery (NIC, 2025). Several ministries deploy AI across applications, including e-government chatbots, automatic document digitization programs, and predictive analytics programs for urban management. Law enforcement and judicial bodies have also begun leveraging AI. Viettel's AI-based Legal Virtual Assistant helps judges and civil servants quickly search case files and legal precedents, and may have contributed to as much as a 30% reduction in their document research workload. These applications contribute to measurable improvements in operational efficiency across government functions. In the transportation sector, AI technologies power nonstop electronic toll collection systems on highways and optimize traffic control centers in major cities, helping to reduce congestion. Logistics firms are adopting AI for route optimization and demand forecasting, and ride-hailing platforms employ AI algorithms for matchmaking and dynamic pricing, which has transformed urban mobility (Official Development Assistance [ODA], 2023).

The finance and banking sector in Vietnam is another early adopter of AI. Banks use AI-driven systems for fraud detection, anti-money laundering monitoring, and credit scoring. Many Vietnamese banks now employ AI chatbots for customer service and virtual assistants to handle routine inquiries. These applications contribute to a safer and more efficient financial system. In commerce, retailers and e-commerce companies use AI for personalized product recommendations, inventory management, and image recognition, including computer vision for automatic product tagging and cashier-less checkout (NIC, 2025).

In the healthcare sector, AI is making significant inroads in diagnostics and clinical decision-making. Vietnamese hospitals have begun deploying AI-based medical imaging systems to assist doctors in detecting diseases with greater speed and accuracy (OECD, 2023). For instance, VinBrain's DrAid (developed by Vingroup) can analyze chest X-rays to identify lung pathologies in under five seconds with over 89% accuracy, and it was even adapted to help screen for COVID-19 pneumonia during the pandemic. Another local innovation, VinBigData's VinDr, supports radiologists in diagnosing lung, liver, breast, and spinal conditions with more than 90% accuracy, significantly improving diagnostic throughput. These tools expand healthcare capacity, particularly in areas with specialists shortages. AI-driven platforms are also used in telemedicine services and disease control initiatives. According to research by the Vietnam Academy of Science and Technology, applying AI in oncology can increase the accuracy of certain cancer diagnoses up to 95%, illustrating AI's potential to improve patient outcomes (Vietnam Academy of Science and Technology [VAST], 2024).

The education sector in Vietnam has adopted AI for personalized learning and administrative efficiency. A growing number of EdTech start-ups offer AI-powered tutoring apps, language learning assistants, and adaptive learning platforms that adjust to students' abilities. Some Vietnamese schools are experimenting with AI-enhanced e-learning systems and automated grading tools. Such solutions are particularly valuable for remote learning. Agriculture is another field where AI has begun traction, from smart farming solutions that use sensors and analytics to optimize irrigation and fertilizer use, to models that analyze meteorological data for improved disaster forecasting. One pilot project uses AI to analyze satellite and sensor data to predict storms and flooding, thereby helping farmers and authorities prepare for natural disasters. In another initiative, Vietnamese researchers applied AI models to meteorological data to improve storm path predictions as part of broader efforts to strengthen climate resilience in the agricultural sector (NIC, 2024). These cross-sector examples demonstrate that AI adoption has reached the stage of widespread practical implementation in Vietnam, and is being deployed at scale in the finance, commerce, transport, healthcare, education, agriculture, and public administration sectors. This broad base of application, combined with strong public adoption, provides a solid foundation for further leveraging AI to enhance productivity and innovation in Vietnam's economy.

National AI Policies and Strategies

National AI Strategy of Vietnam

The government of Vietnam has articulated a clear national vision and multifaceted strategy to develop and apply AI for socioeconomic advancement. At the center of this framework is the National Strategy for Research, Development and Application of Artificial Intelligence through 2030, issued in January 2021. This strategy lays out ambitious goals: by 2030, Vietnam aims to rank among the top four ASEAN countries and the top 50 countries globally in AI research and applications. To achieve this, the strategy calls for the development of critical AI infrastructure and ecosystems, including at least 10 nationally prestigious AI brands/products and three national centers for big data and high-performance computing (HPC), to ensure Vietnam has sufficient computing capacity and domestic innovations needed for AI leadership. The National AI Strategy also emphasizes human capital through education and training programs, alongside promoting AI entrepreneurship, and directing AI solutions toward priority sectors, including healthcare, agriculture, education, manufacturing, and smart cities. Concrete capacity-building targets have been established. For example, by 2030, Vietnam should train or attract around 7,000 high-quality AI researchers and developers, and develop about 500 AI-focused enterprises with "Made in Vietnam" solutions. Under this strategy, ministries are tasked with specific objectives. For example, the Ministry of Education has been instructed to revise curricula to produce AI talent, and the Ministry of Science and Technology (MOST) has been directed to fund core AI research (Ministry of Science and Technology [MOST], 2023).

Key Policies and Measures

Beyond the national AI strategy, Vietnam has rolled out complementary digital transformation and innovation policies that reinforce AI development. Notably, the government approved a National Digital Transformation Program that provides a roadmap for adopting digital technologies, including AI, across government, the economy, and society, targeting broad changes by 2030. This program sets targets for: (i) expanding e-government services; (ii) building digital infrastructure, including universal broadband; (iii) providing digital skills training; and (iv) growing the digital economy as a share of GDP.

AI is identified as a core enabling technology within these efforts, aligning with Vietnam’s “Make in Vietnam 4.0” agenda to leapfrog peer countries in advanced Industry 4.0 technologies. In parallel, sectoral policies have been updated to incorporate AI components. For example, the Ministry of Information and Communications (MIC) is implementing an ICT infrastructure master plan (2021–30) that includes building green data centers, 5G networks, and IoT platforms to support AI deployment. MIC has also launched a national open data portal and is developing guidelines for AI ethics in technology development. The MOST, which leads the national AI agenda, has initiated annual AI research grants and innovation contests, such as the AI Awards and Vietnam Artificial Intelligence Day (AI4VN) Summit, to spur local solutions. The Ministry of Planning and Investment, through the National Innovation Center (NIC), has established incubation programs and an AI Startup Accelerator to mentor and fund AI start-ups. In the education sector, the Ministry of Education and Training (MOET) is integrating AI and data science into university programs, and even primary/secondary curricula are introducing computational thinking and coding to build the pipeline of future AI professionals. One flagship initiative is the “AI for All” program, jointly launched by MOST and industry partners in 2022, which aims to raise public awareness about AI and provide basic AI education to students and workers (MOST, 2023).

To back these strategies, the government is allocating significant resources and establishing a supportive regulatory environment. Public investment in science, technology, and innovation (STI), which includes AI, is slated to increase substantially. In fact, Vietnam’s government announced that 3%–4% of the national budget will be allocated for STI, and digital transformation over the next five years, with the goal of mobilizing USD10–USD15 billion in total investment (public and private) in these areas. This represents a notable commitment, bringing R&D spending closer to levels seen in more advanced regional economies. Funding mechanisms are also being fine-tuned: for instance, the National Technology Innovation Fund (NATIF) has designated AI adoption as a priority area and is providing grants and subsidized loans for enterprises investing in AI solutions. The government is also adjusting procurement policies to favor domestic digital products, with a new framework prioritizing Vietnamese-developed AI solutions in public projects. These measures are designed to stimulate the local AI market and encourage both companies and state agencies to develop homegrown AI applications.

Safety and Ethics

Crucially, Vietnam is moving to create a comprehensive legal and ethical framework for AI. Recognizing the need to address data privacy, safety, and accountability in AI, the government has accelerated work on the country’s first Law on Artificial Intelligence. A draft AI Law was released for public consultation in September 2025, outlining rules for AI development and use, including risk-based classifications and transparency requirements for high-risk systems. The draft law is expected to be finalized and enacted by 2026, positioning Vietnam among the early adopters of dedicated AI legislation in the region. In preparation, MOST has already issued guidelines on responsible AI development and convened ethics discussions, anticipating future challenges. The forthcoming AI law aims to ensure AI technologies are developed safely and ethically, mandating principles, such as human oversight, fairness, data protection, and accountability.

This legal groundwork, alongside Vietnam’s Cybersecurity Law (2018) and data privacy regulations, will form a baseline governance structure for AI. In addition, Vietnam passed a new Law on Digital Technology Industry (2025) that covers emerging tech industries and may complement the AI-specific law.

Multi-ministerial coordination and implementation programs have been key to translating strategy into action. Vietnam’s approach to AI policy is cross-cutting: a National Steering Committee on Digital Transformation (chaired by the Prime Minister) oversees major digital and AI initiatives, ensuring that ministries work in concert. Under MOST’s leadership, line ministries have launched numerous AI-related initiatives. For example, in 2023 the Ministry of Public Security began testing AI for smart city security and traffic monitoring while the Ministry of Agriculture deployed pilot expert systems for crop disease prediction. MOST itself hosts the annual Vietnam Artificial Intelligence Day (AI4VN) conference to bring together stakeholders and report progress on the AI Strategy. The MIC, in addition to infrastructure, promotes “Make in Vietnam” AI products by certifying and showcasing local solutions. The Ministry of Planning and Investment’s NIC Vietnam AI Economy Report 2025 (along with other publications) helps inform policy and identifies regulatory bottlenecks. Vietnam is also updating its strategies as the landscape evolves: MOST announced in 2025 that it is revising the National AI Strategy to incorporate new developments (like generative AI) and extending it through 2030. This update, along with the AI law, will provide more detailed implementation roadmaps and clarify responsibilities among ministries.

Cooperation and Partnerships

Policy support is also fostering international partnerships to strengthen Vietnam’s AI capabilities. The government actively encourages collaborations, such as the Vietnam–Australia AI Cooperation Network, which connects Vietnamese AI experts both domestic and diaspora, with Australian institutions for joint research and training. In education, leading universities, such as the Hanoi University of Science and Technology (HUST) have partnered with foreign tech companies. HUST and Republic of Korea’s (ROK) Naver Group launched an International AI Research Center in 2021 to facilitate exchange of expertise and development of open AI resources. Vietnam also engages in regional frameworks (through ASEAN and APEC) to harmonize AI governance and share best practices. All these policy efforts, including strategic planning, increased funding, regulatory development, and collaborative programs, reflect a strong government commitment to make AI a cornerstone of national development. Vietnam’s leaders have repeatedly affirmed the goal of turning the country into an AI and high-tech hub in Southeast Asia by the end of this decade. While challenges remain in execution, Vietnam’s policy and strategy landscape provides a supportive environment for continued AI growth across industries.

Key Stakeholder Mapping

Vietnam’s AI ecosystem spans large domestic technology groups, a fast-growing start-up community, government ministries and innovation agencies, national research institutes and universities, professional associations, and a widening set of international partners. Public institutions set national direction through strategy, infrastructure, and regulatory development while large firms and start-ups drive adoption and commercialization across priority sectors.

Private Sector

Vietnam’s private sector combines large anchor firms that can deploy AI at scale with a growing cohort of start-ups building specialized products in finance, education, healthcare, and enterprise automation. Domestic conglomerates and telecom operators supply the data, infrastructure, distribution channels, and implementation capacity that accelerate adoption across the wider economy (NIC, 2025).

Major Players

FPT Corporation

FPT Corporation is Vietnam’s largest IT conglomerate and treats AI as a strategic growth area. It operates the FPT AI Center and the FPT.AI platform, providing business services spanning natural language processing, computer vision, and enterprise automation. FPT invests heavily in research and

development (R&D) and talent development, and became the first Southeast Asian corporate partner of Mila, a leading AI research institute in Canada.

Viettel Group

Viettel Group is Vietnam's largest telecommunications operator and runs an AI program centered on speech recognition, cybersecurity analytics, and smart-city solutions. Viettel applies AI to network optimization and public-service use cases, including the deployment of Vietnamese-language voice and speech capabilities in operational settings.

Vingroup

Vingroup develops AI through multiple subsidiaries. VinAI Research conducts foundational research and focuses heavily on automotive AI. VinBigData develops big data and healthcare AI, including the VinDr product line. VinBrain develops healthcare AI products, such as DrAid™, which are deployed in Vietnamese hospitals, translating domestic R&D into operational clinical use.

VNG Corporation

VNG Corporation builds AI capabilities through Zalo AI, advancing Vietnamese-language speech and text processing and embedding these capabilities into widely used digital products. VNG also convenes ecosystem activities through the annual Zalo AI Summit and works with universities to support AI talent development.

CMC Corporation

CMC Corporation is expanding AI capabilities across cloud computing, cybersecurity threat intelligence, and smart-city projects, including initiatives developed with foreign partners. Its role is concentrated in enterprise IT implementation, where cloud platforms and security workflows are core adoption pathways.

VNPT (Vietnam Posts and Telecommunications Group)

VNPT develops AI solutions for e-government and telecommunications. Its deployments include optical character recognition for government documents and AI-enabled platforms linked to IoT applications, such as smart farming.

Start-ups and SMEs

Vietnam has roughly 300 AI start-ups as of 2024, operating across fintech, education technology, healthcare technology, retail and marketing analytics, and enterprise process automation. Examples include Trusting Social (AI-based credit scoring), ELSA Speak (AI-enabled language learning), and start-ups focused on intelligent document processing and customer-service automation. Several firms are oriented toward international expansion and foreign investment, supported by accelerators and programs linked to NIC and private venture funds.

Multinationals

Multinational firms contribute infrastructure, training, and developer ecosystem support. IBM, Microsoft, Google, and NVIDIA run programs that engage Vietnamese developers and universities through workshops, hackathons, and training initiatives. Qualcomm opened an AI R&D Center in Hanoi in September 2023 focused on machine learning applications optimized for Snapdragon platforms. NVIDIA has announced partnerships to provide AI training and hardware support to Vietnamese universities.

Core Products and Services

Across large firms and start-ups, private-sector AI activity concentrates in five recurring capability areas. First, Vietnamese-language AI products, including speech recognition, speech synthesis, and language understanding embedded in consumer and enterprise services. Second, enterprise automation,

including chatbots, intelligent document processing, and customer-service systems. Third, telecom and smart-city deployments, where AI supports network operations, security analytics, and public-service optimization. Fourth, healthcare AI products in medical imaging and clinical decision support, where domestic firms have progressed from development into hospital deployment. Fifth, fintech applications, including credit scoring, fraud and risk analytics, and customer engagement tools.

Public Sector and Parastatals

Vietnam's public sector shapes AI adoption through strategy implementation, digital infrastructure development, data governance, and regulatory and ethical guidance. Key ministries and national institutions convene ecosystem actors through national programs and summits and provide direct support to start-ups and emerging technology commercialization.

Major Players

Ministry of Science and Technology (MOST)

MOST leads national AI policy implementation. It oversees delivery of the National AI Strategy, coordinates AI-related programs across line ministries, and funds AI R&D initiatives. MOST also runs the AI4VN Summit as a national networking platform and is drafting the country's AI regulatory framework, including the proposed AI law.

Ministry of Information and Communications (MIC)

MIC leads digital infrastructure and data policy that enable AI adoption. It manages broadband and 5G expansion, supports “Make in Vietnam” digital products, and operates the National Data Portal to expand open datasets for innovation. MIC also develops AI-related guidance, including ethics-oriented initiatives and pilots linked to e-government and smart-city programs.

Ministry of Planning and Investment (MPI) and the National Innovation Center (NIC)

NIC, established in 2019 under MPI, functions as a national hub for innovation and start-up development. It hosts AI incubators, coordinates training programs with multinational partners, such as Google and Microsoft, and conducts policy research on emerging technology and the AI economy. NIC published the Vietnam AI Economy 2025 report and uses it to guide ecosystem mapping and policy recommendations (NIC, 2025).

Vietnam Academy of Science and Technology (VAST)

VAST is Vietnam's leading national research institute and conducts foundational and applied AI research, including work in natural language processing, robotics, and machine learning. It also supports applied projects in domains, such as climate modeling and biomedical AI, and provides science-policy advice and research collaboration channels with universities (VAST, 2024).

Academia and Research

Universities and academic labs are central to Vietnam's AI talent pipeline and research output. Technical universities are expanding AI and data science degree offerings, creating specialized research centers, and integrating industry-linked projects and internships to reduce practical skill gaps.

Major Players

Hanoi University of Science and Technology (HUST)

HUST has expanded AI education and research capacity and launched an international AI research center with global partners, strengthening collaboration and graduate training.

Vietnam National University (VNU)

VNU in Hanoi and Ho Chi Minh City has expanded AI research and training programs, including the establishment of dedicated data science and AI institutes, and serves as a major national pipeline for AI graduates and academic research outputs.

Ho Chi Minh City University of Technology (and other technical universities)

Leading technical universities across Vietnam have opened AI research centers and introduced new AI and data science curricula, increasing the volume of AI graduates and supporting applied research collaborations with industry.

Civil Society and International Partners

Professional associations and quasi-public organizations support dialogue between industry and policymakers, highlight applied AI case studies, and contribute to workforce development. International development organizations and bilateral partners provide financing, technical expertise, and alignment with global governance norms.

Major Players***Vietnam Software and IT Services Association (VINASA)***

VINASA convenes industry stakeholders through AI-focused networks, such as its AI and Automation Club, contributes policy input, including engagement with the draft AI law, and runs national events, such as the Vietnam AI Summit and related recognition programs that elevate high-performing solutions (NIC, 2025).

Vietnam Union of Science and Technology Associations (VUSTA)

VUSTA supports policy discussion and public engagement through forums on AI ethics, the future of work, and governance issues that shape responsible adoption pathways.

International development organizations and bilateral partners

International partners support digital transformation and AI capacity building through funding, technical assistance, and governance alignment. The ADB and the World Bank support digital programs that include AI-related components, including e-government and smart-city efforts. UNESCO and the OECD provide AI ethics guidance aligned with international principles. Bilateral programs include Japan-supported capacity building through Japan International Cooperation Agency (JICA), ROK-supported training initiatives, and the Vietnam–Australia AI Network linking researchers (OECD, 2023).

Strategic Positioning and Recommendations

A SWOT analysis of Vietnam’s AI ecosystem highlights a mix of strengths and opportunities, alongside notable weaknesses and threats that need to be addressed. Key internal strengths and weaknesses as well as external opportunities and threats are summarized.

SWOT Analysis**Strengths****i) Young, tech-savvy talent pool**

Vietnam benefits from a youthful, digitally literate population and a growing base of tech talent. With more than 1,600 domestic AI researchers and thousands of IT graduates each year, the workforce provides a strong foundation for rapid technology adoption. High enthusiasm for

technology, reflected in strong measures of AI awareness and acceptance, supports experimentation and uptake of AI solutions.

ii) Government commitment and vision

The government has demonstrated clear political will to advance AI through the National AI Strategy to 2030, supported by complementary policies, increased funding, and coordinated multi-ministerial programs. This strategic direction, including upcoming legislation through the draft AI Law, provides policy certainty for investors and innovators and signals that AI development is a national priority.

iii) Emerging tech ecosystem and infrastructure

Vietnam's digital infrastructure and innovation ecosystem continue to strengthen. Data availability is rising and computing infrastructure is improving, supported by new data centers and planned national GPU facilities. The country hosts numerous tech hubs while foreign technology leaders, such as NVIDIA and Qualcomm, have shown growing interest in the AI ecosystem, reinforcing Vietnam's position as an emerging regional AI center.

iv) Enthusiastic adoption and market receptiveness

Consumers and enterprises are receptive to AI solutions. A large majority of businesses have piloted AI, and the online population shows high engagement with AI tools, with usage reaching 78%. Early deployments in fintech, e-commerce, and healthcare provide local proof-of-concept effects that support wider adoption and faster product diffusion in the domestic market.

Weaknesses

i) Shortage of deep AI expertise

Despite a large IT workforce, Vietnam faces a shortage of advanced AI experts and high-quality researchers. Fewer than 300 Vietnamese are identified as cutting-edge AI experts, and firms struggle to recruit specialized AI talent. Brain drain reinforces this constraint as top graduates pursue opportunities abroad or with foreign firms. From 2024 to 2025, an estimated 150,000–200,000 IT positions, including AI specialists, may go unfilled due to the limited talent pipeline, leaving projects understaffed or reliant on foreign expertise.

ii) Nascent research and academic linkages

Vietnam lacks top-tier, globally recognized AI research institutions, and university–industry collaboration remains limited. Commercialization of local AI research is weak, few universities rank strongly in AI-specific fields internationally, and domestic firm-level R&D investment remains modest. This creates a persistent gap between academic output and market-ready innovation.

iii) Inadequate high-end infrastructure and data frameworks

While foundational digital infrastructure has improved, access to high-performance computing and cloud resources remains limited, especially for start-ups and small and medium-sized enterprises (SMEs). The country does not yet operate a national supercomputing center at scale, and many firms face prohibitive costs for advanced infrastructure. Data governance and open-data standards remain under development, resulting in fragmentation, data silos, and quality issues that impede model training and scaling.

iv) Underdeveloped legal and ethical framework

Until recently, the legal environment for AI has lacked clarity, creating uncertainty for developers and users. Key issues, including personal data protection, liability for AI-driven decisions, and intellectual property for AI innovations, remain insufficiently defined. Although the draft AI

Law and related regulations are progressing, enforcement capacity and detailed operational guidance, including ethics and safety-testing frameworks, remain nascent.

Opportunities

i) Global partnerships and investment

Vietnam can accelerate AI development through partnerships with leading international technology firms and research institutions. Collaborations with companies, such as NVIDIA, Google, and Microsoft, can strengthen knowledge transfer, attract capital, expand market access for Vietnamese start-ups, and increase foreign direct investment as global firms seek growth opportunities in Southeast Asia.

ii) AI applications in priority sectors for development

AI can deliver high productivity and inclusion gains in sectors central to Vietnam's development agenda. Manufacturing can use AI-enabled automation and predictive maintenance to improve efficiency and move up the value chain. Agriculture can adopt precision farming to raise yields and strengthen climate resilience. Healthcare can expand telemedicine, diagnostics, and decision support to improve access in underserved areas. Education technology can help address teacher shortages and improve learning outcomes through personalization.

iii) Regional cooperation and support through the APO and ASEAN

As an APO and ASEAN member, Vietnam can use multilateral cooperation to strengthen capacity building, training, and applied productivity projects. Regional initiatives, including ASEAN efforts on AI ethics and data interoperability, can support Vietnam's regulatory preparedness and enable leadership roles in selected regional guidelines and standards.

iv) Policy refinement and first-mover advantage

The draft AI Law and strategy updates provide an opportunity to build pragmatic, innovation-supportive AI governance early in the regional cycle. A balanced legal framework that protects users while enabling innovation can attract firms seeking predictable operating conditions. Government support for open-source AI and local language datasets, including the VIGEN (open-source Vietnamese language dataset), can differentiate Vietnam's products and expand high-value localized applications, including for Vietnamese-language services and context-specific domains.

Threats

i) Intense competition for talent and investment

Vietnam faces competition from regional peers, such as Singapore, Indonesia, and India for skilled AI talent and investment capital. Without competitive compensation and research funding, brain drain risks intensifying and investor attention may shift toward markets with stronger ecosystems. This dynamic can leave Vietnam positioned primarily as an adopter of foreign AI rather than a creator of frontier technologies.

ii) Ethical, social, and cybersecurity risks

Rapid AI uptake without safeguards can undermine public trust. Risks include algorithmic bias, misuse of facial recognition and surveillance, personal data breaches, and AI-generated misinformation. AI systems can also be targets of cyberattacks or tools enabling more sophisticated attacks. High-profile failures or abuses could trigger public backlash and slow adoption if not addressed through governance, enforcement, and public awareness.

iii) Technological change outpacing local readiness

Global AI advances, including generative models and autonomous systems, are evolving quickly. Vietnam risks capability gaps if education curricula, workforce training, and domestic R&D do not keep pace. Dependence on foreign AI platforms can also create geopolitical and supply-chain exposure, limiting resilience and long-term autonomy.

iv) Economic and funding constraints, especially for SMEs

Many Vietnamese firms, particularly SMEs, face limited budgets for AI investment. Economic downturns or external shocks can reduce private investment and slow adoption, widening gaps between large firms and smaller enterprises. Inconsistent research funding, including fluctuations in government support or venture capital cycles, will concentrate AI progress in a few urban hubs and limit broad-based productivity gains.

Summary

Vietnam's AI ecosystem combines strong scaling conditions, including a young talent base, clear government backing, improving infrastructure, and high market receptiveness, with constraints in advanced skills depth, research commercialization, high-end compute access, data governance maturity, and legal-ethical clarity. The most actionable opportunities lie in targeted sectoral deployment, structured international partnerships, and early governance refinement anchored in localized language and data assets while the most material risks center on regional competition, trust and cybersecurity failures, technology cycle slippage, and uneven diffusion driven by SME financing constraints.

Future Needs and Collaboration Pathways**Domestic Priorities****Human Capital and Skills Development**

Vietnam's foremost need is to expand the supply of skilled AI professionals through a multipronged talent strategy. This includes continued integration of AI and data science across university programs and extending into vocational training. Scholarships and funding for advanced AI studies (Master of Science and Doctor of Philosophy (PhD)) should be expanded to grow the cadre of local experts. Industry-academia collaboration is also central, with firms providing real-world projects, internships, and faculty upskilling to ensure graduates have applied experience. Workforce transition should include retraining and upskilling pathways that help the 1 million-strong IT workforce build competencies in machine learning, data engineering, and related skills. The "AI for All" initiative can be scaled through partnerships with technology firms that support mass online courses and certification pathways. Vietnam can also leverage its diaspora and international experts by creating incentives for overseas Vietnamese AI scientists to mentor or return through visiting professorships and R&D lab collaborations. Urgency is reinforced by a 2025 survey showing that 55% of Vietnamese businesses cite a lack of digital skills as the main barrier to AI adoption.

Computing Infrastructure and Data Ecosystems

Vietnam needs to strengthen high-performance compute access and the data foundations required for AI development. Rather than presuming a pre-approved national AI supercomputing facility, the priority is to develop or co-develop large-scale HPC or GPU infrastructure, potentially through public-private partnerships, to widen access to computational capacity for research and deployment. Data ecosystem development should advance implementation of the National Data Strategy through open data repositories, data marketplaces, and interoperability standards. Government agencies can accelerate access to anonymized datasets in priority areas, such as transportation, healthcare, and agriculture while strengthening governance protocols for reuse. Continued development of Vietnamese-language datasets, including open-source resources, such as the VIGEN corpus, supports language

technologies and user-facing AI services. Regional diffusion also depends on extending high-speed internet and 5G coverage, and investing in IoT sensor networks for smart cities and agriculture so AI-enabled applications are not concentrated only in major urban centers. Policy support can include targeted incentives for data-center investment and grants that support open dataset creation.

Research, Innovation, and Entrepreneurship

Vietnam needs a stronger pipeline to convert AI research into deployable products and firms. Public support can increase AI-focused R&D and product development through larger dedicated grants and competitive grand challenge programs linked to national priorities, such as rice yield improvement and traffic congestion reduction. Private-sector R&D can be strengthened through tax credits, co-funding schemes that match portions of AI start-up investment, and expanded innovation voucher programs that help SMEs pilot AI adoption. An enabling commercialization pathway can include technology transfer offices at universities and seed funding that supports lab-to-start-up transitions. Vietnam can also consider AI innovation zones or tech parks that include regulatory sandboxes for testing drones, autonomous vehicles, and other emerging technologies. IP protection processes can be streamlined for AI-related inventions, including faster processing for AI patent applications, to strengthen incentives for domestic innovation. Large domestic technology firms can serve as innovation anchors by expanding access to Application Programming Interfaces (APIs), datasets, and cloud platforms for start-ups and by strengthening corporate venture funding. Investment in Vietnamese AI start-ups is reported to have risen sharply in 2023–24, though growth estimates vary across sources, which strengthens the case for sustained policy support that stabilizes and compounds momentum.

Governance, Ethics, and Policy Implementation

As AI diffusion accelerates, Vietnam needs to convert governance gaps into delivery strengths through institutions, enforcement capacity, and practical oversight mechanisms. Finalizing and enacting the AI Law is positioned as a major step, but implementation capacity will determine outcomes. A dedicated coordinating function, potentially a regulatory authority or council, can support cross-sector oversight, guideline issuance, and inter-agency coordination on security, consumer protection, and liability. Ethical AI guidelines should be operationalized through a multistakeholder AI ethics committee that includes government, industry, academia, and civil society. Practical mechanisms can include certification systems or ethics labels that signal adherence to safety and fairness standards. Data protection rules may require AI-specific refinements for biometric data use and automated decision transparency. Regulator capability also needs strengthening through AI literacy training for policymakers, judges, lawmakers, and enforcement bodies. Alignment with OECD and UNESCO principles can reinforce credibility and support coherence with international norms. Monitoring should include clear metrics and annual reporting on adoption rates, start-up activity, and training outcomes to support evidence-based adjustment to the National AI Strategy.

SME Adoption and Diffusion in Traditional Sectors

Broad-based productivity gains require diffusion beyond large technology firms into SMEs and traditional industries. Vietnam can strengthen adoption through incentives, such as AI integration vouchers or grants that subsidize SME adoption costs and reduce implementation risk. Regional AI hubs and demonstration centers can showcase locally relevant use cases, such as aquaculture applications in the Mekong Delta and AI-enabled productivity tools for textile manufacturing. Adoption programs should be paired with outreach and training through business associations and vocational institutions to enable managers to understand practical pathways for implementation. Large enterprises and successful start-ups can be incentivized to mentor SMEs through structured extension-style support. Public-sector pilots in smart cities and e-government can raise service quality while building familiarity and trust among citizens. Ongoing monitoring of barriers is also needed. The research highlights evidence that affordability constraints can be binding, including reference to 40% of SMEs being unable to afford AI, which implies that financing support and shared implementation capacity should remain core program elements.

Collaboration Opportunities

Local Perspective

i) Industry–academia delivery partnerships

Domestic collaboration should emphasize joint delivery mechanisms that translate training into implementation capacity, including project-based university partnerships, internships, faculty upskilling, and lab collaborations that produce applied outcomes for firms and public agencies.

ii) Regional diffusion support and demonstration capacity

Collaboration among ministries, local governments, business associations, and training institutions can scale demonstration hubs outside major cities, ensure adoption toolkits reach SMEs, and strengthen diffusion in traditional sectors with tailored use cases and implementation support.

Global Perspective

i) Co-development of compute and governance capacity

International partnerships can support Vietnam's access to high-end compute and specialized expertise while strengthening the credibility and practicality of governance frameworks through adoption of relevant global best practices and peer learning.

ii) Applied R&D and twinning arrangements

Vietnam can deepen twinning arrangements between domestic institutions and foreign AI centers, including models similar to the HUST-Naver AI Center, to accelerate skill formation, research output, and applied solution development.

APO Joint Initiatives

i) Regional training and deployment workshops

Vietnam can co-organize APO workshops focused on applied AI for smart manufacturing and agriculture, using case-based formats that translate into implementation playbooks and diffusion toolkits.

ii) Multilateral applied R&D projects

Vietnam can propose APO-sponsored multilateral projects that co-develop AI solutions for shared challenges, including disaster early warning systems and SME upskilling platforms, pooling expertise and spreading costs across participating economies.

iii) Regional guidelines on ethics and interoperability

The APO can facilitate joint work on regional guidelines for AI ethics and interoperability. Vietnam can help shape these outputs to reflect domestic regulatory needs while supporting cross-border trust and coordination.

iv) APO center of excellence proposal

Vietnam would benefit from proposing an APO Center of Excellence on AI focused on areas aligned with its national strengths, such as agriculture or AI-enabled public services, to anchor sustained regional collaboration and channel international expertise into domestic programs.

PART IV

**CONCLUSION AND
FUTURE DIRECTIONS**

TOWARD INCLUSIVE AI PROSPERITY THROUGH STRATEGY AND COOPERATION

The primary purpose of this study was to comprehensively survey and catalog the state of AI utilization among the member economies of the Asian Productivity Organization (APO) to identify areas where strategic policy interventions could support their sustainable growth and development.

The study began with a discussion of AI as a general-purpose technology (GPT) and its potential to stimulate economic growth and social development in the APO member economies. This discussion was followed by an assessment of AI readiness using available empirical data. The study also established an analytical framework through which to chart the AI landscape and analyze the strengths, weaknesses, opportunities, and challenges of each member. A survey of regional experts from APO member economies produced a substantial body of data. Analysis of these data yielded policy implications for international cooperation projects that leverage AI as an engine for future growth.

The Importance of Systemic Capacity Building and the AI Transition

As discussed throughout this report, AI is not merely a productivity tool: it has all the defining features of a GPT, capable of reshaping production and value creation mechanisms across the breadth of the economy. Its core functions are prediction, optimization, and generation, and by utilizing these functions, firms can maximize operational efficiency, allowing for rapid structural transformation in both the manufacturing and service sectors.

Moreover, as APO members transition toward a more knowledge-intensive economy, AI is emerging as a new driver of national competitiveness. This competitiveness flows from data and algorithmic capabilities. But in order to translate this potential into actual economic performance, countries must establish absorptive capacity at the national level; this extends beyond the adoption of individual tools. AI readiness should be defined not as a narrow digital metric, but as a holistic gauge of systemic capacity in which infrastructure, governance, and human capital are integrated to create substantive value.

To facilitate AI-driven growth, policy must be forward-thinking and proactive; a strategic outlook is essential to mitigate the uncertainties and disparities that arise during the diffusion process. This is because AI has two fundamental traits: it augments high-skilled labor while displacing routine cognitive tasks. These twin effects can drive productivity, but without adequate transition support, they risk deepening labor market polarization and become a destabilizing socioeconomic force. At the same time, resource constraints and utilization gaps among small and medium enterprises (SMEs) can act as bottlenecks, slowing AI uptake and limiting innovation across entire regions. Policy authorities should therefore prioritize strengthening utilization capacity rather than just adopting, by redesigning business processes and reskilling workers. Given AI's data-intensive nature, governments must also establish transparent and robust governance and ethical frameworks. A sustainable AI ecosystem ultimately depends on public trust in the technology.

State of AI among APO Members

The findings of this report categorize APO members into three stages of AI development based on their economic foundations and technical readiness.

i) Global leaders and frontier group (ROK, Japan, India)

These economies drive global AI innovation through manufacturing capacity and advanced IT infrastructure. The Republic of Korea (ROK) has set its sights on becoming a leading player in the space through its world-leading technology penetration and semiconductor supply chain. Japan focuses on “physical AI”(e.g., robotics) and smart cities, leveraging its existing strengths in robotics. India has emerged as a global hub for AI talent and digital public infrastructure (DPI).

ii) Challenger and accelerator group (Turkiye, Malaysia, Vietnam)

These economies have finalized national roadmaps and are accelerating investments in specific sectors, such as defense, data centers, and start-up ecosystems.

iii) Foundational and early adoption group (Pakistan, Lao PDR, Mongolia, Nepal, Sri Lanka)

These members are in the process of establishing individual strategies or building foundational digital government platforms and human capital.

The SWOT analysis conducted in this report shows that all APO members have committed governments and dynamic demographics, but these opportunities coexist with a common threat: a severe concentration of resources in the hands of a few. Most members identified brain drain and a shortage of high-performance computing resources as critical weaknesses. In addition, the gap in AI adoption between large enterprises and SMEs emerged as a major roadblock. One nearly universal issue is a dependence on multinational Big Tech, and there is a growing call for what is being referred to as “digital sovereignty”. This has led some members to pursue indigenous development of large language models (LLMs) and to establish a regional data commons. Geopolitical uncertainties, ethical issues, and security risks were highlighted as shared threats that require strategic solidarity and the establishment of common, supranational guidelines.

TABLE 16.1

OVERVIEW OF AI READINESS AND CAPACITY OF 11 APO MEMBER ECONOMIES (1)

	Republic of Korea	India	Japan
Statistics and Indicators	- Korean firms AI adoption: 1.4% (2017) → 6.4% (2023) - Public AI contracts: 325 (2017) → 1,033 (2023) (3.2×) - Government AI R&D: KRW386 billion (2019) → 1.193T (2023) (share: 1.9% → 3.8%) - AI workforce: 11,000 (2019) → 54,000 (2024) - SMEs AI adoption: 31% (2025) - AI patent filings: 517 (2017) → 1,354 (2021) - AI VC investment: USD4.6 billion (2021 peak) → USD2.7 billion (2024)	- AI skill penetration: 2.8 (Global rank: 1st, 2024) - AI-skilled workforce: 14-fold increase (2016–23) - Enterprise AI adoption: 48% (FY24) - AI patent grant ratio: 0.37% (2010–25) - Private AI investment: USD1.4 billion (2023) - Projected talent gap: >1 million (by 2027)	- Robot density: 390 (2018) → 419 (2023) (5th globally, 7.4% growth) - R&D expenditure: JPY19.24 trillion (FY2020) → JPY20.70T (FY2022) (3.65% GDP) - AI R&D: JPY174.4 billion (FY2021) → JPY272.5 billion (FY2022) (56.3% growth) - AI patents: ~4,500 (2014) → ~10,300 (2022) (doubled in 8 years) - Enterprise adoption: Elite 90%–97% (SoftBank, MUFG, Colopl) vs. SME 16% - Financial sector: ~60% GenAI adoption (BoJ survey, 155 institutions) - Education gap: Students 83.1% GenAI usage vs. Teachers 17% (OECD 54th/55) - Municipal GenAI: 29% (2023) → 50%–60% (2025 estimate); Google Workspace 223% YoY growth

	Republic of Korea	India	Japan
National Strategy and Policy	- National Strategy for AI (2019): Establish a world-beating AI ecosystem - AI-Digital Innovation Growth Strategy (2024): Build a world-class AI ecosystem by capturing the momentum of generative AI - National AI Strategy Policy Directions (2024): Strengthen the AI ecosystem - AI Basic Act (2025): Improve quality of life and enhance national competitiveness - Strengthen National AI Capabilities (2025): Expand AI computing infrastructure; develop next generation AI models; accelerate AI adoption - AX flagship Projects (2025): Become one of the world's top 3 AI powers and a global leader in Physical AI - ROK AI Action Plan (2025): Leapfrog competitors to rank among the world's top 3 AI powers - AI for All Initiative (2025): Promote AI education for all ages; foster universal AI literacy; and create talent pipelines	- National Strategy on AI (2018): Vision for inclusive growth, "#AIforAll" - IndiaAI Mission (2024): Five-year plan to build sovereign compute and data infrastructure and ensure safe AI - DPDPA (2023): Legal framework for data privacy and governance - Bhashini Initiative (2022): Multilingual AI for digital inclusion	- AI Basic Plan (December 2025): Utilization-first doctrine; 2027 checkpoint; four fundamental policies - AI for Science Initiative (FY2026): JPY35.5 billion for domain-specific models and automated labs - Physical AI Moonshot (2025–30): JPY200–JPY300 billion; humanoid robot prototype by 2030 - Stargate Data Center: USD500 billion investment (2025–2028); 13.7 exaflops capacity - DASH for SaMD: Adaptive regulatory pathways for AI medical devices (PMDA) - AI Safety Institute (AISl): Established in 2024; risk assessment and international safety coordination - GENIAC: JPY20–JPY30 billion (2024–26) for enterprise GenAI adoption support - Sovereign AI data mobilization: NDL 300,000 publications + NICT 900TB corpus for LLM training
Key Stakeholders	Public sector (governance): National AI Strategy Committee (President-chaired), Office of the Senior Presidential Secretary for AI Future Planning, line ministries (MSIT, MOTIR, MSS, MOE, MCST, MOEL) Public & quasi-public institutions: NIA (public-sector AI & data infra), IITP (AI R&D planning/evaluation & talent programs), NIPA (industry diffusion), KISA (AI security/trust), ETRI (core AI/semiconductor R&D), KISTI (HPC & data infrastructure), KISDI (AI regulation/governance research) Academia & research hubs: KAIST (AI human capital & frontier research; national AI research hub participation) Private sector: conglomerates & big tech (Samsung, SK Telecom, NAVER/HyperCLOVA X, Kakao/Kanana, LG, Hyundai, KT), plus AI start-ups & semiconductor/AI-app ecosystem (e.g., Upstage, Rebellions, FuriosaAI, Twelve Labs, etc.)	Government: MeitY (mission custodian, DPDPA), DST (RDI Scheme), MoE, & MSDE (Talent development) Public Institutions: CDAC (AIRAWAT Compute), IITs/IISc (CoEs, KOTAK-IISC AI-ML Centre) Private Sector: TCS/Infosys (Global integrators), Sarvam AI (Sovereign LLM), Qure AI (Iconic healthcare AI)	Government: AI strategic headquarters (prime minister-led), Digital Agency, METI, MEXT, MIC, MHLW Research: RIKEN AIP, University of Tokyo Matsuo-Iwasawa Laboratory (7,721 global students), NICT, NDL, NII Major corporations: SoftBank (Stargate), MUFG (15,000 daily AI users), Toyota (Woven City), Fujitsu-NVIDIA Emerging AI start-ups: Preferred networks (sovereign LLM), Sakana AI (unicorn, Daiwa partnership) Financial oversight: Bank of Japan (155 institutions surveyed; GenAI risk framework) Municipal innovation: Akita Prefecture (95% productivity gain), Yokosuka City, Chiba City models

		Republic of Korea	India	Japan
S W O T	Strengths	- S1: Robust IT infrastructure and global tech adoption: Ranked 1st globally in IoT (53%) - S2: National Infrastructure: Establishing a 2-exaflop AI computing center by 2030 with a KRW2 trillion investment - S3: Global chip supply: World-class manufacturing leadership in HBM and foundries - S4: Innovation assets: Ranked third globally in AI patents (24,178 filings); VC investment reached USD4.58 billion - S5: Human Capital: 70.6% of young adults (25–34) hold a bachelor's degree or higher, the highest in the OECD	- S1: Global lead in AI skill penetration (2.8) - S2: High enterprise AI adoption (48%) - S3: Unique Digital Public Infrastructure (DPI) for scale	- S1: World-leading manufacturing automation (419 robots/10,000 employees, 5th globally) - S2: Exceptional R&D intensity (JPY20.7T, 3.65% GDP; AI R&D 56.3% YoY growth) - S3: Elite enterprise adoption models (97% SoftBank; JPY12B–JPY15B MUFG productivity value) - S4: Regulatory innovation and responsible AI governance (DASH for SaMD, AISI, MIC frameworks) - S5: Strategic public–private partnerships (Oct 2025 ecosystem mobilization: Stargate, Fujitsu–NVIDIA, Digital Agency–OpenAI) - S6: World-class Physical AI testbed (Toyota Woven City: world's first AI-native residential city)
	Weaknesses	- W1: SME capital gap: AI innovation is concentrated in large conglomerates, leaving SMEs with marginal roles - W2: Infrastructure dependency: Reliance on foreign GPUs and cloud services despite localization efforts - W3: Talent shortage: Brain drain and an aging population threaten the long-term supply of skilled AI professionals	- W1: Low AI patent grant ratio (0.37%) - W2: Severe shortage of high-end research talent - W3: Low private R&D investment (USD1.4 billion)	- W1: Severe SME AI adoption gap (16% SME vs. 90%–97% elite enterprises; 6x disparity) - W2: Teacher AI literacy crisis (17% vs 83% students; OECD 54th/55 in classroom AI integration) - W3: Workforce reskilling barriers (29% vs. US 3.7% "no interest" in upskilling; 8x gap) - W4: Limited foundational LLM development capacity; dependence on foreign platform (strategic pivot to "utilization-first") - W5: Acute AI talent shortage (45,000–55,000 vs. US 200,000–250,000; 60% of firms report hiring difficulty) - W6: Organizational structures misaligned with AI (kaizen culture vs. rapid AI experimentation needs)
S W O T	Opportunities	- O1: Market expansion: Rapid growth in Generative AI; government launching a "National AI Team" for world-class LLMs - O2: Massive budget: 2026 AI-related budget is KRW9.9 trillion, a 3x increase from the previous year - O3: Next-gen hardware: Strategic entry into On-device AI and industrial AI using existing semiconductor strength - O4: Global ethics: Early enactment of the AI Basic Act positions ROK as a norm-setter	- O1: Leverage DPI and multilingualism for Global South leadership - O2: Significant government investment (INR1 trillion RDI Scheme) to crowd in private capital	- O1: Physical AI leadership leveraging manufacturing heritage (humanoid robot market USD38 billion by 2035) - O2: Demographic automation imperative (working-age population: 74M → 45M, 2020–2060) - O3: APO regional AI leadership (Matsuo Lab: 7,721 students from 33 countries; replicable governance templates) - O4: Sovereign AI positioning as middle-power alternative model (end-to-end domestic control with international partnerships) - O5: Green AI and energy-efficient computing leadership (Fujitsu MONAKA chip; efficiency innovation incentives)

	Republic of Korea	India	Japan
S W O T	Threats - T1: G2 competition: Risk of losing market share to massive US and PR China AI platforms and hyper-scale models - T2: Trade uncertainty: Global protectionism and trade disputes disrupting digital value chains and hardware supply - T3: Diffusion risks: Rising concerns over privacy, algorithmic bias, and labor market polarization	- T1: Global competition for AI chips and compute - T2: High reliance on foreign foundational models (83% of start-ups) - T3: Ethical risks from deepfakes/misinformation	- T1: Intensifying US-PR China AI competition forcing binary alignment pressure and geopolitical fragmentation - T2: Persistent foreign platform dependency and perpetual "AI rent" payments to foreign providers - T3: Rapid technological obsolescence (6–12 month AI cycles) outpacing consensus-based adaptation - T4: Brain drain to US tech companies (2–3× compensation differential; limited immigration offset) - T5: Energy constraints (USD0.20–0.25/kWh; 90% energy imports) limiting infrastructure scale
	Future Needs and Collaboration Areas for improvement - Mitigating the country's reliance on foreign computing infrastructure - Strengthen industry-specific AI capabilities - Nurturing workers skilled in AI Collaboration areas - Share digital government & public AX experience with APO members based on joint research - Joint AI talent development programs and knowledge exchange - Collaborative computing infrastructure and technology transfer initiatives	Needs - Institute National AI Fellowships - Fast-track AI patent regime - Decentralize talent development to Tier 2/3 data & AI labs - Establish AI Safety Institute Collaboration - Share DPI and AI skilling models with APO members - Joint R&D for localized, multilingual AI (e.g., Bhashini) - Harmonize ethical AI frameworks regionally	Priority Areas (P1–P6) - P1: Regional AI talent development - Matsuo-Iwasawa Laboratory GCI program expansion; APO AI Literacy Certification (target: 10K/year) - P2: Physical AI collaboration - Woven City testbed access; regional robotics standards harmonization - P3: SME AI Diffusion - Sector-specific toolkits; implementation support network (target: 10,000 SME adoptions) - P4: Municipal AI governance – Template sharing (Akita, Yokosuka models); cross-border digital services platform - P5: Responsible AI safety – AISI-coordinated regional network; APO AI Ethics Framework by 2027 - P6: Shared Computing Infrastructure - Regional data commons; APO computing facility (target: 1 exaflops by 2028) Early momentum priorities: P1 (Education) and P3 (SME) - "low-hanging fruit" with existing infrastructure; ~USD4–USD5 million per economy over 5 years

Source: Author's compilation.

TABLE 16.2

OVERVIEW OF AI READINESS AND CAPACITY OF 11 APO MEMBER ECONOMIES (2)

	Lao PDR	Malaysia	Mongolia
Statistics and Indicators	- Digital adoption enabling AI: Internet use rose from 54% (2020) to 62% (2021) to 62.7% (2022) to 63.6% (2023) - Government AI readiness is improving but remains at a low tier: 31.72 (2022) to 33.05 (2023) to 36.08 (2024) - AI-specific baselines (workforce, R&D, public AI contracts) not yet established; strategy calls for baselining from 2025	- AI market: USD1.06 billion (2025) → USD3.59 billion (2030, CAGR 27.6%); potential GDP impact ~USD115 billion by 2030 - Government AI readiness index: Score ~71.4, ranked 24th (2024); second in ASEAN after Singapore - Digital and AI infrastructure FDI: USD16.9 billion (2024) from Microsoft, Google, AWS and others; GERD 1.04% of GDP (MYR15.8 billion, 2020) with higher learning institutions now the main R&D funders - Workforce: 44% use generative AI monthly; a projected tech talent deficit of 500,000 by 2030; strong interest in reskilling but guidance gap persists	- AI adoption (proxy): Government AI Readiness Index: 37.2 (2021); global rank 103th → 42.36 (2024); global rank 98th (13.9%, 5 position) - AI-related patents: 2 (2021) → 1 (2024) → 1 (2025) - AI workforce (proxy): ICT workforce increased from 17,739 (2021; male: 11,470, female: 6,269) → 22,184 (2025; male: 12,037, female: 10,147), representing overall growth of 25.1% (male 4.9%, female 61.9%) - Government and private AI R&D investment: Not available
National Strategy and Policy	- No official National AI Strategy has been published; AI is framed under broader digital transformation plans - Umbrella frameworks: 20-Year Digital Economy Vision (2021–2040), 10-Year Strategy (to 2030), and 5-Year Plan (to 2025) - Trust/rights foundations: Law on Electronic Data Protection (2017); software and Internet Content Center licensing (2017); cloud and data-center licensing (2017) - Alignment tools: ASEAN Guide on AI Governance and Ethics (2024) and Expanded Guide on Generative AI (2025); UNESCO AI Readiness Assessment Methodology (RAM) underway in 2025 - Key 2025 initiatives: National-standard Data Center + secure Government Data-Exchange System (feasibility); AI Innovation Center + AI Special Economic Zone feasibility; Lao national LLM for Lao-language public services	- National AI Roadmap (AI-Rmap) 2021–2025: First AI blueprint across governance, R&D, infrastructure, talent, ecosystem - National AI Office (NAIO, 2024): Central “control tower” under Ministry of Digital / MyDigital for AI strategy and governance - National AI Governance & Ethics (AIGE) Guidelines (2024): 7 principles for responsible, human-centric AI; voluntary but core reference - National AI Action Plan 2030 (draft, 2025): Execution plan for 2026–2030 covering sectoral use cases, talent, ecosystem, and governance	- No standalone National AI Strategy (as of 2025) - AI priorities integrated into the Five-Year Development Guidelines of Mongolia (2026–2030), two relevant policy directions: - Governance and digital transformation (Digital First principle; data and statistics quality) - Science, technology, and AI (AI market competitiveness; data economy; AI skills) - Gaps: No dedicated AI implementation plan, budget, or centralized governance mechanism

		Lao PDR	Malaysia	Mongolia
	Key Stakeholders	• Government coordination: National Committee on Digital Transformation (2023) as the control tower; Ministry of Technology and Communications (MTC) as lead • Public entities: National Data Center; Department of Digital Technology; National University of Laos (NUOL); Ministry of Education and Sports ICT Center; National Library • Private sector and partners: Phongsavanh Group; Silicon Tech Park; ALO Technology Group; China–Lao Information Communication Center; publishers/content partners • International/regional: UNESCO (RAM), ASEAN sectoral bodies	• Government: NAIQ; MOSTI (AI-Rmap, AIGE, AI Sandbox/NTIS); Ministry of Digital & MDEC (Malaysia Digital, MDAG-AI); KESUMA (TalentCorp, HRD Corp, MyMahir NAICI); MOHE (AI faculties, AI in medicine/semiconductors); MITI (NIMP2030, SmartMFG+, AI chip export controls) • Public/quasi-public: MRANTI (R&D commercialization, MRANTI AI Programme, AI Park, AI Sandbox); MDEC (digital economy and AI grants); TalentCorp & MyMahir NAICI (AI workforce strategy); NAIQ Lab (citizen-centric pilots, like Rakan Tani) • Private: Microsoft, Google, AWS, NVIDIA (cloud, compute, skillings); YTL group (NVIDIA-backed sovereign compute, Green Data Centre Park Johor, ILMU national LLM, Ryt Bank digital bank); PETRONAS, TM, CelcomDigi–DHL and others deploying AI • Academia: UTM (first Faculty of AI); UM (AI in medicine); USM (AI for semiconductors); other research universities as main AI R&D and talent hubs	• Government: Ministry of Digital Development, Innovation and Communications (policy lead), Ministry of Economy and Development, Ministry of Education, National Statistics Office • Public: National Data Center (e-government, cloud, AI & Big Data data center planning), e-Mongolia Academy (digital government platforms and services), IT Park (start-up incubation and training) • Private: Chimege Systems, AND Solutions, Rookie Systems
S W O T	Strengths	• S1: Top-level political backing for digital transformation; clear digital-economy roadmap authorizing AI pilots • S2: Clean electricity potential and policy to prioritize power for AI/data centers over crypto by early 2026 • S3: Early concrete AI programs (national LLM, data center and data exchange feasibility) provide a launchpad	• S1: Strong political will and evolving architecture: AI-Rmap, NAIQ, AIGE, draft AI Action Plan 2030 • S2: Large FDI in hyperscale cloud and data centers and emerging sovereign compute stack (NVIDIA–YTL infra, ILMU national LLM, AI-powered digital banking) • S3: Solid digital infrastructure and position as a regional data hub; universities now major share of R&D spending	• S1: Established digital public infrastructure and integrated e-governance systems • S2: Foundational legal frameworks for data protection, cybersecurity, and transparency • S3: Expanding ICT workforce with improving gender inclusion • S4: Improving digital connectivity, including next-generation mobile networks • S5: High-level political commitment to digitalization embedded in the Five-Year Development Guidelines (2026–2030)
	Weaknesses	• W1: No standalone National AI Strategy yet; priorities and standards still fragmented • W2: Low AI readiness and cybersecurity maturity relative to peers • W3: Limited domestic compute and data-sharing infrastructure; most capabilities still in feasibility • W4: Few established AI metrics for tracking progress	• W1: Severe AI and digital skills gap; one-third of workers never used AI at work; projected 500,000 skilled-talent shortfall by 2030 • W2: Nascent local innovation ecosystem: small, grant-dependent start-up base; limited AI-specific IP and tracking; declining business share of R&D • W3: Fragmented policy landscape across ministries; lack of unified AI metrics (AI patents, AI workforce, sectoral adoption)	• W1: No approved National AI Strategy or costed implementation framework • W2: Limited private-sector AI adoption and absence of national adoption statistics • W3: Thin AI innovation ecosystem and limited start-up and SME support • W4: Acute shortages in advanced AI skills and higher education capacity • W5: No dedicated or publicly reported AI R&D budget lines • W6: Fragmented data systems, weak interoperability, and limited AI-ready datasets • W7: Underdeveloped AI ethics, safety, and oversight mechanisms

	Lao PDR	Malaysia	Mongolia
S W O T	Opportunities • O1: Finalize and launch National AI Strategy using UNESCO RAM findings and ASEAN guides • O2: Convert feasibility projects into funded infrastructure (government cloud, secure data exchange, scaled national data center) • O3: A Lao LLM can unlock adoption in Lao-language public services across education, health, agriculture, tourism • O4: AI Innovation Center/AI SEZ can attract start-ups and compute providers leveraging clean energy • O5: Embed ASEAN AI/GenAI governance guidance into procurement and sandboxes now	• O1: Potential to become an ASEAN AI and data center hub with sovereign, Malay/local-language models and services • O2: Productivity gains from AI in priority sectors: manufacturing (smart factories), agriculture (agritech/Rakan Tani), healthcare (medical AI), finance and public services • O3: Chance to lead regionally in AI governance and ethics, and niches, like halal supply chains, Islamic finance, and tropical agriculture	• O1: National AI and Big Data Strategy as a coordination and sequencing mechanism • O2: Expansion of gender-inclusive digital and AI skills pipelines • O3: Data center investment and cloud modernization for AI workloads • O4: Regional and international partnerships for capacity building and policy learning • O5: Context-specific AI applications in public services and priority economic sectors
	Threats • T1: Dependence on foreign technology and partners for LLMs and compute may limit sovereignty if unmanaged • T2: Cybersecurity and privacy risks may outpace oversight capacity • T3: Uncertain funding for major AI infrastructure could delay rollout • T4: Skills gaps may slow scaling from pilots to production	• T1: Geopolitical tensions and export controls on advanced AI chips pose risks to compute supply and investor certainty • T2: Strong regional competition (especially from Singapore and other ASEAN peers) for AI talent, R&D mandates, and capital • T3: Rising cyber and social risks, including a potential “AI divide” between large firms and SMEs, urban and rural areas, and younger and older workers	• T1: Widening rural–urban disparities in access to AI infrastructure and skills • T2: Ongoing brain drain and challenges in retaining AI talent • T3: Dependence on foreign AI solutions and cloud platforms • T4: Rising cybersecurity and data privacy risks as AI adoption scales • T5: Persistently low innovation outputs and limited local value capture • T6: Weak safety and accountability practices that undermine public trust
Future Needs and Collaboration	• Publish an interim AI policy note (priority sectors and minimum guardrails) while the full strategy is finalized • Adopt ASEAN AI Governance and GenAI guidance by default in pilots, procurement, and training • Implement data centers and government data exchange with staged milestones and service-level targets • Establish national AI baselines in 2025, including workforce size, pilots per ministry, Lao LLM corpus/usage, data exchange coverage, IDC/cloud capacity • Invest in talent, cybersecurity, and partner programs to support skills and compute transfer	• Finalize and fund the National AI Action Plan 2030; strengthen NAIIO’s mandate to align strategies, budgets, and KPIs across ministries • Shift to a demand-driven talent model (MyMahir NAICI, GIAT) with focus on SMEs and non-tech/older workers; close VC and scale-up financing gaps; use public procurement to grow local AI vendors • Build a national AI metrics system (AI patents, workforce, sectoral adoption) for evidence-based policy and monitoring • APO collaboration: a regional AI talent mobility scheme, joint AI governance & ethics workshops, and “AI for Good” pilots in areas, like agriculture, climate resilience, and health	• AI governance and ethics: Develop national AI ethics, accountability, and data-sharing frameworks • Innovation and R&D: Establish AI-specific funding, research–industry collaboration, and patent commercialization mechanisms • Human capital: Expand advanced AI education, scholarships, and applied research pathways APO collaboration priorities: • AI data innovation labs and productivity metrics • SME-focused AI accelerator programs • Ethical and inclusive AI pilots in public services • Regional knowledge exchange and peer-learning partnerships

Source: Author’s compilation.

TABLE 16.3

OVERVIEW OF AI READINESS AND CAPACITY OF 11 APO MEMBER ECONOMIES (3)

	Nepal	Pakistan	Sri Lanka
Statistics and Indicators	- Government budget on AI: NPR23.1 million (2025) - Microsoft AI Diffusion Rate (Adoption): 13% - Oxford Insights Government AI Readiness Index: 33.14 - AI workforce: Target for 5,000 skilled AI professionals by 2030 - AI Excellence centers: Proposed in all 7 provinces in collaboration with universities and research institutions (2025)	- Government AI (2024) Readiness Index: 40.61 - Technology score: 36.94. - Data & Infrastructure score: 43.87. Adoption rate: - Agriculture - 25% - Healthcare - 45% - Finance - 65% - Manufacturing - 35% - Education - 50% AI Workforce: 15,000 (2024) growing 10%–15% YoY Govt. AI Investment: PKR24 billion (2024–25) (AI market investment implied by growth to ~USD3 billion by 2030)	- Oxford Insights Government AI Readiness Index: 90 (2020) →85 (2024) - Tortoise Global AI Index: 82 (2024)
National Strategy and Policy	- National AI Policy (2025): Vision for Nepal to be within top 50 in Government AI Readiness Index - AI Guidelines for Banking and Financial Institutions (2025): Responsible and ethical use of AI - Establishment of National AI Center (2025) - Promotion of AI Start-ups (2025): Concessional loans, investment promotion	- National AI Policy – 2025 (approved by the Federal Cabinet on 30 July 2025) - Vision: Develop a knowledge-based economy through democratic access to AI, improving social services, and providing ethical governance - Goal: Educate 1 million AI professionals by 2030, incorporate 50,000 AI-powered civic initiatives into society, produce 1,000 PhD-trained AI professionals, and attain 90% public knowledge by 2026	- Digital Sri Lanka 2030: National Digital Economy Strategy 2030 (2023): First policy document indicating AI readiness - White Paper on AI (2024): First policy document on AI. adoption in Sri Lanka - AI Sri Lanka 2028: Sri Lanka's National Strategy on AI (2024): National AI plan - Digital Economy Blueprint 2025: National policy document requiring localized AI Models
Key Stakeholders	Government: AI Regulatory Council, MoCIT, National AI Center, DoIT, E-Gov Board, NRB Public institutions: AI Excellence Centers, Universities, NAST Private: CAN Federation, NAS-IT, AI start-ups ecosystem	Government: Ministry of Information Technology and Telecommunication (MoITT) – Lead Agency for AI Ministry of Science and Technology (MoST) Private: More than 50–100 AI-related companies & start-ups Public institutions: - National Center of Artificial Intelligence (NCAI) - Association for Advancement of Artificial Intelligence (AAAI) Pakistan Chapter (established 2025) - Sino-Pak Center for Artificial Intelligence (SPCAI) (established 2019) - AI-Sarosh (established 2022)	Government: Ministry of Digital Economy, Presidential Secretariat Industries: ICT/ITES industry firms, telecommunication industry Academia: University of Moratuwa, University of Colombo School of Computing Professional bodies: SLASSCOM (Sri Lanka Association for Software and Services Companies), Computer Society of Sri Lanka (CSSL) Foreign government agencies, IGOs, & think tanks: AI Singapore, Citra Social Innovation Lab (UNDP)
SWOT	S1: Formal National AI Policy (2025) adopted S2: Institutional arrangement with AI Regulatory Council and National AI Center S3: Growing Digital Infrastructure (National ID, digital payments) S4: University AI/ML programs developing skilled workforce	S1: Youthful demographics & talent pool: 60 % under 30 2.37 million freelancers (3rd globally) S2: High generative AI awareness - 76% know ChatGPT S3: National AI Policy 2025 approved on July 2025 (Framework 7 pillars)	S1: Highly skilled IT workforce S2: Government commitment S3: Multistakeholder approach - National policies provide a foundation for wider AI adoption S4: Strong IT industry

		Nepal	Pakistan	Sri Lanka
S W O T	Weaknesses	- W1: Fragmented institutional coordination, low resource availability, and implementation bottlenecks - W2: Very low Research and Development (R&D) and brain drain of AI-skilled manpower - W3: Weak infrastructure, low digital literacy, limited data protection and cybersecurity	- W1: Infrastructure gaps: Rural vs. Urban (rural region has access to broadband is only 30 %), 20 MW data-center capacity (limited according to requirement) - W2: Skills and awareness deficit - Only 15%–20% SMEs use basic AI, gender gap in AI roles - W3: Ethical pillar enforcement gap - 70% healthcare pros flag privacy risks	- W1: Lack of a robust and conducive foundation: Broadband internet in Sri Lanka differs significantly by region and technology, with high-speed (up to 1 Gbps) fiber concentrated in urban areas, primarily in Colombo. But rural areas rely on 4G LTE/3G mobile networks of only a fraction of internet providers, which offer lower, variable speeds, and limited data in some cases - W2: Lack of legal and policy frameworks: Lack of an actionable policy restricts and demotivates adoption across sectors. The Intellectual Property Act (2003) has no provisions governing AI-generated content. This gap is compounded by the absence of judicial review of the same is yet to occur. There is no mechanism to ensure data privacy as even the "right to be forgotten" is not found within the gamut of the national legal system. Further, the current legal system is not fully equipped to assign accountability in cases where AI is involved - W3: Low AI-related skills: Sri Lanka ranks second in South Asia in ChatGPT usage per capita. However, the World Bank warns that Sri Lanka ranks lowest in AI–human complementarity, suggesting that more jobs could be displaced if AI adoption outpaces workforce reskilling efforts - W4: Resistance to change: Despite high per capita ChatGPT usage in Sri Lanka, AI is often perceived as a tool of convenience by employees. Hence, attempts to introduce institutional AI usage policies and AI-based systems is met with resistance
	Opportunities	- O1: Strong government commitment and AI adoption potential in priority sectors - O2: Expanding digital public infrastructure and AI education programs - O3: Potential to develop a Green AI hub leveraging favorable climate conditions and renewable energy	- O1: CPEC 2.0 Digital Corridor: USD2 billion for AI and 5G (2025) - O2: Sectoral success stories - O3: AI products by NCAI (e.g., enhancing yields by 15 % and reducing costs by 20% in agriculture, fraud reduction in MCB by 25%) - O4: Global Models (Romania EUR180M AI/green)	- O1: Income generation opportunities - O2: International partnerships: Private-sector collaboration with international partners, alongside expanding labor market demand for AI. 7.3% of all white-collar job postings required AI-related skills
S W O T	Threats	- T1: High risk of cyberattacks, hacking, and misinformation - T2: Lack of strong governance to regulate biased or unethical AI use - T3: Reliance on foreign AI technologies risks data sovereignty	- T1: Data misuse in surveillance - (e.g., Punjab Safe Cities facial recognition systems) - T2: Quantum-AI cyber risks (e.g., Trillium counters 40% more attacks) - T3: Brain drain and funding volatility	- T1: Widening social divide: In Sri Lanka, the digital divide is significant. While 72% of the urban population was digitally literate in 2021, this declined to 55.2% in rural areas and 38.2% in the estate sectors. Unsustainable AI adoption may widen this gap, and worsen regional disparities both socially and economically as rural and estate youth struggle to enter a labor market where AI skills are likely to be a prerequisite - T2: Unethical and unprofessional use: Many employees view AI as a tool of convenience, and jeopardize institutional data security due to the lack of knowledge in professional use of AI - Global competition

	Nepal	Pakistan	Sri Lanka
Future Needs and Collaboration	• Leverage AI expertise from other APO members • Participate in AI capacity development and productivity enhancement programs from the APO • Access shared applied AI research, computing infrastructure, and technology transfer initiatives from regional partners	• AI training and certification programs: APO-certified training modules • Regional AI research network: Collaborative research clusters • Shared data and simulation platforms: Creating a regional data exchange framework • Green AI Initiatives: Joint projects • Pilot projects for SMEs: AI-enabled productivity improvements in SMEs through regional case studies	• Assistance from the APO and APO members with established AI ecosystems in developing change agents that could promote AI adoption • Develop institutional policies to promote and govern AI usage • Training tactical-level managers as change agents • Adopting solution-based AI models from other APO members

Source: Author's compilation.

TABLE 16.4

OVERVIEW OF AI READINESS AND CAPACITY OF 11 APO MEMBER ECONOMIES (4)

	Turkiye	Vietnam
Statistics and Indicators	• Share of enterprises using AI: 2.7% (2021) → 7.5% (2025) (approximate 2.8 times increase) • AI-related firms in technoparks: 2,300+ (2023) → 6,001 (2025) • AI-related patents and utility models: 158 (2014) → 946 (2024)	• AI Adoption rate (total businesses): 13% (2023)→18% (2024) • AI Patenting: 372 patent applications (2nd in ASEAN after Singapore) • AI Research (2010 – 2018): 2,500 publications (5th in ASEAN) • 55th place globally (6th in ASEAN) in the 2022 Government AI Readiness Index • AI start-ups: 60 (in 2021) - > 300 (in 2024)
National Strategy and Policy	• National Artificial Intelligence Strategy (2021–2025): Maximizes AI's social and economic benefits by 2025; priorities include talent development, R&D, data and infrastructure, ethics and legal frameworks, collaboration, and public-sector transformation • National AI Strategy Action Plan (2024–2025): Implementation roadmap for the strategy; 70+ actions across six pillars (e.g., Turkish-language AI/LLMs, a public data space, a trustworthy AI label) • 2030 Industry and Technology Strategy (2025): Long-term framework for industrial transformation and competitiveness that positions AI as a strategic technology	• Vietnam's National Strategy for AI Research, Development and Application through 2030 (issued in 2021) • National Digital Transformation Program (through 2025, with a vision to 2030) • Law on Artificial Intelligence (draft, released for public consultation in 2025, expected to issue in 2026) • Law on Digital Technology Industry (2025)
Key Stakeholders	• Government: Digital Transformation Office of the Presidency (2018–2025) / Cyber Security Presidency (AI coordination); Ministry of Industry and Technology • Public institutions: TUBITAK Artificial Intelligence Institute; TRUBA (Turkish National Science e-Infrastructure / national HPC center) • Private: ASELSAN; Turkcell; Turk Telekom; AI start-up ecosystem	• Government: Ministry of Science and Technology (MST), National Innovation Center (NIC), Ministry of Planning and Investment (MPI), Ministry of Education and Training (MOET), National Technology Innovation Fund (NATIF), National Steering Committee on Digital Transformation, Ministry of Public Security (MPS) • Public institutions: VNPT, Viettel, Banks, Universities, Vietnam Software and IT Services Association (VINASA), Vietnam Union of Science and Technology Associations (VUSTA) • Private: Vingroup, FPT Corporation, AI start-ups, multinational tech companies
Strengths	• S1: Strong policy vision and institutional ownership (high-level coordination of the national strategy; support and funding mechanisms) • S2: Advanced, dual-use capabilities driven by the defense industry (e.g., autonomous systems, radar/sensor and image processing know-how) • S3: Robust digital infrastructure and e-government capacity (a strong foundation that accelerates AI adoption and deployment)	• S1: Young, tech-savvy, digitally literate population and talent pool • S2: Strong government commitment and vision • S3: Emerging tech ecosystem and infrastructure • S4: High adoption and market receptiveness

	Turkiye	Vietnam
S W O T	Weaknesses - W1: Talent shortages and brain drain; firms cite the lack of qualified specialists as the top barrier to AI adoption - W2: Data challenges; data silos, inconsistent data quality, and limited cross-agency data sharing - W3: External dependency; high reliance on foreign suppliers for GPU/HPC capacity and cloud infrastructure	- W1: Shortage of deep AI expertise despite the large IT workforce - W2: Nascent research capacity and academic linkages - W3: Inadequate high-end infrastructure and data frameworks - W4: Underdeveloped legal and ethical framework (until now)
S W O T	Opportunities - O1: AI-driven productivity and quality gains in manufacturing and export-oriented industries, with potential for regional leadership in Industry 4.0 - O2: Strong domestic data potential and Turkish-language AI solutions, including the goal of a Turkish LLM and localized applications - O3: Opportunity to lead regionally on AI ethics and standards, improving trust and market access through alignment with EU/OECD frameworks	- O1: Significant opportunity for Vietnam to partner with leading international tech firms and research institutions - O2: Leverage AI to make leaps in sectors crucial for productivity and inclusive growth - O3: Policy refinement and first-mover advantage
S W O T	Threats - T1: Intensifying global competition and market pressure from major tech firms - T2: Economic, political, and geopolitical uncertainty, weakening investment appetite, and increasing risks to access advanced chips - T3: Rising brain-drain risk and a widening gap between frontier and late-adopting sectors and regions	- T1: Intense competition for talent and investment in the region - T2: Ethical, social, and cybersecurity risks - T3: Technological change outpacing local readiness - T4: Economic and funding constraints, especially for SMEs
Future Needs and Collaboration	- Scale up human capital development and workforce upskilling and reskilling programs - Strengthen R&D, open data and computing infrastructure (HPC), and expand domestic capacity to develop AI models and solutions - Deepen international cooperation (APO/OECD/EU networks) through joint projects and knowledge sharing	- Strengthen human capital and skills development in AI - Significantly strengthen its digital infrastructure and data foundations - Foster research, innovation, and entrepreneurship in AI - Establish robust AI governance, ethics, and policy implementation - Promote widespread AI adoption, especially for SMEs and traditional sectors - Leverage international collaboration and APO for AI Development

Source: Author's compilation.

Policy Recommendations: Three Strategic Tasks for Mutual AI Prosperity

i) Establishing trust-based common governance and institutional integration

There is a need to establish a common AI governance and ethical framework at the APO level that reflects the unique socioeconomic context of its members. While global AI norms are largely influenced by North America and Europe, APO members have distinct cultural values and are at different stages of economic and industrial developmental stages. This necessitates the development of context-specific standards. Setting regional data interoperability standards and common guidelines for trustworthy AI would help minimize social risks. Furthermore, this report recommends creating an APO Policy Sandbox to foster an environment where innovative AI services can scale across borders, providing members with collective bargaining power at international standard-setting forums.

ii) Strengthening human capital and vitalizing knowledge-sharing ecosystems

To bridge the regional capacity divide, a knowledge-sharing platform should be established and institutionalized. At the APO level, efforts are needed to address the shortage of AI talent and to systematically transfer policy best practices from frontier to foundational economies. Members can also cooperate to create an AI Labor Mobility Program that facilitates cross-border talent exchanges and joint certification. In addition, an APO common AI literacy certification for the

existing workforce, alongside sector-specific reskilling programs, would help prevent labor market polarization. This could also help mitigate brain drain and foster a virtuous cycle of talent circulation that upgrades the value of digital human capital across Asia.

iii) **Sharing technical collaboration platforms and physical infrastructure**

To overcome resource constraints that individual economies may find difficult to bear, this report recommends establishing an APO Regional Data and Computing Center. Such a facility could provide SMEs and start-ups with low-cost access to high-performance computing (e.g., GPUs) to develop AI models and perform other tasks. This would significantly accelerate industrial commercialization. In addition, establishing an APO Data Commons to aggregate sector-specific data is recommended, as it could improve the efficiency of joint R&D. These platforms would establish crucial linkages across the regional AI ecosystem across APO member economies, serving as a powerful engine to protect collective interests in the face of dominant global technology firms.

Contributions to the Literature and Avenues of Future Research

This study provides a systematic overview of the AI landscape in the Asia-Pacific region through a unified analytical framework. The findings, including AI readiness, strengths, weaknesses, opportunities, threats, and policy dimensions can inform practical guidelines for policymakers and serve as a springboard for more in-depth research.

In particular, the in-depth analysis of individual economies reflects their unique developmental and industrial contexts and can serve as a vital reference for formulating tailored national strategies or cross-border cooperation models. The data and insights accumulated in this report constitute a major intellectual asset that could be leveraged to accelerate AI-driven digital transformation and pursue sustainable development within the APO.

It must be noted, however, that this study relied in part on the qualitative judgments of experts, which introduces certain limitations regarding scientific objectivity. While expert judgment can help identify and interpret some complex phenomena, this line of inquiry could be expanded by building a continuous, evidence-based verification system informed by quantitative indicators. Subsequent research should integrate the current framework with additional statistical data to empirically evaluate AI capabilities across multiple dimensions. Three specific tracks are proposed: first, a comparative legal analysis to design interoperable standards for shared governance; second, an empirical estimation of AI labor demand and supply to inform the design of the mobility program; and third, a technical architecture and economic feasibility study for the regional computing center. The results of these studies could help ensure that the recommendations of this report are translated into substantive policy.

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LIST OF TABLES

PART I: CONTEXT AND FOUNDATIONS

CHAPTER 1 OVERVIEW

Table 1.1	APO (2025) and the Present Study.....	3

CHAPTER 2 AI READINESS AND STRUCTURAL TRANSFORMATION

Table 2.1	AI System Tasks.....	7
Table 2.2	AI-based Transformation: Dimensions and Mechanisms.....	11
Table 2.3	Sectoral Restructuring and Value-chain Reposition: Dimensions and Mechanisms.....	12
Table 2.4	Effects of AI on Labor: Dimensions and Mechanisms.....	13

PART II: ANALYTICAL FRAME AND DIAGNOSTIC ASSESSMENT OF AI POLICIES

CHAPTER 3 ANALYTICAL FRAMEWORK AND METHODOLOGY

Table 3.1	Summary of AI Readiness among APO Members.....	29

PART III: NATIONAL AI ECOSYSTEMS – ASSESSMENT, POSITIONING, AND ROADMAP

CHAPTER 5 INDIA

Table 5.1	India's National AI Policy Matrix.....	48
Table 5.2	Summary of Key Stakeholders.....	56
Table 5.3	Key Future Needs and Collaboration Directions for India's AI Development.....	66

CHAPTER 6 JAPAN

Table 6.1	Key Japanese AI Readiness Indicators.....	69
Table 6.2	Japan's National AI Policy Matrix.....	74
Table 6.3	Summary of Key Stakeholders.....	81

CHAPTER 7 REPUBLIC OF KOREA

Table 7.1	Status of Workers in AI-related Occupations, 2024.....	104
Table 7.2	ROK's AI Policy Matrix.....	105
Table 7.3	Ministerial Roles.....	112
Table 7.4	Summary of Key Stakeholders (Public Sector and Parastatals).....	113
Table 7.5	Summary of Key Stakeholders (Large Enterprises).....	114
Table 7.6	Summary of Key Stakeholders (SMEs and Start-ups).....	116
Table 7.7	SWOT Matrix: ROK.....	120
Table 7.8	Strategic Directions and Policy Examples.....	122

CHAPTER 8 LAO PDR

Table 8.1	AI-related Indicators in Lao PDR.....	126
Table 8.2	Lao PDR's National Policy Matrix.....	128
Table 8.3	Summary of Key Stakeholders.....	132
Table 8.4	SWOT Matrix: Lao PDR.....	137

CHAPTER 9 MALAYSIA

Table 9.1	Key AI Development Indicators for Malaysia, 2020–25.....	147
Table 9.2	Sectoral Adoption of AI Tools in Malaysia (Selected Sectors, 2024).....	147
Table 9.3	Selected Indicators of AI Use in Malaysia, 2023–25.....	148
Table 9.4	AI-related R&D Indicators in Malaysia, Time Series Trends.....	148
Table 9.5	Malaysia's National AI Policy Matrix.....	152

Table 9.6	Summary of Key Stakeholders.....	156
Table 9.7	SWOT Matrix: Malaysia.....	160
CHAPTER 10 MONGOLIA		
Table 10.1	Key AI Indicators: Mongolia.....	162
Table 10.2	Mongolia's National AI Policy Matrix.....	164
Table 10.3	Summary of Key Stakeholders (Private Sector).....	169
Table 10.4	Summary of Key Stakeholders (Public Sector and Parastatals).....	170
Table 10.5	SWOT Matrix: Mongolia.....	174
CHAPTER 11 NEPAL		
Table 11.1	GARI Scores for Nepal, 2021–24.....	178
Table 11.2	IMF AI Preparedness Index of Nepal, 2023.....	179
Table 11.3	Nepal's Network Readiness Index (NRI), 2024.....	179
CHAPTER 12 PAKISTAN		
Table 12.1	AI-related Patent Trends in Pakistan.....	197
Table 12.2	AI Workforce in Pakistan.....	198
Table 12.3	Pakistan's Government and Private R&D Investment in AI.....	199
Table 12.4	Pakistan's AI-related Funding for FY2024–25 and FY2025–26.....	202
Table 12.5	Recommendations: Pakistan.....	212
CHAPTER 13 SRI LANKA		
Table 13.1	Sri Lanka's AI Readiness, 2020–24.....	217
Table 13.2	Sri Lanka Tortoise Global AI Index Scores.....	218
PART IV: CONCLUSION AND FUTURE DIRECTIONS		
CHAPTER 16 TOWARD INCLUSIVE AI PROSPERITY THROUGH STRATEGY AND COOPERATION		
Table 16.1	Overview of AI Readiness and Capacity of 11 APO Member Economies (1).....	273
Table 16.2	Overview of AI Readiness and Capacity of 11 APO Member Economies (2).....	277
Table 16.3	Overview of AI Readiness and Capacity of 11 APO Member Economies (3).....	280
Table 16.4	Overview of AI Readiness and Capacity of 11 APO Member Economies (4).....	282

LIST OF FIGURES

PART I: CONTEXT AND FOUNDATIONS

CHAPTER 2 AI READINESS AND STRUCTURAL TRANSFORMATION

Figure 2.1	Conceptualization of an AI Foundation Model.....	6
Figure 2.2	Data Centers: Key Participants and Inputs.....	8
Figure 2.3	AI Mentions in the Legislative Proceedings of 75 Jurisdictions, 2016–24.....	8
Figure 2.4	AI in National Legislative Proceedings, 2016–24 (Sum).....	9

PART II: ANALYTICAL FRAME AND DIAGNOSTIC ASSESSMENT OF AI POLICIES

CHAPTER 3 ANALYTICAL FRAMEWORK AND METHODOLOGY

Figure 3.1	Milestone AI Policy Announcements.....	21
Figure 3.2	AI Policies in APO Member Economies.....	22

PART III: NATIONAL AI ECOSYSTEMS – ASSESSMENT, POSITIONING, AND ROADMAP

CHAPTER 5 INDIA

Figure 5.1	Organizational Readiness Levels in India, 2024.....	36
Figure 5.2	AI Adoption Rate by Sector in India, 2025.....	37
Figure 5.3	AI Share in Tech Patents.....	38
Figure 5.4	India’s GenAI Momentum Growth Rate vs. Top Five Global Average, 2014–23.....	38
Figure 5.5	Indian Government and Private-sector Investments in AI R&D, 2021–24.....	40
Figure 5.6	AI Readiness: India vs. APJC.....	59
Figure 5.7	SWOT Matrix: India.....	63

CHAPTER 6 JAPAN

Figure 6.1	Japanese AI Readiness: Time-series Trends for Key Indicators, 2018–25.....	70
Figure 6.2	Bimodal AI Adoption Distribution in Japan vs. International Benchmarks (%).....	71
Figure 6.3	SWOT Matrix: Japan.....	85

CHAPTER 7 REPUBLIC OF KOREA

Figure 7.1	Use of AI by Korean Firms, 2017–23.....	95
Figure 7.2	AI Adoption by Sector, 2023.....	96
Figure 7.3	Public Sector AI Adoption in the ROK.....	97
Figure 7.4	AI Adoption by Field, Public Sector Top 10, 2017–23.....	97
Figure 7.5	US Patent and Trademark Office Patent Filings by ROK, 2017–21.....	98
Figure 7.6	ROK’s Share of AI-Related Academic Publications, 2017–24.....	99
Figure 7.7	AI Publications by Type in the ROK, 2017–24.....	100
Figure 7.8	ROK AI Venture Capital Investment, 2017–24.....	101
Figure 7.9	ROK AI Venture Capital Investment Trend by Industry, 2017–24.....	101
Figure 7.10	Korean Government AI R&D Investment, 2019–23.....	102
Figure 7.11	AI Workforce in the ROK, 2019–24.....	103

CHAPTER 9 MALAYSIA

Figure 9.1	Projected Growth of Malaysia’s AI Market.....	142
Figure 9.2	Adoption Gap in Malaysia’s AI Landscape.....	143
Figure 9.3	AI Adoption Rates by Sector in Malaysia.....	144
Figure 9.4	Malaysia’s Government AI Readiness Index.....	144

CHAPTER 12 PAKISTAN

Figure 12.1	AI Adoption Rates by Sector, Cross-country Comparison.....	195
Figure 12.2	Pakistan's National AI Policy Matrix.....	199
Figure 12.3	AI Market Projected in Pakistan.....	204
Figure 12.4	SWOT Matrix: Pakistan.....	207

CHAPTER 13 SRI LANKA

Figure 13.1	Framework of Sri Lanka's National AI Strategy.....	220
Figure 13.2	Strategic Framework for Advancing AI in Sri Lanka.....	221
Figure 13.3	Digital Economy Blueprint.....	223
Figure 13.4	Key AI Stakeholders in Sri Lanka.....	227
Figure 13.5	SWOT Matrix: Sri Lanka.....	228

CHAPTER 14 TURKIYE

Figure 14.1	AI Adoption by Enterprise Size in Turkiye.....	233
Figure 14.2	Reasons for Non-adoption of AI by Enterprises, 2025.....	233
Figure 14.3	Enterprises Using AI Technologies by Country and Region, 2023–24.....	234
Figure 14.4	AI Application Areas among Enterprises in Turkiye: 2023 vs. 2024.....	235
Figure 14.5	Number of Patent and Utility Model Applications Related to AI in Turkiye, 2014–2024.....	236
Figure 14.6	Growth in the Number of AI-focused Companies in Turkiye.....	237

ABBREVIATIONS AND ACRONYMS

AAAI	Association for Advancement of Artificial Intelligence
ABCI	AI Bridging Cloud Infrastructure
ADB	Asian Development Bank
AI	Artificial intelligence
AI4VN	Vietnam Artificial Intelligence Day
AIGE	National Artificial Intelligence Governance and Ethics
AILA	Artificial Intelligence Landscape Assessment
AIP	Center for Advanced Intelligence Project
AIPI	Artificial Intelligence Preparedness Index
AIRAWAT	AI Research, Analytics and Knowledge Dissemination Platform
AI-Rmap	National Artificial Intelligence Roadmap
AISI	AI Safety Institute
AIST	National Institute of Advanced Industrial Science and Technology
AMD	Advanced Micro Devices
ANRF	Anusandhan National Research Foundation
APEC	Asia Pacific Economic Cooperation
APIs	Application Programming Interfaces
APJC	Asia-Pacific-Japan
APO	Asian Productivity Organization
ARM	Advanced RISC Machine
ASEAN	Association of Southeast Asian Nations
AutoML	Automated machine learning
AWS	Amazon Web Services
AX	AI Transformation
B2C	Business-to-Consumer
BCG	Boston Consulting Group
BFS	Banking and financial services
BFSI	Banking, financial services, and insurance
BIMSTEC	Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation
BNS	Bharatiya Nyay Sanhita <i>(India's new substantive criminal law enacted to replace the colonial-era Indian Penal Code effective from 1 July 2024)</i>
BoJ	Bank of Japan
BPM	Business Process Management
CAGR	Compound Annual Growth Rate

CAIR	Centre for Artificial Intelligence and Robotics
CAN	Computer Association of Nepal
CBDDO	Presidency's Digital Transformation Office
CBSE	Central Board of Secondary Education
C-DAC	Centre for Development of Advanced Computing
CEO	Chief Executive Officer
CERT-In	Indian Computer Emergency Response Team
CFSAI	Committee on Formulating a Strategy for Artificial Intelligence
CoE	Center of Excellence
COREs	Centers of Research Excellence
CPEC	China–Pakistan Economic Corridor
CSOs	Civil society organizations
CSPAI	Certified Security Professional in Artificial Intelligence
CSSL	Computer Society of Sri Lanka
CTS	Craftsman Training Scheme
DASH	Data-driven Approach for Software as a Medical Device Holistic Safety
DDT	Department of Digital Technology
DGT	Directorate General of Training
DNF	Digital Nepal Framework
DOI	Department of Industry
DoIT	Department of Information Technology
DPDPA	Digital Personal Data Protection Act
DPI	Digital public infrastructure
DPIAs	Data Protection Impact Assessments
DRDO	Defence Research and Development Organisation
DST	Department of Science & Technology
DX	Digital transformation
EGDI	E-Government Development Index
eKYC	Electronic Know Your Customer
EPO	European Patent Office
ETA	Electronic Transactions Act
ETRI	Electronics and Telecommunications Research Institute
EU	European Union
EUR	European Union euro (ISO currency code)
EV	Electric vehicle
FAS	Financial Services Agency

ABBREVIATIONS AND ACRONYMS

FMCG	Fast-moving Consumer Goods
FSA	Financial Services Agency
FY	Financial year
GARI	Government AI Readiness Index
GCI	Global Consumer Intelligence
GDMS	Global Digital Management Solutions
GDP	Gross domestic product
GenAI	Generative AI
GENIAC	Generative AI Accelerator Challenge
GERD	Gross Expenditure on R&D
GII	Global Innovation Index
GPAI	Global Partnership on Artificial Intelligence
GPT	General-purpose technology
GPU	Graphics processing unit
GW	Gigawatt
HCI	Human Capital Index
HEC	Higher Education Commission
HLIs	Higher learning institutions
HMB	High-bandwidth memory
HPC	High Performance Computer
HPC	High-performance computing
HPGS	Happy Palace Grammar School
HRD Corp	Human Resource Development Corporation
HUST	Hanoi University of Science and Technology
IBEF	India Brand Equity Foundation
ICT	Information and communications technology
ICTA	Information and Communication Technology Agency of Sri Lanka
ICTAI	International Center for Transformative Artificial Intelligence
IEA	International Energy Agency
IEC	International Electrotechnical Commission
IFR	International Federation of Robotics
IISc	Indian Institute of Science
IIT	Indian Institute of Technology
IITP	Institute for Information & Communications Technology Planning & Evaluation
ILO	International Labor Organization
IMF	International Monetary Fund

INR	Indian rupee (ISO currency code)
IOE	Institute of Engineering
IoE	Internet of Everything
IoT	Internet of Things
IP	Intellectual property
IPA	Information-technology Promotion Agency
IPC	International Patent Classification
IPO	Indian Patent Office
IPO	Initial public offering
ISMAP	Information System Security Management and Assessment Program
ISO	International Organization for Standardization
IT	Information technology
ITES	Information Technology Enabled Services
ITIs	Industrial training institutes
ITU	International Telecommunication Union
ITU	Istanbul Technical University
JICA	Japan International Cooperation Agency
JISA	Japan Information Technology Services Industry Association
JPO	Japan Patent Office
JPY	Japanese yen (ISO currency code)
KAIST	Korea Advanced Institute of Science & Technology
KCMC	Korea Media and Communications Commission
KESUMA	Ministry of Human Resources
KISA	Korea Internet & Security Agency
KISDI	Korea Information Society Development Institute
KISTI	Korea Institute of Science and Technology Information
KLI	Korea Labor Institute
KOSEN	National Institute of Technology (Japan; from <i>Kōtō Senmon Gakkō</i>)
KOSGEB	Small and Medium Enterprises Development Organization
KOSIS	Korean Statistics Information Service
KPI	Key Performance Indicator
KRW	Republic of Korea won (ISO currency code)
KVKK	Personal Data Protection Authority
LAK	Lao PDR kip (ISO currency code)
LGWAN	Local Government Wide Area Network
LKR	Sri Lankan rupee (ISO currency code)

ABBREVIATIONS AND ACRONYMS

Llama	Large Language Model Meta AI
LLM	Large language model
LUMS	Lahore University of Management and Science
MASTIC	Malaysian Science, Technology Information Centre
M.AX	Manufacturing-AI Convergence
MCST	Ministry of Culture, Sports and Tourism
MDAG-AI	Malaysia Digital Acceleration Grant-Artificial Intelligence
MDASH	Mathematics, Data Science, and AI Education Program Certification System
MDDIC	Ministry of Digital Development, Innovation and Communications
MDEC	Malaysia Digital Economy Corporation
MeitY	Ministry of Electronics & Information Technology
METI	Ministry of Economy, Trade and Industry
METU	Middle East Technical University
MEXT	Ministry of Education, Culture, Sports, Science and Technology
MGX	MGX (UAE state-backed AI investment fund)
MHA	Ministry of Home Affairs
MHLW	Ministry of Health, Labour and Welfare
MIC	Ministry of Information and Communications (Vietnam)
MIC	Ministry of Internal Affairs and Communications (Japan)
MIDA	Malaysian Investment Development Authority
MITI	Ministry of Investment, Trade and Industry
ML	Machine Learning
MLOps	Machine learning operations
MNC	Multinational corporation
MNT	Mongolian tugrik (ISO currency code)
MoCIT	Ministry of Communication and Information Technology
MoDE	Ministry of Digital Economy
MoE	Ministry of Education (India)
MOE	Ministry of Education (Republic of Korea)
MoED	Ministry of Economy and Development
MOEF	Ministry of Economy and Finance
MOEL	Ministry of Employment and Labor
MoES	Ministry of Education and Sports
MOET	Ministry of Education and Training
MoFRPT	Ministry of Federal Education and Professional Training
MOHE	Ministry of Higher Education

MoIP	Ministry of Industries and Production
MoITT	Ministry of Information Technology and Telecommunication
MOLE	Ministry of Labour and Employment
MoM	Month over month
MoNE	Ministry of National Education
MoST	Ministry of Science and Technology (Pakistan)
MOST	Ministry of Science and Technology (Vietnam)
MOSTI	Ministry of Science, Technology and Innovation
MOTIR	Ministry of Trade, Industry and Resources
MoU	Memorandum of Understanding
MPI	Ministry of Planning and Investment
MSDE	Ministry of Skill Development and Entrepreneurship
MSIT	Ministry of Science and ICT
MSS	Ministry of SMEs and Startups
MTC	Ministry of Technology and Communications
MUFG	Mitsubishi UFJ Financial Group
MW	Megawatt
MyIPO	Intellectual Property Corporation of Malaysia
MYR	Malaysian ringgit (ISO currency code)
NADRA	National Database and Registration Authority
NAIF	National Artificial Intelligence Fund
NAIO	National AI Office
NAIS	National AI Strategy
NAPS	National Apprenticeship Promotion Scheme
NASSCOM	National Association of Software and Service Companies
NAVTTTC	National Vocational and Technical Training Commission
NBR	National Bureau of Asian Research
NCAI	National Center of Artificial Intelligence
NCBC	National Center for Big Data and Cloud Computing
NCRA	National Centre of Robotics and Automation
NCVET	National Council of Vocational Education and Training
NDL	National Diet Library
NEA	New Enterprise Associates
NEDO	New Energy and Industrial Technology Development Organization
NEP	National Education Policy
NGO	Nongovernmental organizations

ABBREVIATIONS AND ACRONYMS

NIA	National Information Society Agency
NIC	National Innovation Center
NICT	National Institute of Information and Communications Technology
NID	National Identity Card
NII	National Institute of Informatics
NIMS	National Institute for Materials Science
NIPA	National IT Industry Promotion Agency
NIPSSR	National Institute of Population and Social Security Research
NISTEP	National Institute of Science and Technology Policy
NITI Aayog	National Institution for Transforming India
NLP	Natural language processing
NM-ICPS	National Mission on Interdisciplinary Cyber-Physical Systems
NPEDC	National Productivity and Economic Development Centre
NPR	Nepalese rupee (ISO currency code)
NPS	National Productivity Secretariat
NPU	Neural processing unit
NRB	Nepal Rastra Bank
NRI	Network Readiness Index
NSDC	National Skill Development Corporation
NSTP	National Science and Technology Park
NTIS	National Technology and Innovation Sandbox
NTT	Nippon Telegraph and Telephone Corporation
NUOL	National University of Laos
NUST	National University of Science and Technology
OCR	Optical character recognition
OECD	Organisation for Economic Co-operation and Development
OPHRD	Ministry of Overseas Pakistanis and Human Resource Development
OVP	Medium-Term Program
PCSIR	Pakistan Council of Scientific & Industrial Research
PFN	Preferred Networks, Inc.
PhD	Doctor of Philosophy
PIAIC	Presidential Initiative for Artificial Intelligence and Computing
PIB	Press Information Bureau
PKR	Pakistani rupee (ISO currency code)
PMDA	Pharmaceuticals and Medical Devices Agency
PMKVY	Pradhan Mantri Kaushal Vikas Yojana

PPP	Public–private partnership
PSA	Principal Scientific Advisor
PSDP	Public Sector Development Programme
PSEB	Pakistan Software Export Board
PSU	Public Sector Unit
PwC	PricewaterhouseCoopers
QR	Quick Response
R&D	Research and development
RAM	Readiness Assessment Methodology
RB	Reserve Bank of India
RDI	Research, Development, and Innovation
RFID	Radio Frequency Identification
RIKEN	Rikagaku Kenkyūsho (Institute of Physical and Chemical Research)
ROC	Republic of China
ROI	Return on Investment
ROK	Republic of Korea
S&T	Science and technology
SAARC	South Asian Association for Regional Cooperation
SaaS	Software as a Service
SaMD	Software as a medical device
SBP	State Bank Pakistan
SDGs	Sustainable Development Goals
SEZ	Special Economic Zone
SIDH	Skill India Digital Hub
SIM	Skill India Mission
SINET	Science Information Network
SLASSCOM	Sri Lanka Association for Software and Services Companies
SLIIT	Sri Lanka Institute of Information Technology
SMEs	Small and medium-sized enterprises
SO	Strengths–Opportunities
SOEs	State-owned enterprises
SPC	Secure Public Cloud
SPCAI	Sino-Pak Center for Artificial Intelligence
ST	Strengths–Threats
STEM	Science, Technology, Engineering, and Mathematics
STI	Science, Technology, and Innovation

ABBREVIATIONS AND ACRONYMS

STP	Software Technology Park
STPI	Software Technology Parks of India
SWOT	Strengths, weaknesses, opportunities, and threats
TalentCorp	Talent Corporation Malaysia Berhad
TALIS	Teaching and Learning International Survey
TB	Terabytes
TCS	Tata Consultancy Services
TIHs	Technology and Innovation Hubs
TPU	Tensor Processing Unit
TRAI	Turkiye Artificial Intelligence Initiative
TRCSL	Telecommunications Regulatory Commission of Sri Lanka
TRIPS	Trade-Related Aspects of Intellectual Property Rights
TRUBA	National High-Performance Computing Center
TRY	Turkish lira (ISO currency code)
TTRPs	Technology and Translation Research Parks
TU	Tribhuvan University
TUBITAK	Scientific and Technological Research Council of Türkiye
TurkStat	Turkish Statistical Institute
TUSIAD	Turkish Industry and Business Association
UAE	United Arab Emirates
UCSC	University of Colombo School of Computing
UK	United Kingdom
ULAKBİM	National Academic Network and Information Center
UM	Universiti Malaya
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations International Children's Emergency Fund
UPI	Unified Payments Interface
USA/US	United States of America
USD	United States dollar (ISO currency code)
UTM	Universiti Teknologi Malaysia
VAST	Vietnam Academy of Science and Technology
VFX	Sound effects
VIGEN	Open-source Vietnamese language dataset

VINASA	Vietnam Software and IT Services Association
VND	Vietnamese dong (ISO currency code)
VNPT	Vietnam Posts and Telecommunications Group
VNU	Vietnam National University
VUSTA	Vietnam Union of Science and Technology Associations
WEF	World Economic Forum
WIPO	World Intellectual Property Organization
WO	Weaknesses–Opportunities
WT	Weaknesses–Threats
WTO	World Trade Organization
xIPF	Cross-Industry Physical AI Foundation Models Consortium
YoY	Year-on-year

LIST OF CONTRIBUTORS

Korea Institute for Industrial Economics and Trade (KIET)

Dr. Jaehan Cho

Director of Future Industrial Policy Center & Senior Research Fellow
Center of Industrial Policy Center

Dr. Danbee Song

Director of Office of Industrial Innovation Policy & Research Fellow
Office of Industrial Innovation Policy

Dr. Mincheol Choi

Supervisor & Research Fellow
Office of Industrial Innovation Policy

Dr. Soon-hong Min

Associate Research Fellow
Office of Industrial Innovation Policy

Minyoung Cha

Researcher
Office of Industrial Innovation Policy

Cheyeong Lee

Researcher
Office of Industrial Innovation Policy

Administrative support

Crossen Aaron Lee

Administrative Coordinator
Public Relations Team

Hyeonji Kim

Administrative Associate
Research Support Team

National Experts

Nikhil Panchbhai

Director & Group Head

Information Technology & Centre of Excellence on IT for Industry 4.0

National Productivity Council of India

New Delhi, India

Dr. Akira Murata

Associate Professor

Faculty of International Liberal Arts

Juntendo University

Tokyo, Japan

Phouthaphone Southammavong

Director

Planning and Cooperation Division

Institute for Industry, Commerce and Energy

Vientiane, Lao PDR

Dr. Aznul Qalid Md. Sabri

Associate Professor

Universiti Malaya

Kuala Lumpur, Malaysia

Oyungoo Enkhbold

Consultant

Accelerator Lab

UNDP in Mongolia

Ulaanbaatar, Mongolia

Deepesh Lekhak

General Manager (Under Secretary)

National Productivity and Economic Development Centre Limited

Kathmandu, Nepal

Dr. Muhammad Awais

Assistant Professor

Department of Fibre and Textile Technology

University of Agriculture, Faisalabad

Faisalabad, Pakistan

Pranidhi Prasandika Algama Bopagamage

Deputy Director

National Productivity Secretariat

Colombo, Sri Lanka

Dr. Ahmet Er

Industry and Technology Specialist
Directorate General for Strategic Research and Productivity
Ministry of Industry and Technology
Ankara, Turkiye

Vu Thi Thu Phuong

Acting Director
International Cooperation
Commission for Standards, Metrology and Quality of Viet Nam (STAMEQ)
Hanoi, Vietnam

APO Secretariat

Kyung Hyun Park

Program Officer
Asian Productivity Organization

