



NATIONAL AI ROADMAP

for the Sustainable Productivity
of Industries in Thailand



สถาบันส่งเสริมผลิตผล
THAILAND PRODUCTIVITY INSTITUTE



futurelab

The Asian Productivity Organization (APO) is an intergovernmental organization that promotes productivity as a key enabler for socioeconomic development and organizational and enterprise growth. It promotes productivity improvement tools, techniques, and methodologies; supports the National Productivity Organizations of its members; conducts research on productivity trends; and disseminates productivity information, analyses, and data. The APO was established in 1961 and comprises 21 members.

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NATIONAL AI ROADMAP

FOR THE SUSTAINABLE PRODUCTIVITY
OF INDUSTRIES IN THAILAND

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This publication was authored by Moses Ma and the FutureLab team.

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ABOUT THIS REPORT

This report was developed under an APO policy assistance initiative in response to a request from the Thailand Productivity Institute (FTPI) to support the formulation of a national AI roadmap for enhancing the sustainable productivity and competitiveness of Thai industries. To undertake the specialized research, stakeholder engagement, technical analysis, and preparation of the roadmap, the APO engaged FutureLab as an external technical partner, working in close consultation with FTPI and the APO Secretariat throughout the assignment. The process combined international expertise with extensive local inputs, including 23 in-depth ethnographic interviews with policymakers, industry leaders, academics, and other stakeholders, followed by a strategy workshop in Bangkok and an AI training program to test and translate the roadmap's recommendations into practical capacity-building approaches.

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The FutureLab team is grateful for the consistent and thoughtful support and guidance provided by the APO and FTPI teams, with whom it was a privilege to collaborate. Their dedication and commitment were instrumental in the successful preparation of this report.

The Asian Productivity Organization (APO) is an intergovernmental organization that promotes productivity as a key enabler for socioeconomic development and organizational and enterprise growth. It advances productivity improvement tools, techniques, and methodologies; supports the National Productivity Organizations (NPO) of its members; researches productivity trends; and disseminates productivity-related information, analyses, and data. Established in 1961, the APO currently comprises 21 member economies.

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FOREWORD

Artificial intelligence (AI) is no longer a technology of the future but a defining force reshaping industries, economies, and societies. With Thailand advancing toward a more innovative and competitive economy, accelerating AI adoption presents a significant opportunity to enhance industrial competitiveness, boost productivity, and strengthen long-term economic resilience. Developed through the Specific National Program by the Ministry of Industry (MIND), Thailand Productivity Institute, and Asian Productivity Organization (APO), the *National AI Roadmap for the Sustainable Productivity of Industries in Thailand (2025–2030)* provides a strategic framework to accelerate AI adoption and promote responsible governance, workforce development, and sustainable and inclusive growth. To realize this vision, strong leadership, investment in human capital, an enabling innovation ecosystem, and close collaboration among government, industry, academia, and international partners are required to ensure that AI benefits all members of the society.

This roadmap reflects Thailand’s commitment to advancing the APO Vision 2030 through the Strategic Partnership Program’s (SPP) Key Strategic Focus Area 1: Digital Transformation and Thailand 4.0, recognizing AI as a key driver of productivity transformation, smart industries, and digital ecosystems that will strengthen Thailand’s position as a regional digital leader. Building upon the results of the SPP, Thailand will focus on the development of AI Productivity Specialists while promoting the adoption of AI across organizations and throughout industrial value chains. By integrating AI, innovation, and sustainable productivity into every stage of industrial development, we aim to create a greener, smarter, more competitive Thailand for the future.

Thailand’s MIND remains committed to leading the nation’s AI-driven industrial transformation through innovation, stronger industrial capabilities, and responsible AI adoption. I sincerely thank the APO and all experts, researchers, government agencies, academic institutions, and private-sector partners whose contributions made this roadmap possible. I hope that this roadmap will serve as a strategic guide and inspire collective action toward a more productive, innovative, resilient, and sustainable Thailand.

Dr. Nattapol Rangsitpol
Permanent Secretary, Ministry of Industry
APO Director for Thailand

In the present era, Artificial intelligence (AI) is not just a technological capability but also a new source of productivity, competitiveness, innovation, and resilience. Therefore, for Thailand, the central question is not whether AI will reshape industry but how deliberately and inclusively can the country harness it to create greater value from its people, enterprises, resources, and existing industrial strengths. This *National AI Roadmap for the Sustainable Productivity of Industries in Thailand* responds to that imperative by placing productivity improvement at the heart of AI-enabled industrial transformation.

The timing is particularly important. Thailand enters this transformation with considerable strengths and a clear need to renew its growth model. The World Bank estimates that manufacturing continues to account for about 25% of Thailand's GDP and 16% of employment at about 6.2 million jobs. Moreover, economic growth is projected at only 1.6% in 2026, highlighting the importance of moving toward higher-value activities, stronger innovation, and greater productivity. Encouragingly, Thailand possesses substantial foundations for this transition: its digital economy already contributes around 6% of GDP, while near-universal mobile connectivity, advanced digital public infrastructure, digital payments, and a growing technology ecosystem provide a strong platform to scale AI adoption.

AI can help Thailand convert these foundations into a new productivity dividend. In factories, it can strengthen predictive maintenance, quality control, energy management, supply-chain optimization, and advanced automation. For SMEs, it can lower the cost of accessing sophisticated analytics, knowledge, markets, and business services. Across the wider economy, it can reinforce Thailand's capabilities in advanced electronics, electric vehicles, food and agriculture, healthcare, tourism, and emerging green industries. This convergence between digital transformation and green industrial upgrading is especially promising: a recent World Bank analysis estimates the expansion of advanced green manufacturing to raise Thailand's GDP by an additional 2.9% by 2035.

However, technology by itself does not generate productivity. Productivity gains rise when technology is combined with capable people, redesigned processes, quality data, investment, effective institutions, and a culture of continuous improvement. Recent international evidence reinforces this point. The ILO's 2026 review finds that generative AI increases productivity gains but has considerable variations in its outcomes, indicating that effective implementation matters as much as technological access. Its broader research similarly shows that AI is more likely to transform and augment many jobs than simply eliminate them, making workforce development, reskilling, social dialogue, and responsible adoption essential components of the transition.

Hence, the Roadmap appropriately goes beyond technology deployment and connects AI adoption with workforce capability, SME transformation, digital infrastructure, responsible governance, sustainability, inclusion, partnerships, and measurable results. It proposes concrete ambitions for industrial productivity and AI adoption and, importantly, calls for monitoring systems that connect technology uptake to outcomes such as productivity growth, cost reductions, innovation, and resource efficiency. While doing so, it shifts the discussion from “How much AI are we adopting?” to “What measurable value is AI creating?” This distinction is fundamental to a productivity-centered national strategy.

The Roadmap also reflects the realities of Thailand rather than relying solely on global models. Developed collaboratively by the Thailand Productivity Institute, the Asian Productivity Organization, and FutureLab, it draws on 23 in-depth ethnographic interviews, a strategy workshop involving key stakeholders, and practical AI training with tested methodologies for wider implementation through an AI Productivity Specialist. The Roadmap, which combines national insight, international experience, and an implementation-oriented approach, is thus of particular value.

The task ahead is to sustain the execution of this roadmap. The government must provide strategic direction and enabling conditions; industries must transform AI into better processes, products, services, and business models; educational and research institutions must keep renewing skills and knowledge; and workers and communities must actively participate in shaping the transformation. The collaboration among the Ministry of Industry, other government agencies, the private sector, academia, financial institutions, and international partners will be indispensable. The Roadmap itself recognizes that coordinated partnerships are essential for infrastructure, skills, SME support, innovation, and financing.

For the APO, this is ultimately a productivity agenda with a human purpose. The measure of success will not be the sophistication of algorithms deployed but whether AI allows Thailand to increase the value of its resources, create more productive jobs, strengthen enterprises of every size, accelerate green transition, and expand opportunities across society.

Thailand possesses the industrial foundations, entrepreneurial capability, institutions, and human talent to succeed. With disciplined implementation, continuous learning, responsible governance, and an unwavering focus on measurable productivity outcomes, AI can become not only a response to technological disruption but also a powerful instrument for building a more competitive, sustainable, inclusive, and prosperous Thailand.

I hope that this publication will serve as a roadmap for action and an invitation to policymakers, enterprises, workers, researchers, and partners to shape that future together.

Dr. Indra Pradana Singawinata
Secretary-General
Asian Productivity Organization

EXECUTIVE SUMMARY

The global context in which Thai society operates is being shaped by a convergence of economic, cultural, and environmental factors that are undergoing rapid and accelerating change.

These accelerating rates of change pose significant challenges for Thailand, as they represent highly disruptive forces that are already causing major upheavals globally. To address these challenges effectively, it is imperative for Thailand to prepare its leadership and its people for the waves of change that have already begun, as well as for the even more disruptive transformations that lie ahead. Only through proactive planning and decisive action can Thailand protect its people, preserve its cultural heritage, and sustain economic growth while enhancing social well-being.

This report is intended to support this proactive effort by focusing on artificial intelligence (AI) as a critically important technology for both the present and the years to come. AI appears to be an increasingly defining technology of the 21st century, requiring companies and nations alike to develop high levels of AI capability to remain competitive. While many factors will shape Thailand’s future, AI is now widely recognized as a central driver of productivity, competitiveness, and innovation and is thus the primary focus of this report.

TABLE 1
KEY THEMES ADDRESSED IN THIS REPORT INCLUDE:
1. Lagging productivity growth in Thailand
2. The middle-income trap
3. The critical role of the Ministry of Industry in leading and coordinating the transformation
4. Recognition that current challenges must be addressed as a matter of urgency
5. A commitment to preserving and protecting Thailand’s cultural identity and social values

Thailand has already initiated efforts to adopt AI through the 5-Year National AI Strategy developed by the Ministry of Digital Economy and Society (MDES) and the Ministry of Higher Education, Science, Research and Innovation (MHESI). This report thus concentrates on the complementary and critical role of the Ministry of Industry (MIND), with particular attention to the rapidly evolving global AI landscape. Its objective is to ensure that Thailand’s industrial sector can compete effectively in an AI-enabled future. The themes and initiatives outlined here provide a comprehensive blueprint for AI-driven transformation that aligns with Thailand’s unique cultural, social, and economic context and that equips government institutions with the tools, capabilities, and governance frameworks required for sustainable and productive AI adoption.

This project was undertaken as a collaborative effort between the Thailand Productivity Institute (FTPI), the Asian Productivity Organization (APO), and FutureLab Consulting. The situation analysis and recommendations presented in this report are based on a series of focused learning activities conducted in 2025. These included extensive ethnographic interviews with policymakers, industry leaders, academics, and community stakeholders across Thai society. Through this process, the project identified a set of overarching goals that position AI as a strategic force for strengthening Thailand’s regional and global competitiveness.

Key themes addressed in this report include:

1. Lagging productivity growth in Thailand and the adverse economic consequences that may arise if gross domestic product (GDP) growth continues to lag behind population growth.
2. The need for transformation across Thai industries, small and medium-sized enterprises (SMEs), and government institutions is to overcome the middle-income trap and drive productivity and economic growth by fully integrating into an increasingly digital global economy in which AI plays a central role.
3. The critical role of MIND in leading and coordinating this AI-enabled industrial transformation.
4. Recognition that current challenges, including fragmented governance structures, limited AI readiness within the industry, and unequal access to digital infrastructure, must be addressed as a matter of urgency.
5. A commitment to preserving and protecting Thailand's cultural identity and social values as the nation undergoes large-scale technological change. To support this objective, the report proposes the development of AI models and agents grounded in Thailand's own cultural and social context.

This report does not merely articulate an aspirational vision. Rather, it is grounded in empirical insights drawn from a broad cross-section of Thai society, including ethnographic research, in-depth workshops, and structured training dialogs. These inputs inform a set of strategic policy recommendations designed to align Thailand's technological future with its historical foundations and its economic, social, and cultural priorities.

Thailand's Ministry of Industry: A Critical Role

It is evident that AI must play a central role across Thailand's key economic sectors, including manufacturing, automotive, electronics and semiconductors, petrochemicals, textiles, rubber, and iron and steel. In this context, MIND is, and will continue to be, a critically important driver of GDP growth and a central actor in Thailand's broader AI-enabled societal transformation. Accordingly, this report focuses on MIND's role and presents an in-depth analysis of international models and benchmarks across five strategic focus areas:

1. Scaling up an AI-proficient workforce.
2. Accelerating AI adoption among SMEs.
3. Expanding digital infrastructure to reach at least 70% of industrial SMEs.
4. Establishing institutional frameworks and performance dashboards to monitor AI-driven productivity gains.
5. Ensuring cross-ministerial coherence in AI policy execution.

Key findings in these areas include the following:

Workforce Development: Regional peers, including Malaysia and India, have launched large-scale initiatives to train tens of thousands of workers in AI

and digital skills within a three- to five-year timeframe. By leveraging train-the-trainer models, public-private academies, and industry-recognized certifications, these countries have accelerated both workforce upskilling and AI adoption across the industry.

It's imperative for Thailand to prepare its leadership and its people for the waves of change that have already begun, as well as for the even more disruptive transformations that lie ahead.

SME AI Adoption: Achieving AI adoption among at least 40% of SMEs will require blended financial incentives. International examples include technology voucher schemes covering up to 50% of project costs, such as Hong Kong's voucher program offering support of up to HK\$600,000 (approximately US\$77,000) (Leads Technologies, 2024), as well as co-funding grant models such as the United Kingdom's (UK) Made Smarter pilot, which allocated £22.5 million to support 300 SMEs. These programs have successfully stimulated private investment in AI and

Automation (Metal Additive Manufacturing Magazine, 2024). Many countries also allocate between 0.5%–1% of GDP to digitalization initiatives. Singapore, for instance, committed approximately US\$3 billion into an SME productivity fund in 2025, reinforcing AI adoption as a national economic priority (Mitchell, 2025).

Digital Infrastructure: Achieving 70% or greater national coverage of high-speed internet and cloud computing is essential for widespread AI adoption among SMEs. Advanced economies have achieved broadband coverage exceeding 90% through sustained public investment. Malaysia, for instance, reached 96.9% 4G coverage of populated areas by 2022 (Ookla, 2025) and extended connectivity to more than 800 remote communities through satellite-based solutions (Wong, 2023).

Institutional Frameworks and Performance Dashboards: Effective policy execution requires robust governance mechanisms to track AI adoption and productivity-related key performance indicators (KPIs). Many governments rely on annual surveys and digital economy reports to measure progress. For example, Singapore tracks the proportion of SMEs adopting AI, which increased from 3.5% in 2018 to 4.2% in 2023, and quantifying productivity gains associated with AI use. AI-focused dashboards typically monitor indicators such as the number of AI specialists trained, the percentage of SMEs using AI, productivity growth among AI-adopting firms, patent filings, and research publications. These metrics are commonly updated on a quarterly or annual basis. Thailand would benefit from implementing a similar dashboard as an affordable and achievable first step toward improving policy coherence and cross-agency coordination. Much of the required data is already collected by the National Innovation Agency (NIA) and could be readily adapted for AI monitoring. However, over time, Thailand should aim to move toward near real-time reporting to enable more responsive management of national AI readiness.

Policy Coherence and Coordination: Beyond performance dashboards, cross-agency alignment can be strengthened through the establishment of a dedicated inter-ministerial working group. International experience shows

that centralized coordination mechanisms are effective in avoiding policy fragmentation. For example, the UK’s Office for AI operates as a joint unit spanning business and digital ministries to oversee AI strategy implementation (Office for AI, nd). Similarly, Malaysia’s National AI Office (NAIO), launched in 2024, functions as a central authority for AI initiatives across ministries and sectors (Ministry of Digital Malaysia, 2024a). Such coordination bodies are often chaired at the deputy prime minister or equivalent level to ensure alignment across skills development, digital infrastructure, and industrial AI adoption policies. Common practices include unified budget planning for AI initiatives and shared KPI dashboards reviewed collectively by all relevant agencies. This whole-of-government approach helps prevent policy silos and ensures that AI initiatives are aligned with broader national digital economy objectives.

To address the challenges presented by AI and to leverage its potential to enhance Thailand’s global competitiveness, it will be necessary to adopt a comprehensive and integrated approach. This includes mobilizing the capabilities, programs, and networks of MIND in close collaboration with key government partners, particularly MDES and MHESI. Achieving these objectives will require a large coordinated portfolio of initiatives, which are described in detail in subsequent sections of this report.



THE BROADER STRATEGIC CONTEXT

Although this report focuses on Thailand, no nation operates in isolation within the current global strategic environment. Major forces, including global technological development and adoption, climate change and the energy transition, regional and global economic trends, industrial competition, and geopolitical dynamics such as trade policies and tariffs, play a decisive role in shaping outcomes in Thailand and elsewhere. Any serious effort to plan for a positive and resilient future for the Thai nation must thus consider this broader strategic context.

It is neither necessary nor practical within the scope of this report to provide an exhaustive analysis of the entire global context, which would require extensive treatment well beyond the purpose of this document. Nevertheless, it is prudent to frame Thailand's AI strategy by highlighting a limited number of external factors that are already influencing national conditions and are expected to continue shaping Thailand's future trajectory. Accordingly, this section briefly addresses six such factors, summarized in Table 2.

Acceleration of Change

There is a broad consensus that the pace of change is accelerating globally. Social, economic, and business processes that once unfolded over decades are now occurring within months. This compression of time horizons creates significant challenges for societies and organizations, particularly in their capacity to adapt, update institutional frameworks, and integrate rapid change into prevailing mental models. As a result, accelerated change can also contribute to uncertainty, resistance, and social discontent (Schwab, 2016).

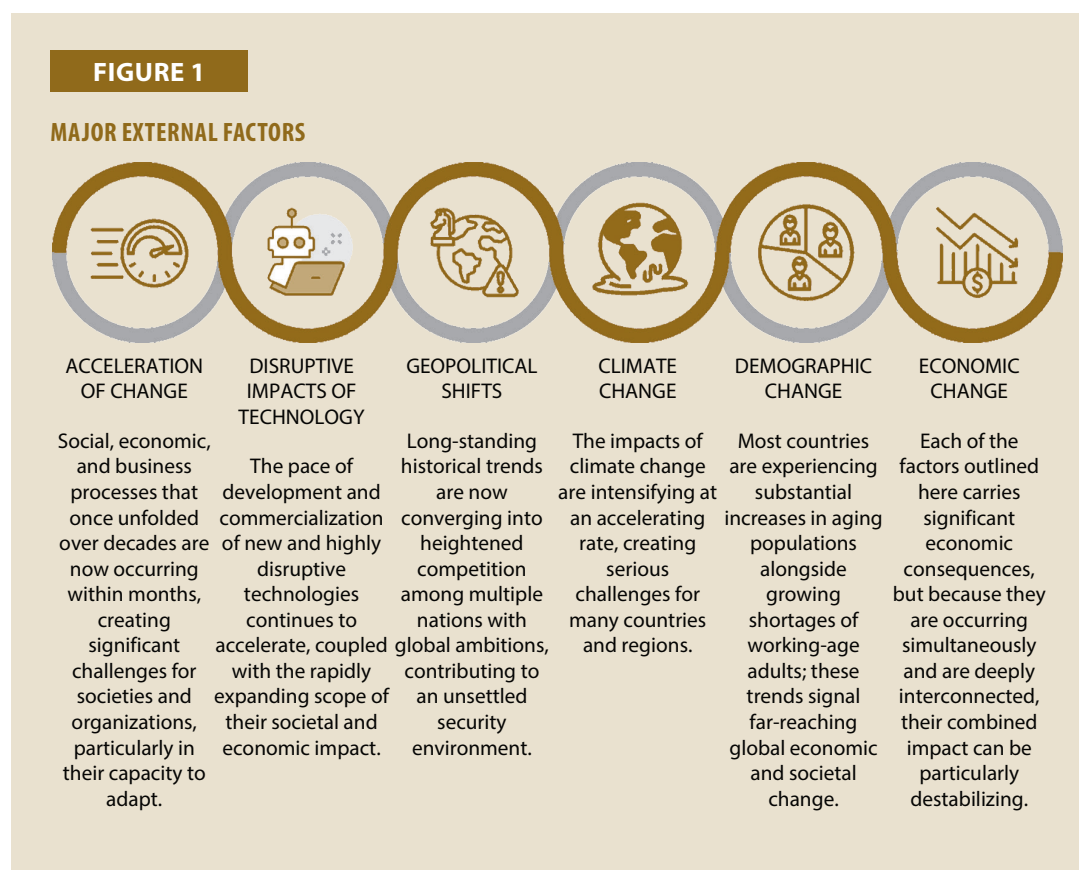


TABLE 2

KEY THEMES ADDRESSED IN THIS SECTION INCLUDE

1. Acceleration of change
2. Disruptive impacts of technology
3. Geopolitical shifts
4. Climate change
5. Demographic change
6. Economic change

Disruptive Impacts of Technology

The pace of development and commercialization of new and highly disruptive technologies continues to accelerate. Throughout history, economies have been shaped by the tools they employ, and in the present era, the transformative power of digitalization in how people live and work is no exception. What distinguishes the current moment, however, is the extraordinary speed at which these tools are evolving, coupled with the rapidly expanding scope of their societal and economic impact (McKinsey Global Institute, 2023a).

Geopolitical Shifts

Long-standing historical trends, developing over centuries, are now converging into heightened competition among multiple nations with global ambitions. This convergence has contributed to an increasingly unsettled international security environment.

The pace of change in this domain has intensified markedly in recent months and shows no clear signs of abating (Allison, 2017). These dynamics add significant uncertainty to global trade, investment, and industrial policy planning.

Climate Change

The impacts of climate change are intensifying at an accelerating rate, creating serious challenges for many countries and regions. Nations are increasingly confronted with water scarcity or excess, rising temperature extremes, and more frequent and severe high-intensity storms. These pressures are expected to persist, and in many cases intensify, throughout the 21st century (Intergovernmental Panel on Climate Change, 2023).

Demographic Change

Globally, the rapid population growth that began around 1800 is now slowing or reversing in many regions. Most countries are experiencing substantial increases in aging populations alongside growing shortages of working-age adults. These demographic shifts have profound implications for national economies, labor markets, and social systems. Because these trends are occurring simultaneously across much of the world, they signal far-reaching global economic and societal change (United Nations Department of Economic and Social Affairs, 2024).

Economic Change

Each of the factors outlined above carries significant economic consequences. However, because they are occurring simultaneously and are deeply interconnected, their combined impact can be particularly destabilizing. As a result, the global economy is undergoing reconstruction at a fundamental level. By 2030, economic conditions worldwide are likely to differ markedly from those of today (World Economic Forum, 2024a).

It is essential to recognize that these forces are advancing according to their own momentum, with both the scale and frequency of change continuing to increase.

AI is poised to exert a substantial influence on GDP levels, GDP growth rates, and GDP per capita. As a result, it is critically important for both business leaders and policymakers to understand the nature and scale of this relationship.

None of these dynamics is fully within the control of any single actor. No individual political leader, corporate executive, or institution can unilaterally direct or halt these processes. The global system is evolving through the interaction of multiple, self-reinforcing forces.

Taken together, the convergence represents nothing less than a global transformation. The scale and speed of change now underway are unprecedented in human history. Never before has change advanced so rapidly, never before have tools of such power been so widely available, and never before have societies and markets faced such levels of volatility simultaneously. These dynamics are poised to exert profound effects on productivity, GDP growth, and social stability, making it essential for business and government leaders to understand the links between technological change and economic outcomes.

As a result, conditions in Thailand and globally are likely to be fundamentally different by 2050. While the precise contours of these future conditions cannot be predicted with certainty, all nations must prepare systematically for a wide range of possible futures.

In a global system that is accelerating in this manner, business and government leaders must develop a clear understanding of these dynamics, employ sophisticated foresight tools to anticipate future conditions, and make informed policy and investment decisions today. Such actions are essential to preparing societies for the economic and social realities of tomorrow.

Against this backdrop of disruption and uncertainty, Thailand faces the complex challenge of advancing its economic and social objectives while preserving its deeply rooted cultural traditions. Defining a realistic and actionable pathway through which AI can be leveraged to support this balance is the central purpose of this report.

GDP AND AI

Given the critical role of GDP per capita in shaping a nation's economic health and the strong and increasingly evident connection between AI and economic performance, this section provides a more detailed examination of the relationship between AI, GDP growth, and productivity.

It is important at the outset to acknowledge that GDP, as a metric, is imperfect and subject to well-documented limitations. GDP assigns equivalent value to productive activities such as manufacturing output and service delivery, while counting activities that may be socially harmful, including the production of cigarettes, environmental pollution, and even the costs associated with treating pollution-related diseases such as cancer. In this sense, GDP does not distinguish between economic activities that enhance societal well-being and that may undermine it (Philipsen, 2015).

Nevertheless, GDP remains a widely used and useful indicator for comparing economic performance across countries. Economists rely on it to assess overall economic health, long-term prospects, and relative productivity levels. In particular, GDP growth is commonly used to evaluate whether a society is generating new wealth for the benefit of its population, while GDP per capita serves as a proxy for comparative national productivity.

This discussion is especially relevant because AI is poised to exert a substantial influence on GDP levels, GDP growth rates, and GDP per capita. As a result, it is critically important for both business leaders and policymakers to understand the nature and scale of this relation.

In Thailand, a cause for concern is the recent stagnation of GDP growth. After experiencing rapid expansion averaging more than 7% annually between 1960 and 1996, Thailand's growth rate has slowed significantly to below 3% in recent years (World Bank, 2024a). The World Bank projects that absent structural reforms, potential GDP growth will decline further to approximately 2.7% during the 2022–2030 period, compared to an average of 3.2% in the preceding decade (World Bank, 2025).

Several structural factors are contributing to this slowdown, including an aging workforce, weak investment levels, insufficient policy coordination, stalled innovation, and the emergence of global trade tensions. Together, these factors are constraining Thailand's growth potential.

These constraints have cascading effects throughout the economy. One notable example is the deterioration of Thailand's investment climate. In 2023, foreign direct investment (FDI) inflows totaled only US\$2.96 billion, the lowest level among ASEAN economies (FDI Insider, 2023). In contrast, Indonesia attracted US\$21.7 billion, Malaysia US\$18.5 billion, and Vietnam US\$8.3 billion during the same year. This trend is concerning, as FDI often serves as a critical channel for technology transfer and the acquisition of advanced technical expertise.

Analysis by the National Economic and Social Development Council (NESDC) explicitly links low FDI inflows to Thailand's relatively slow transition toward high-technology industries. According to the NESDC, attracting additional investment will require Thailand to accelerate its shift into high-tech sectors (Digital Policy Alert, 2024). Investors increasingly perceive greater opportunities in neighboring economies that are rapidly industrializing or offering more advanced manufacturing and digital innovation ecosystems. As a result, Thailand's export performance has weakened, with the manufacturing production index declining across multiple quarters and exports contracting amid intensifying regional competition.

SMEs play a central role in Thailand's economy, accounting for approximately 99.5% of firms and contributing roughly 35% of GDP. Despite their importance, many SMEs lag in innovation capacity and

access to global markets. Persistent constraints include limited financing for technology upgrades, shortages of skilled labor, and burdensome regulatory requirements.

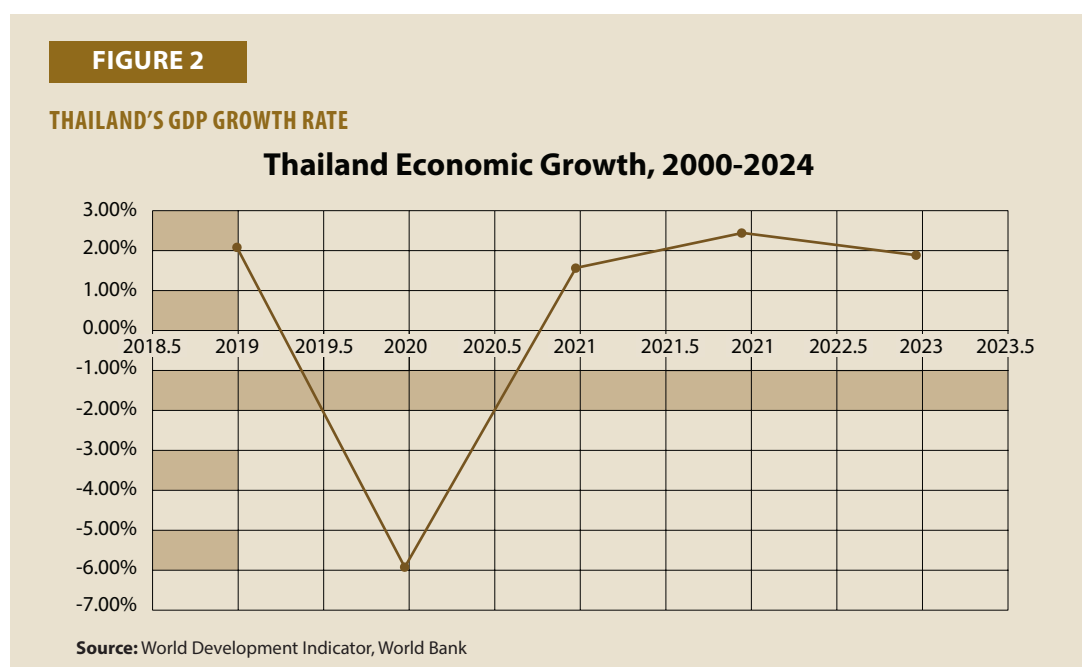
As labor force growth slows and is expected to reverse in the coming years, future economic expansion must increasingly come from higher efficiency and greater value creation, in effect, from innovation. Without meaningful improvements in SME productivity, Thailand's growth rate is likely to remain in the range of 2%–3%, only marginally above population growth, and is insufficient to raise average incomes significantly. The World Bank has explicitly warned that structural reforms aimed at enhancing economic competitiveness are essential to boosting long-term growth, emphasizing that maintaining the status quo will result in persistently weak performance.

Thailand's digital economy further illustrates this challenge. At present, digital activities account for only about 6% of the national GDP. By comparison, Singapore's digital economy contributes nearly 18% of GDP (GovInsider, 2024), while South Korea's aggressive automation strategy, with approximately 1,000 industrial robots per 10,000 workers, has reinforced its manufacturing competitiveness (Statista, 2023). Other ASEAN economies, including Vietnam, are targeting a digital economy share of up to 30% of GDP by 2030 and explicitly position AI as a primary driver of breakthrough growth.

If Thailand fails to keep pace with these developments, it risks falling further behind as peer economies capture AI-driven productivity gains. Conversely, by embracing AI and Industry 4.0 principles, Thailand has the opportunity to offset labor shortages, modernize its industrial base, and generate new sources of growth across multiple sectors.

Absent such a transition, Thailand faces the prospect of prolonged stagnation and entrenchment in the middle-income trap. Traditional growth engines, including tourism and low-cost labor, are widely regarded as insufficient to sustain economic expansion through 2030. This suggests that a large-scale pivot toward advanced technology is not merely desirable but also a national imperative.

This context raises critical questions regarding the role of MIND and its support for the initiatives of MDES and MHESI under the 5-Year National AI Strategy. As MIND is already positioned as a central driver of industrial transformation, overseeing agencies such as the Eastern Economic Corridor of Innovation (EECi) and the Department of Industrial Promotion's (DIP) SME support programs, it is well placed to provide a significant and much-needed acceleration of AI adoption across the Thai industry.



MIND has long championed the Thailand 4.0 agenda, which seeks to upgrade traditional industries, including automotive manufacturing, electronics, and food processing, into higher-value sectors such as robotics, biotechnology (biotech), and smart manufacturing. This leadership is reflected in policy instruments such as investment incentives administered by the Board of Investment (BOI), including corporate tax exemptions of up to 13 years for research and development (R&D), automation, and advanced technology projects.

However, institutional gaps and cultural factors may be constraining the effectiveness of MIND. Coordination with other key ministries, including Digital Economy, Education, and Science, has been uneven, while siloed bureaucratic structures continue to slow decision-making and implementation. Within both MIND and the broader industrial sector, a risk-averse culture and a prevailing “fear of failure” mindset have, at times, inhibited experimentation and innovation.

Although MIND’s network of affiliated organizations, including the Federation of Thai Industries (FTI), the Thailand Productivity Institute (FTPI), and the Management System Certification Institute (MASCI), provides multiple channels for disseminating standards and best practices, these bodies must modernize their operational approaches to accelerate technology adoption among firms. Although there is widespread recognition that “coordinated efforts across sectors” are required to align innovation policies, translating this aspiration into effective whole-of-government execution remains a significant challenge. A practical first step would be for these channel partners to adopt AI internally in a comprehensive and demonstrative manner.

The Potential Impact of AI on GDP Growth

AI and related technologies, including machine learning, robotics, the Internet of Things (IoT), and advanced data analytics, possess transformative potential across virtually all sectors of Thailand’s economy. When effectively implemented, AI can drive productivity gains by automating routine tasks, optimizing operational processes, enabling data-informed decision-making, and augmenting human capabilities rather than merely substituting for them.

Global studies project substantial economic gains from AI adoption. One widely cited analysis estimates that AI could contribute between 10% and 18% of GDP in major Asia-Pacific economies by 2030. Thailand can thus leverage AI as a strategic enabler to significantly elevate its long-term growth trajectory and escape persistent productivity constraints.

Automation, ranging from basic mechanization to advanced robotics, is particularly relevant for Thailand’s industrial sector. As wage pressures rise and labor shortages become more pronounced, robotics can help sustain and potentially expand manufacturing output. International comparators are instructive in this regard. South Korea leads the world in robot density, with more than 1,000 robots per 10,000 manufacturing employees, enabling continued competitiveness in automobiles, electronics, and semiconductors despite high labor costs. Singapore, with approximately 670 robots per 10,000 workers and increasing, similarly leverages robotics to support high-value manufacturing and services with a constrained workforce (Statista, 2023).

Initiatives such as the Eastern Economic Corridor’s (EEC) promotion of “Smart Factories” incorporating IoT and robotics should thus be emphasized and accelerated. Scaling robot adoption across Thai firms, particularly for assembly, welding, logistics, and related tasks, would yield substantial efficiency gains. At an Industry 4.0 forum, it was noted that AI and robots enabled global manufacturers such as Schneider Electric to reduce costs by up to 50% and improve productivity by 20%–50%. Comparable gains in Thai factories would directly contribute to GDP growth through higher industrial output.

Advanced technologies can also catalyze growth in services and emerging digital industries. AI-driven platforms can enhance tourism through personalized travel applications, multilingual automated customer service, and smart tourism analytics; improve healthcare through AI-assisted diagnostics and telemedicine; and modernize retail and financial services through e-commerce, financial technology (fintech) solutions, and digital payment systems.

In parallel, Thailand must build domestic AI capabilities to expand its digital content industry, software development sector, and information technology (IT) services exports. As ASEAN's internet economy continues to expand rapidly, Thai firms and startups are well-positioned to capture regional market share by scaling AI-enabled products and services. For example, AI-based natural language processing (NLP) tailored to the Thai language and local cultural preferences could provide competitive advantages in domestic markets and in neighboring Cambodia, Laos, Myanmar, and Vietnam (CLMV) economies.

Biotech also holds transformative potential, especially in the transition toward smart agriculture. Advances in high-yield, climate-resilient crops, as well as biotech applications in food processing, medicine, and environmental management, offer opportunities for Thailand to move up the value chain. As a major global food exporter, Thailand could enhance competitiveness by developing proprietary seed varieties and expanding bio-based production within EECi, including biotech research facilities and bio-refineries.

Taken together, these developments indicate that AI and its associated technologies already have the capacity to provide a substantial boost to Thailand's GDP growth. However, it is important to note that whatever AI is capable of today represents only an early stage of its evolution. AI systems will continue to improve rapidly, expanding both their economic impact and strategic importance. Accordingly, AI proficiency should be viewed not as a static capability, but as a dynamic and continuously evolving force. This reality underscores the urgency for Thailand to pursue proactive AI policies, with MIND positioned to act decisively as a central leader in driving national AI adoption and industrial transformation.

THE FOCUS ON AI

In the face of rapid and multifaceted change, it is pertinent to consider why this report focuses specifically on AI. After all, AI is only one of many emerging technologies that already has and will continue to have a major global impact. As discussed in Section 2, emerging technologies themselves represent just one theme among several major disruptors that societies are now required to address.

We suggest that AI warrants critical attention because of a set of distinguishing factors that set it apart from other emerging technologies.

Impact

AI is likely to have a decisive effect on growth in GDP per capita, primarily because it is fundamentally changing how we work. It is difficult to overstate this influence. At a foundational level, AI alters how problems are solved, how individuals conceptualize problems, and even which problems are considered worth addressing (Brynjolfsson & McAfee, 2014).

In 2024, for example, an AI system contributed to work that was awarded the Nobel Prize in Chemistry. Although three human researchers formally received the prize, the achievement would not have been possible without AI. This pattern is increasingly evident across professions and at all levels of work, ranging from highly complex tasks to routine activities.

In short, AI is not merely another technological advance. It represents a transformative force that reshapes economic activity, professional practice, and the nature of problem-solving itself.

TABLE 3

KEY THEMES ADDRESSED IN THIS SECTION INCLUDE

1. Acceleration of change
2. Disruptive impacts of technology
3. Geopolitical shifts
4. Climate change
5. Demographic change
6. Economic change

Here is an example, taken from a recent report by a prominent technology journalist:

AI is rapidly becoming a competitive necessity in e-commerce. From product recommendations and customer support to inventory forecasting and dynamic pricing, AI is reshaping how online retailers attract, convert, and retain customers. Its rapid adoption is driven by the demand for personalized shopping experiences, rising customer acquisition costs, and increasing pressure to optimize operations at scale. As AI technologies become more accessible and are increasingly integrated into e-commerce platforms such as Shopify, Wix, and Squarespace, merchants of all sizes are deploying them to drive efficiency, reduce costs, and unlock new sources of growth. Whether operating a small direct-to-consumer online store or scaling a business-to-business (B2B) marketplace, understanding how AI works and where it can be applied is essential to remaining competitive in an increasingly crowded digital economy (PricewaterhouseCoopers, 2017).

What's happening is nothing short of a global transformation, to force upon all of us a monumental change, the likes of which humanity has literally never seen before.

Dominance

What we are experiencing today with AI represents only the beginning. Within a few years, AI is likely to become the dominant force shaping economic activity.

AI is already exerting a substantial economic impact, and forecasts suggest that this influence will become progressively more decisive in the years ahead. In significant ways,

AI will shape the future of the economy. Within the next decade, mastery of AI will likely become a prerequisite for sustaining a healthy and competitive national economy (McKinsey Global Institute, 2020).

Gateway

Within the ecosystem of advanced technologies, AI is rapidly evolving into a foundational gateway technology. It is already being used as the primary means of accessing a wide range of other powerful technologies. As a result, AI is increasingly becoming the preferred interface to the broader universe of advanced digital capabilities. Mastery of this interface is thus essential to effectively leveraging any of the others (OpenAI, 2023).

Inequality

While AI has the potential to drive per capita GDP growth, as described in the previous section, strong aggregate growth can obscure significant social imbalances. If economic gains are highly concentrated among a small group of individuals and powerful firms, overall GDP growth may mask a deterioration in the economic conditions faced by large segments of the population. A small minority may accumulate extraordinary wealth while the majority experiences stagnation or decline. Such outcomes increase the risk of social unrest and long-term national decline, underscoring the need for careful and deliberate management. The central challenge is to ensure that AI is deployed in ways that reduce, rather than exacerbate, economic inequality.

Policy

To mitigate potential downside risks, AI adoption must become widespread across the population. Achieving this outcome requires intentional and coordinated government policy action, particularly in areas such as infrastructure investment, education and skills development, intergovernmental collaboration, and broader economic strategy. Only through a systematic and inclusive approach can Thailand successfully navigate this period of profound technological change.

If any of these five propositions were valid, a focused emphasis on AI would be justified. If several are valid, such a focus becomes critically important. We suggest, however, that all five propositions hold true, making this issue one of utmost importance for the Thai nation.

Emerging Capabilities: From Large Language Models (LLMs) to Agentic to Artificial General Intelligence (AGI)

Over the coming years, the pace of AI development is likely to shift from exponential to super-exponential growth as leading firms compete to establish dominant platforms. This acceleration is driven by multiple factors. First, unprecedented levels of investment are being deployed in an effort to outpace competitors. This competitive dynamic is forcing rapid innovation across the sector. What distinguishes the current era is that innovation increasingly encompasses software engineering itself, which forms the foundation of AI development. At some point, AI systems may begin to design and improve subsequent generations of AI, potentially accelerating progress beyond existing power-law trajectories. The anticipated endpoint of this innovation pathway is AGI, a term that is now widely used

in the industry but remains poorly defined. Predicting technological change at this scale carries significant uncertainty. Even OpenAI has struggled to define AGI in legal terms, referring to it only as the point at which an AI system can generate at least US\$100 billion in profits.



In general terms, AGI is understood to describe a state in which AI systems exhibit broad, generalized intelligence. Such systems would not merely respond to prompts but would demonstrate autonomous and creative reasoning capabilities, potentially outperforming humans across most tasks. AGI is also closely linked to robotics, particularly the future ability of machines to replicate human cognition and physical action in real-world environments.

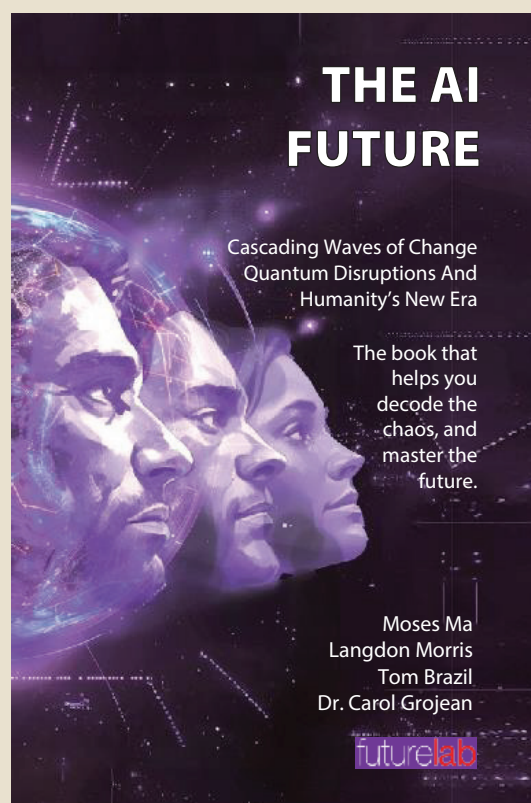
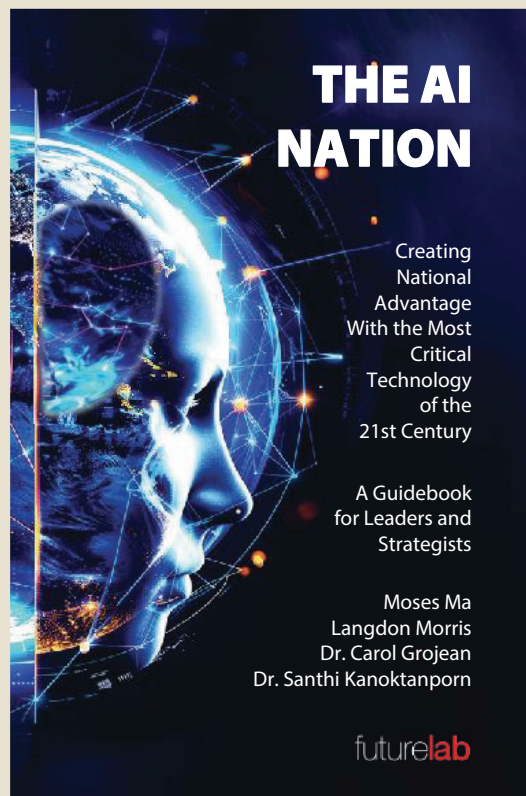
There is a clear evolutionary pathway from LLMs to Agentics. This report conceptualizes this progression as a series of development waves. While 2024 marked Wave 1, characterized by the widespread adoption of LLMs, 2025 is emerging as Wave 2, defined by the rise of agentic systems. Wave 3 is expected to involve teams of AI agents collaborating to perform complex and highly specialized tasks. Wave 4, which is highly uncertain and often projected to occur between 2027 and 2028, may involve embodied agents operating in robotic form and performing discrete tasks autonomously. Wave 5 represents the realization of AGI, which many experts estimate could occur around or after 2030. These timelines remain highly speculative, but the wave framework is intended to illustrate the pattern by which transformative change unfolds.

Each successive wave is expected to deliver a substantial leap in capability relative to the previous one. By the time Wave 5 is reached, AI systems could be orders of magnitude more capable than those available today. Even if such estimates prove optimistic, the impact remains profound. These advances will fundamentally reshape how economies function and how value is created (Floridi, 2019).

Some observers anticipate a further stage, often referred to as Wave 6 or the “AI Singularity.” Borrowed from physics, the term singularity describes a point beyond which outcomes become impossible to predict. In the AI context, it suggests a threshold after which technological development becomes fundamentally unknowable. On current trajectories, this point could be reached as early as 2030, though it may also take significantly longer. Regardless of timing, the key analytical value lies in observing how successive waves are structured. If an AI Singularity were to occur, it would likely result in sweeping disruption to existing modes of work and life.

Whether such disruption proves beneficial or harmful will depend in part on policy choices and preparation. Although the AI Singularity lies beyond the scope of this report, it remains within the horizon of strategic planning. The recommendations presented here represent, at present, the most effective steps toward preparing for what may ultimately become a fundamental transformation of society.

Please note FutureLab has written extensively on the future waves of AI development in two recent books—*The AI Nation*, which focuses on national policy, and *The AI Future*, which examines the development and impact of these technologies.



STRATEGIC OBJECTIVES AND A VISION FOR AI IN THAILAND

As described in the previous sections, Thailand's 5-Year National AI Strategy will be implemented within the context of a broader global landscape of accelerating change, the transformative impact of AI on GDP and GDP Growth, and the rising prominence of AI among emerging technologies. To achieve the critical aims outlined in the 5-Year Strategy, it is strategically imperative for Thailand to adopt a holistic approach, ensuring that government ministries collaborate effectively. At the core of this effort, MIND, MDES, and MHESI must function not as isolated silos but as synchronized partners in a national AI transformation initiative.

At the center of this collaboration is a shared mission: to accelerate AI adoption across industries, enhance Thailand's economic competitiveness through the effective deployment of AI and related technologies, and cultivate a future-ready workforce. Each ministry contributes unique capabilities, and by aligning these capacities, the AI strategy can move rapidly from aspiration to measurable impact.

Ministry of Digital Economy and Society (MDES): The Infrastructure Orchestrator MDES is the steward of Thailand's digital infrastructure and plays a pivotal role in building the foundations necessary for AI adoption, including data governance frameworks, cloud infrastructure, 5G deployment, and cybersecurity standards. The ministry is positioned to lead the development of the National AI and Innovation Dashboard, ensuring data interoperability among ministries and enabling real-time strategy governance. MDES can also facilitate data-sharing agreements between government, academia, and the private sector to support AI training and analytics.

Ministry of Higher Education, Science, Research and Innovation (MHESI): The Talent Engine MHESI is responsible for preparing Thailand's human capital and innovation pipelines to be AI-ready. The ministry should spearhead upskilling and reskilling initiatives by funding AI training programs, embedding AI into Science, Technology, Engineering, and Mathematics (STEM) curricula, and establishing national centers of excellence in AI and semiconductor research. Additionally, MHESI should coordinate research funding to align with strategic AI goals and priorities, with a focus on agentic, low-resource NLP, and Thai-language AI systems.

Ministry of Industry (MIND): The Economic Catalyst MIND is tasked with defining and implementing the AI strategy as part of Thailand's industrial and economic transformation. It should target key vertical industries, including automotive, electronics, and food processing, where AI can unlock significant productivity gains, and serve as leaders in national AI adoption pilots. MIND can drive these shifts through targeted incentives, AI-readiness diagnostics for factories, and partnerships that integrate AI agentic and smart manufacturing technologies into Thai industrial zones, potentially beginning with EEC.

To channel AI's transformative potential effectively, Thailand must also preserve its unique cultural identity while pursuing economic aspirations. The challenge lies in leveraging AI's benefits without compromising qualities that are distinctively Thai. Achieving this requires clear foresight, coordinated action, and sustained commitment.

TABLE 4

SIX STRATEGIC OBJECTIVES:

1. Enhance Economic Growth through an AI-Driven Industrial Transformation
2. Use AI to Enrich Society by Improving Public Services, Education, and Quality of Life
3. Use AI to Attain Sustainable Development for Long-Term Resilience
4. Foster Inclusive Growth and Reduce Inequality through AI
5. Position Thailand as the Regional AI and Innovation Hub in ASEAN
6. Institute a Cohesive Policy and Regulatory Framework

A Vision

Thailand should aspire to leverage AI and related technologies to become the regional leader in innovation and economic prosperity while safeguarding Thai cultural values, promoting environmental stewardship, and ensuring inclusive benefits across society.

Realizing this vision demands coordinated efforts from the government and private sector to accelerate workforce development, overcome policy silos, address gaps in digital infrastructure, and provide coherent AI governance. Interviewees emphasized that AI must align with Thailand’s broader developmental goals: strengthening competitiveness, improving public services, reducing inequality, and preserving cultural identity.

To support this vision, six strategic objectives have been identified to guide the national AI roadmap. These objectives incorporate recommendations on ethical AI use, workforce training, and sustainable development, ensuring that strategies are ambitious yet grounded. By linking these objectives to actionable policies, Thailand can leverage its rich data resources, cultural heritage, and emerging technology ecosystem to build a cohesive AI-driven transformation plan. In doing so, the country will achieve near-term economic gains while shaping the regional discourse on responsible AI governance.

Interviews also highlighted that Thailand’s AI journey represents both a national imperative and a regional opportunity. AI can rejuvenate traditional industries, modernize rural areas, and foster collaboration with ASEAN neighbors and global business partners, positioning Thailand as a leader in responsible AI development.

The six strategic objectives combine high-level ambition with pragmatic considerations across multiple sectors. Each objective includes stakeholder insights, policy priorities, and concrete use cases, ensuring the roadmap supports sustainable, inclusive, and culturally resonant AI adoption.

By aligning their missions with an AI focus, MIND, MDES, and MHESI can operationalize the AI strategy with clarity, speed, and impact. Together, these six strategic imperatives will serve as central themes driving Thailand’s national transformation.

Objective 1: Enhance Economic Growth through an AI-Driven Industrial Transformation

The first objective addresses a core economic priority: harnessing AI to modernize industries, invigorate entrepreneurship, and enhance Thailand’s competitiveness in global markets.

Ethnographic interviews with EECi and DIP highlighted the need to move beyond pilot AI projects and toward full-scale industrial adoption (National Innovation Agency, 2024a). Many Thai factory owners remain hesitant to invest in AI solutions, despite recognizing their potential to improve efficiency, reduce costs, and strengthen risk management. The slow pace of adoption stems from resistance to new technology, concerns over upfront costs, and a shortage of AI-trained personnel.

Leaders in government agencies, including the Digital Economy Promotion Agency (DEPA), emphasized that AI adoption must be supported by strong policy incentives and inclusive digital-skills programs (Digital Economy Promotion Agency, 2023a). These could include financial support for SMEs to experiment with AI-enabled automation, tax credits for companies undertaking AI upskilling programs—such as DEPA’s 2.5× (250%) training-expense deduction (Ministry of Industry, 2024a)—and real-time AI readiness dashboards to track penetration in key sectors. Without coordinated action, industry leaders warned that Thailand’s competitiveness could decline relative to regional peers like Singapore and Korea, where AI adoption is progressing more rapidly (Eastern Economic Corridor Office, 2023).

Strategic Priorities for MIND

Policy Incentives and Funding: Interviews reinforced the need for a structured incentive framework to encourage AI adoption, particularly among SMEs. Potential measures include direct subsidies, tax deductions (including DEPA’s 2.5× training-expense deduction), and low-interest loans tied to AI-driven productivity improvements (World Bank, 2022a).

Upskilling and Workforce Development: Another recurring theme is the urgent need to equip mid-career professionals to implement and maintain AI systems.

Government agencies plan to collaborate with universities and private training providers on large-scale programs, leveraging AI-driven training models. The concept of “teaching AI with AI” emerged in discussions, suggesting that new training paradigms can reduce costs and accelerate skill acquisition.

Focus on Key Sectors: Manufacturing, agriculture, tourism, and services are expected to benefit most immediately from AI-driven modernization.

Government ministries should collaborate effectively. MIND, MDES, and MHESI must function not as isolated silos but as synchronized partners in a national AI transformation initiative.

Specific policies could include AI-enabled predictive maintenance in factories, AI-based yield optimization in agriculture, and AI-assisted personalization in tourism. By integrating AI into these sectors, Thailand can shift from labor-intensive models to higher-value, innovation-driven activities.

Ecosystem Partnerships: Successful AI integration requires robust public-private collaboration. Government bodies, including DIP, EECi, and NIA, should work alongside multinational technology firms such as Amazon Web Services (AWS) and Microsoft to provide access to advanced AI tools, consultation, and co-innovation platforms (International Labour Organization, 2023).

Key Action Items

1. Accelerate AI adoption to achieve productivity improvements across key sectors, including manufacturing, agriculture, healthcare, and tourism.
2. Establish a high-level AI Steering Committee/Advisory Board to ensure cross-sector coordination, leadership clarity, and accountability. This body would also oversee budget allocation and progress evaluations.
3. Implement incentives, financial support, and upskilling programs to overcome industry hesitancy toward AI adoption.
4. Foster partnerships across government agencies and with private-sector entities to ensure effective AI integration throughout the economy.

PLEASE NOTE: The additional suggested actions listed below, and on the following pages, could enable greater disruption and innovation, but may also increase the need for risk management, given Thailand's deliberate and cautious business culture. These actions should thus be considered recommendations for pilot projects only. This list is not exhaustive; it is intended to catalyze strengthening Thailand's innovation culture. Every ministry needs to implement disruptive brainstorming workshops to continuously push the envelope of national innovation.

Priming Next-Level Innovation for Economic Growth

Thailand should aggressively embrace agentic technologies. To lead in the next wave of global innovation, MIND should prioritize AI agentics. Agentic systems are AI platforms capable not only of predicting outcomes but also of autonomously acting toward goals. These systems now represent the cutting edge of the most significant technological breakthroughs. OpenAI's Deep Research initiatives (AWS Institute, 2024) and Google's proposed Agent-to-Agent (A2A) standards (Microsoft & IDC, 2023a) signal that the future will rely on networks of intelligent agents working together, rather than on isolated models. By piloting advanced agentic capabilities now, Thailand could move from a follower to a leader in AI infrastructure, developing autonomous service ecosystems ahead of global competitors. This approach could provide Thailand with a distinct competitive advantage, potentially creating its own "DeepSeek moment (Organization for Economic Co-operation and Development, 2022)."

To achieve this, Thailand must move beyond traditional "comfort zone" industries. Agriculture, tourism, and manufacturing have been core pillars of the national economy. However, long-term resilience requires careful diversification into high-growth sectors. AI can still modernize agricultural production (OpenAI, 2024), while sustainable energy technologies will be essential as the world transitions toward decarbonization. Healthcare innovation, particularly at the intersection of biotech and AI-driven digital health, offers significant opportunities. Additionally, advanced logistics and smart infrastructure, including robotics, photonics, and microelectronics, will support emerging trade and industrial systems. Strategic investment in these fields today will strengthen Thailand's long-term competitiveness and economic security.

Before the onset of a global recession, Thailand must stress-test its innovation systems. Traditional R&D models, which rely on large budgets and long development timelines, may underperform under constrained financial conditions. Instead, Thailand should proactively organize national-level Innovation Stress Test workshops to explore new ideas under resource-limited scenarios, following China's DeepSeek research program (Google DeepMind, 2024). Techniques such as lean-startup prototyping, open innovation networks, and agentic automation can reduce capital requirements and accelerate deployment, enabling Thailand to maintain a robust innovation pipeline and solidify its position as the ASEAN hub for lean and agile innovation systems.

Expected Outcomes

By actively promoting AI in traditional industries through dedicated funding, training, and ecosystem partnerships, Thailand can achieve measurable gains in productivity, export competitiveness, and high-value job creation (United Nations Development Programme, 2024a).

Policymakers anticipate that real-time dashboards tracking AI adoption rates and business outcomes (e.g., cost savings, product quality improvements) will enable data-driven refinement of initiatives. Over the longer term, Thailand's economy is expected to normalize digital innovation as standard practice, laying a foundation for sustainable economic resilience and growth.

Objective 2: Use AI to Enrich Society by Improving Public Services, Education, and Quality of Life

AI's potential extends beyond industrial competitiveness into the domain of social well-being, a point frequently emphasized by educators, public officials, and healthcare leaders during the interviews. For example, representatives from Thonburi Hospital noted that AI can streamline patient queuing, reduce waiting times, and support telemedicine, thereby improving access to healthcare for remote and underserved communities. Similarly, educators observed that AI-powered platforms can personalize learning experiences by responding to diverse student needs in real time (Ministry of Industry, 2023).

However, interviews also revealed that many government agencies continue to operate in silos, without a unified framework for AI adoption. Public officials stressed the importance of strong digital infrastructure, robust data governance, and an institutional willingness to experiment with pilot programs, such as AI chatbots for citizen inquiries or predictive analytics for traffic management. By placing citizens' needs at the heart of its AI roadmap, Thailand can deliver tangible improvements to daily life while building public trust in the responsible use of technology.

Strategic Priorities

AI-Enabled Public Services: The government aims to deploy AI-driven solutions across e-governance, ranging from the automation of routine administrative tasks to the use of chatbots for real-time citizen support. A critical component of this effort is data centralization and the establishment of interoperability standards that enable seamless information sharing among agencies. These initiatives are essential and should be fully supported and accelerated.

Education and Personalized Learning: Pilot programs in AI-driven educational technology (edtech) should receive dedicated funding and institutional backing. These initiatives may include smart classrooms equipped with adaptive learning platforms and micro-credential programs designed to help both students and teachers strengthen digital competencies. Interviewees emphasized that AI in education must be applied in hands-on, case-based ways to enhance learning outcomes, rather than simply digitizing traditional teaching methods.

Healthcare and Telemedicine: Healthcare stakeholders highlighted that AI can improve operational efficiency through patient queue management, reduce waiting times, and expand telemedicine services, thereby increasing access to care for underserved communities (Thonburi Healthcare Group, 2023).

Smart Infrastructure and City Management: Interviews with EECi representatives and urban planners indicated that AI can optimize traffic systems, utilities, and other urban services, reducing congestion, conserving energy, and enhancing urban livability (UNESCO, 2023). Collaboration with local governments on pilot “smart city” initiatives should include data-driven dashboards that monitor indicators such as air quality, water consumption, and energy efficiency.

Key Action Items

1. Leverage AI to streamline public services across healthcare, education, and other essential sectors.
2. Develop personalized e-learning, telemedicine, and digital governance systems.
3. Ensure that technology deployments explicitly address public trust, equity, and regional disparities.

By systematically integrating AI into public services, education, and healthcare, Thailand can achieve measurable improvements in overall quality of life. Reduced administrative burdens for government, more personalized and effective learning experiences, and faster, more reliable healthcare delivery is the expected outcome. Over time, these improvements should also strengthen public trust in AI, helping to alleviate concerns related to job displacement and data privacy.

Moreover, strengthened collaboration among government agencies, private technology firms, and local communities can foster an innovation-oriented culture that accelerates AI adoption across multiple sectors.

Priming Next Level Innovation for Enriching Society

AI-Powered E-Learning Systems: Government ministries must lead AI-driven educational initiatives, but staff may be hesitant to support approaches that challenge traditional decision-making structures. For example, while ministries are planning conventional “train-the-trainer” programs, a more impactful model is to “use AI to teach AI.” LLM chatbots can be configured to deliver training at scale, dramatically reducing costs while enabling widespread learning in customer support, telesales, and other sectors.

Where a traditional train-the-trainer model might reach 25,000 participants in a year, an AI-powered e-learning platform could educate over a million learners in the same period at a lower per-student cost. This approach could ensure that every high school teacher, medical facility employee, and automotive industry worker in Thailand gains AI training affordably, positioning the nation ahead of regional peers in AI readiness.

Ancillary Benefits of Rapid Adoption: Scaling AI-based training also delivers secondary advantages. A consistent, nationally coordinated program would allow ministries such as MIND to engage AI vendors to expose millions of users to their software, creating an ecosystem-level boost for emerging AI ventures targeting the Asian market. Applications in AI translation, image and video generation, and productivity tools would accelerate the development of AI solutions tailored to Thailand’s key industries.

Increase the Speed of Innovation. Accelerating innovation requires reducing barriers to experimentation. Ministries can implement low-cost, “fail-fast” pilots, encourage startups to leverage government-funded open-source technologies, and provide funding to scale proven solutions nationally. This approach supports local startups efficiently while offering effective pathways for scaling successful innovations, ultimately increasing Thailand’s capacity for rapid technological advancement.

Objective 3: Use AI to Attain Sustainable Development for Long-Term Resilience

Interviews with environmental experts, academic researchers, and policymakers revealed that sustainability is a critical national priority. Thailand faces mounting climate challenges, including flooding and air pollution, which are exacerbated by rapid urbanization and industrial expansion. AI offers a range of potential solutions, from real-time environmental monitoring to predictive analytics for disaster management (United Nations Development Programme, 2024). However, stakeholders cautioned that AI adoption must be aligned with Thailand’s Sustainable Development Goals to ensure that economic development does not undermine environmental well-being (Ministry of Industry, 2023).

In this context, organizations such as MASCI are exploring how AI can be integrated into the International Organization for Standardization (ISO) compliance and sustainability certification processes. At the same time, EECi is piloting AI solutions to improve energy efficiency in manufacturing, while community representatives expressed optimism that AI-driven precision agriculture could help conserve natural resources. The common theme across these perspectives is that AI’s long-term value lies in its capacity to enhance resilience, reduce resource consumption, and mitigate environmental risks (World Bank, 2024b).

Strategic Priorities

Green AI Solutions: AI applications that directly address environmental challenges, including air quality monitoring, flood forecasting, and waste management, should be prioritized.

Government agencies should promote public–private partnerships to develop and deploy AI tools that reduce pollution, optimize water use, and protect biodiversity. It should be noted that export products

destined for the European Union (EU) will require carbon footprint calculation and tracking by 2030, including those exported to the United Arab Emirates (UAE), and AI can support this requirement at significantly lower cost (Management System Certification Institute, 2023).

Energy Efficiency and Climate Action: Interviews highlighted substantial potential for AI to optimize energy use across factories, commercial buildings, and residential areas. Policy measures may include financial incentives for factories adopting AI-based energy management systems, as well as pilot projects that integrate AI into renewable energy grids. By linking AI adoption to measurable emissions reductions, Thailand can better align economic growth with climate objectives (Eastern Economic Corridor Innovation, 2024).

Sustainability Compliance and ISO Standards: Experience from certification bodies underscores the importance of embedding AI within sustainability and compliance frameworks. Updated guidelines could enable continuous AI-driven monitoring of greenhouse gas emissions and other environmental indicators, allowing for real-time compliance verification. This approach would reduce administrative burdens while strengthening environmental accountability (European Commission, 2023a).

Agricultural Innovation: Agriculture remains a cornerstone of the Thai economy, and AI has the potential to transform precision farming, pest management, and resource optimization.

Through partnerships with research institutions, farmers' cooperatives, and agricultural technology (agritech) startups, the government should scale AI solutions that help farmers improve yields, reduce water consumption, and adapt to climate variability. Further research is also needed to assess the potential application of AI in fish farming and aquaculture (International Energy Agency, 2023).

Key Action Items

1. Align AI initiatives with green solutions to monitor environmental impacts, optimize resource use, and strengthen disaster preparedness (National Innovation Agency, 2024b).
2. Implement AI applications that support energy efficiency and precision agriculture at the national scale (Thailand Development Research Institute, 2023a).
3. Align public and private investment in AI with broader sustainability objectives to safeguard natural resources (ASEAN Secretariat, 2024a).

Priming Next-Level Innovation for Sustainable Development

Continuous Climate Digital Twin: By building a real-time digital twin of Thailand's critical infrastructure, waterways, coastlines, and farmlands, enabled by IoT sensor feeds monitoring water levels, air pollution, soil moisture, and energy usage, Thailand would gain a powerful tool to manage environmental conditions proactively. To enhance preparedness, AI agents could run "stress-test" simulations of extreme scenarios such as mega-monsoons, heatwaves, or industrial spills, and then generate interactive learning drills for policymakers and local agencies. These insights could automatically trigger targeted policy adjustments, ensuring that local response teams remain prepared and can visualize precisely how a 1-in-100-year flood would cascade across power grids, transport networks, and agricultural yields. Comparative benefits would extend to other sectors, including healthcare, where similar digital-twin frameworks could support preparedness for epidemics, pandemics, or mass-casualty natural disasters. The same infrastructure could also be adapted for national defense and civil-defense planning in response to localized or regional crises (Food and Agriculture Organization, 2024).

Autonomous Ecological Remediation Swarms: By deploying coordinated fleets of AI-guided aerial drones, ocean-going drones, and ground-based robots, Thailand could significantly

accelerate responses to environmental degradation. Aerial units could use computer vision to map eroded coastlines or deploy mangrove seed pods, while ground robots could inject microbial amendments into depleted soils and use TinyML models to monitor nutrient levels and adapt planting strategies in real time. Over time, such “biofabrication” swarms could form closed-loop ecosystems that continuously learn how to maximize carbon capture and enhance biodiversity (National Economic and Social Development Council, 2023).

ResilienceCloud Stress-Test Platform: A nationwide supercomputing service could enable companies to rapidly create secure virtual replicas of factories, supply chains, data centers, or financial systems at minimal cost. By integrating real-time inputs—such as machine sensors, operational data, market prices, weather forecasts, and tariff updates—organizations could test and optimize systems without exposing proprietary or sensitive information. Hundreds or even thousands of “what-if” scenarios could be simulated within hours, spanning risks from extreme weather events to sudden market volatility, rather than requiring months of conventional analysis. Results would be displayed through intuitive dashboards highlighting systemic vulnerabilities and shows how to protect key assets. In this way, businesses shift from struggling to fix problems after they happen to planning ahead and staying resilient against economic shocks or trade disruptions (Digital Economy Promotion Agency, 2024b).

Expected Outcomes

Over the long term, Thailand should seek to embed sustainability into the core of its AI ecosystem. Policymakers anticipate that widespread deployment of AI-enabled.

Environmental management tools will reduce pollution, enhance disaster preparedness, and lower resource consumption across industries. Further, real-time sustainability dashboards can provide policymakers, businesses, and citizens with clearer visibility into environmental performance, making accountability more transparent and progress easier to track. Ultimately, AI-driven sustainable development can strengthen Thailand’s long-term resilience by ensuring that innovation does not compromise ecological balance (Nikkei Asia, 2025).

Objective 4: Foster Inclusive Growth and Reduce Inequality through AI

A recurring theme in the ethnographic interviews was concern that AI, if left unmanaged, could exacerbate existing digital divides, particularly affecting rural communities, older adults, and SMEs with limited resources. Representatives from rural provinces expressed concern that while Bangkok-based technology hubs may thrive, less-developed regions could be left behind (Taleb, 2018). To counter this risk, AI policy should explicitly prioritize equitable access, inclusive training, and localization of AI solutions in Thai languages and contexts (Acemoglu & Johnson, 2022).

Leaders in government agencies such as NESDC echoed these concerns, emphasizing that robust broadband infrastructure and targeted training programs are essential if AI is to benefit all communities. Private sector interviewees similarly highlighted the importance of easy-to-use AI tools that do not require advanced technical expertise, enabling farmers and non-English speakers to participate meaningfully.

Strategic Priorities

Bridging the Digital Divide: Rural broadband coverage should be expanded, and AI hubs should be established in underserved areas to address disparities identified in Thailand’s 13th National Economic and Social Development Plan (2023–2027). Funding for community-based pilot projects can demonstrate how AI addresses local challenges. Government involvement is also required to ensure appropriate data standards and security frameworks.

Localization and Language Inclusion: Many AI tools default to English-language models, disadvantaging Thai speakers. Policy should thus prioritize the development of Thai-language AI models, user interfaces, and voice-recognition systems adapted to regional dialects.

Empowering SMEs and Rural Entrepreneurs: Small businesses often lack the resources to experiment with AI. Based on feedback from DIP, the government should introduce micro-grant schemes, co-innovation labs, and training initiatives tailored to SMEs and entrepreneurs in remote regions. These programs should emphasize hands-on, case-based learning to demonstrate tangible returns on investment (ROI) and demystify AI adoption.

Inclusive Workforce Development: AI training initiatives must extend beyond engineers and data scientists to include blue-collar workers, mid-career professionals, and individuals in vulnerable job sectors. Partnerships with universities, community colleges, and vocational institutions can support large-scale reskilling and help mitigate risks associated with AI-driven job displacement.

Key Action Items

1. Building an AI-ready workforce through early integration of STEM and AI fundamentals in formal education and through comprehensive mid-career reskilling programs.
2. Establish certification pathways, targeted training initiatives, and public awareness campaigns that promote lifelong learning.
3. Expand high-speed internet access, deploy 5G networks, and invest in local data centers to support AI adoption nationwide.
4. Strengthen cybersecurity frameworks to protect an increasingly interconnected digital ecosystem.
5. Prioritize Thai-language adaptation in AI tools alongside localized training programs.
6. Support SMEs and vulnerable communities through micro-grants and targeted capacity-building initiatives.

Priming Next-Level Innovation for Inclusive Growth

Village AI Hubs: Establish small-scale AI centers in rural schools or community halls using low-power computing devices. These hubs would enable local residents to develop simple, practical tools, such as predicting crop yields, supporting basic health-clinic operations, or identifying buyers for village products. For more advanced applications, these local systems should be connected to centralized computing resources hosted at university-led Centers of Excellence, as vector-based compute capacity will be required for higher-complexity AI workloads.

Solar-Powered AI Devices: Deploy easy-to-install, solar-powered devices, such as basic single-board computers, that support voice assistants and AI applications designed for farmers, shopkeepers, and adult learners. These devices should function offline, speak local Thai dialects, and allow communities to engage with AI tools on their own schedules.

Community AI Rewards Program: Establish a cooperative-based AI rewards program in which small businesses, gig workers, and farmers earn digital “points” for activities such as data labeling, testing AI tools, or contributing ideas and feedback. Those points could be redeemed for small grants, microloans, or additional training opportunities. By directly linking community participation to tangible economic and learning benefits, such a program would encourage broad engagement while integrating rural communities into Thailand’s national AI ecosystem.

Expected Outcomes

By directly addressing inequality, the benefits of AI can be distributed more evenly across Thailand. Indicators of success may include increased AI adoption among rural SMEs, greater availability of AI services in Thai and regional dialects, and measurable improvements in development outcomes such as healthcare access, educational attainment, and local economic growth. Over time, a more inclusive AI ecosystem can narrow urban–rural gaps, empower marginalized communities, and cultivate a broad base of digitally capable citizens prepared to shape Thailand’s future.

Objective 5: Position Thailand as the Regional AI and Innovation Hub in ASEAN

Interviews with government officials, entrepreneurs, and academics highlighted Thailand’s ambition to emerge as a leading AI and innovation hub in Southeast Asia. While stakeholders acknowledged the strength of Thailand’s digital economy, they also recognized the need to catch up with more advanced AI ecosystems, such as those in Singapore. At the same time, Thailand possesses distinct advantages, including its strategic geographic location, large domestic market, substantial workforce, and data-rich sectors such as agriculture, tourism, and healthcare.

Stakeholders from organizations, including NIA and the Thailand Development Research Institute (TDRI), emphasized that becoming a regional AI leader requires more than technology adoption alone. Thailand must foster innovation, attract top AI talent, cultivate a dynamic startup ecosystem, and actively participate in shaping global AI norms. Establishing centers of excellence, hosting international forums, and promoting ethical, human-centric AI can differentiate Thailand within ASEAN and beyond.

Strategic Priorities

Ecosystem Building and Global Collaboration: Thailand should establish specialized AI research centers that unite academia, industry, and government around key sectors such as manufacturing, chemicals, health technology, agritech, and fintech. In parallel, hosting international conferences, hackathons, and competitions can attract global talent and investment.

Startup Acceleration and Investment: Building on NIA’s “Groom-Grant-Growth-Global” model, Thailand should streamline the transition from ideation to commercialization for AI startups. This includes expanding access to seed funding, providing mentorship from experienced entrepreneurs, and creating regulatory sandboxes for testing AI products. Interviews consistently highlighted the importance of a vibrant startup ecosystem for innovation and talent retention.

Talent Attraction and Retention: Addressing the AI talent gap is critical. Policymakers proposed scholarship programs, partnerships with leading global universities, and immigration incentives for foreign AI specialists. At the same time, rapid upskilling of domestic workers remains essential to building sustainable national capacity.

Thought Leadership in Ethical AI Governance: Thailand’s cultural context, informed by Buddhist ethical traditions and strong community values, offers a unique foundation for contributing to global AI governance discussions. Stakeholders, including policy experts from TDRI and former senior public officials, highlighted the opportunity for Thailand to advance AI guidelines grounded in compassion, inclusivity, and sustainability.

Key Action Items

1. Invest strategically to position Thailand as a regional magnet for AI research, talent, and collaboration.
2. Establish dedicated AI centers and incubators to accelerate technology transfer and commercialization.
3. Host international conferences and develop centers of excellence across priority economic sectors.
4. Ensure that innovation policies are grounded in ethical, human-centric AI standards.

Priming Next-Level Innovation as Regional AI and Innovation Hub

Pan-ASEAN Federated Learning Network: A cross-border consortium in which Thailand hosts the “master node” would support the development of federated models for health diagnostics, smart logistics, and climate forecasting across Southeast Asia.

Trained on local datasets in each member country, all participants would benefit from highly accurate, region-wide AI without compromising data privacy or national sovereignty.

Tokenized AI Sandbox for Cross-Border Ventures: An on-chain “Innovation Passport” could mint non-fungible tokens (NFTs) for validated AI prototypes, grant access to regulatory sandboxes across ASEAN, and automate milestone-based funding. Startups could earn special government-backed tokens by meeting compliance and performance checks, and then redeem them for cloud credits, market pilots, or access to advanced toolsets.

ASEAN AI Investment Summit: Thailand could host an annual ASEAN AI Investment Summit in Bangkok, a flagship event co-hosted by NIA and TDRI, with live 3D “AI Campus” zones for demo-driven deep dives. The summit’s primary draw would be its carefully curated guest list, potentially including pension funds and sovereign wealth managers from across Southeast Asia. By attracting top-tier AI ventures, venture capital (VC) firms, and corporate R&D teams eager to pitch pilot programs, the summit would position Thailand as a key ASEAN nexus where capital meets cutting-edge AI, with media reach across Bloomberg, Nikkei Asia, and other global and local business publications. By creating a rolling pipeline linking startup funding with the following year’s showcase, this approach would help ensure a sustained flow of new ideas and elevate Thailand’s brand as the region’s AI innovation hub.

Expected Outcomes

Achieving this objective would result in a dynamic AI ecosystem that strengthens Thailand’s GDP growth, technology exports, and regional influence. Thailand could become a focal point for international AI conferences, partnerships, and FDI, while domestically developed AI firms expand into neighboring ASEAN markets. Over time, a thriving AI hub would contribute to a more resilient and diversified economy, where advanced technology progresses alongside deep respect for cultural and ethical values.

Objective 6: Institute a Cohesive Policy and Regulatory Framework

As noted throughout this report, no single ministry can deliver the scope or scale of change required to realize Thailand’s AI ambitions. Effective inter-ministerial collaboration is thus essential. This coordination must occur not only among individual ministry leaders and their staffs, but also with clear direction, endorsement, and sustained support from senior national leadership.

Strategic Priorities

Partnerships within Government: Ministries must establish effective and durable working partnerships to address all dimensions of the Five-Year Strategy.

Roles and Responsibilities: Roles and responsibilities should be clearly allocated based on each ministry’s mandate, statutory authority, and operational capacity.

Investment in Ministry Staff Capacity: Targeted investment in skills, knowledge, and institutional capabilities is required to ensure that ministry staff can provide informed leadership on AI initiatives. Only with a sound understanding of AI technologies, their limitations, and their potential can ministries effectively shape policy, regulate deployment, and guide implementation.

Bold and Timely Policy Definition: AI-related policy initiatives are required across the full spectrum of government functions and economic sectors. Many of these initiatives are outlined in this report.

Ministries must act decisively to articulate and implement policy frameworks that support national objectives while positioning the country for regional and global leadership in AI adoption.

Key Action Items

1. Integrate AI objectives and capabilities into digital government strategies and national development plans.
2. Implement a comprehensive national AI policy to align public investment and institutional support around strategic priorities.
3. Establish rigorous data governance, cybersecurity, and privacy protections to build and maintain public trust.
4. Adopt and operationalize ethical AI principles across government and society to ensure transparency, fairness, and accountability.

Priming Next-Level Innovation in Regulatory Policy

AI-Driven Policy Sandbox and Digital Twins: Imagine a computer model of Thailand's entire economy where policymakers can test new rules, such as changing tariffs, updating privacy laws, or introducing ethical guidelines, before making them official. This would allow decision-makers to see, in real time, how each change might ripple through agriculture, manufacturing, healthcare, and finance, enabling proposals to be refined before implementation.

Ministry Collaboration Shared Progress Tracker: Create a simple online dashboard where each ministry logs its AI projects, budgets, and data-sharing plans. The system would automatically flag delays, send reminders, and suggest where resources could be allocated, ensuring that no initiative stalls and that all departments remain aligned.

Citizen-Centric Governance Decentralized Autonomous Organization (DAO): Create a DAO in which citizens, SMEs, and civil-society groups can vote on AI pilots and data governance proposals through tokenized participation. Approved pilots would then be implemented within a Policy Sandbox and would feed performance data back into the DAO, thereby enabling bottom-up policy innovation and providing regulators with direct, quantifiable signals of public trust, ethical compliance, and social impact. For example, Thang Rai could evolve from a simple UBI cash distribution program into a "Universal Basic Capital" model, shifting the emphasis from periodic cash benefits toward sustainable, long-term wealth creation and enduring financial stability.

Expected Outcomes

Through coordinated action and proactive policy leadership, ministries can become a powerful collective force guiding Thailand toward a productive and future-ready AI ecosystem. This approach will enable government institutions not only to regulate AI effectively but also to lead by example in its responsible and impactful use.

Conclusion: Unifying the Vision into Action

Taken together, the six objectives outlined in this report constitute more than a roadmap. They form a comprehensive, multi-layered architecture for Thailand's AI transformation, beginning with technical capability and extending outward to benefit every sector, community, and institution. By integrating economic competitiveness with social inclusion, the framework ensures that AI enhances productivity across agriculture, manufacturing, healthcare, finance, and other strategic sectors, while also narrowing urban-rural disparities through localized solutions, targeted funding, and Thai-language interfaces. Environmental sustainability is embedded throughout the strategy with AI applied to climate resilience, resource optimization, and environmental monitoring. This ensures that innovation and economic growth reinforce, rather than undermine, ecological stability. Regional leadership is framed not as an

aspiration alone, but as a strategic outcome, supported by regional collaboration, investment attraction, and leadership in responsible AI governance.

At the same time, the report makes clear that technological capability alone is insufficient. Interviews consistently emphasized the importance of cohesive, citizen-centered governance. This includes mechanisms to coordinate policy across ministries, engage stakeholders, and uphold robust data governance and ethical standards rooted in widely shared values such as balance, responsibility, and social cohesion. Cultural and societal alignment must remain central, ensuring that AI solutions are adapted to local contexts rather than imposed through external models.

Finally, this strategy is intentionally iterative. Pilot initiatives and targeted deployments should function as learning systems, generating evidence, refining policy, and informing scale-up decisions in real time. This continuous feedback loop enables government, industry, and communities to adapt to emerging challenges and opportunities, from economic shocks to rapid technological advances.

By combining advanced technology, principled governance, inclusive capacity building, and deep cultural awareness, Thailand is well-positioned to develop an AI ecosystem that is resilient, forward-looking, and distinctly national in character—one that supports shared prosperity, environmental stewardship, and sustained digital leadership.



To accelerate AI adoption, we propose that MIND consider a series of Next-Level Innovation pilots to serve as living laboratories:

AI-Powered E-Learning Systems – Adaptive, AI-driven platforms that deliver personalized curricula in Thai and regional dialects, automating homework grading and mentorship to upskill millions at scale.

Agentic Technologies – Multi-agent frameworks for B2B supply chain optimization, manufacturing orchestration, and real-time flow management, demonstrating how autonomous AI cooperatives can boost resilience and efficiency across industries.

ResilienceCloud – A continuous climate digital-twin and resilience stress-test platform that rehearses extreme weather events, tariff shocks, and AI-driven market disruptions in real time.

Federated Village AI Networks – Low-power edge servers in schools and community centers that train localized models on rural datasets and share encrypted updates with a central hub, democratizing AI insights without compromising privacy.

Citizen-Centric Governance DAO – A tokenized, bottom-up policymaking vehicle in which communities vote on AI pilots, data governance rules, and ethical guardrails, with results fed directly into the national Policy Sandbox.

ASEAN AI Investment Summit – An annual flagship expo and deal-making forum that brings pension and sovereign fund managers together with leading AI ventures, forging co-investment vehicles and cross-border partnerships.

Each pilot could validate core strategies, generate rapid learning cycles, and showcase Thailand as a dynamic testbed, bringing these objectives off the page and into practice on a fast track to national impact.

INDUSTRY IMPLEMENTATION FOCUS: MINISTRY OF INDUSTRY

We believe that MIND must play an essential and dynamic role in defining and implementing the principles, policies, and practices necessary to transform Thailand into a leading regional and global AI-powered society in the 21st century.

AI is catalyzing a massive, fast-moving wave of economic change worldwide (World Bank, 2025).

Thailand can either ride this wave to success or be overwhelmed by it. MIND should thus adopt the goal of becoming a world-class “surfer,” organizing itself and its partner agencies to build the proficiencies and programs required.

Achieving this will demand a cultural shift within MIND toward one that genuinely embraces and rewards innovation. Government studies show that public-sector organizations with explicit innovation cultures deliver significantly higher program impact (Infocomm Media Development Authority, 2024).

Throughout this section, we outline specific policy and action recommendations to help Thailand attain regional preeminence in AI.

Transforming entrenched bureaucratic processes will not be easy, as decades-old rituals and hierarchical cultures can stifle agile decision-making. MIND must pair its new AI mandate with change-management programs.

Success hinges on unrestrained collaboration across ministries and layers of government—something the Organisation for Economic Co-operation and Development (OECD) analyses identify as one of the toughest challenges in national AI strategies (International Federation of Robotics, 2024). Because industrial policy cuts across infrastructure, finance, education, and trade, MIND should serve as the lead coordinating body for AI initiatives affecting the real economy.

Transforming entrenched bureaucratic processes will not be easy. Research on public-sector reform warns that decades-old rituals and hierarchical cultures can stifle agile decision-making (Organization for Economic Co-operation and Development, 2023a). Accordingly, MIND must pair its new AI mandate with change-management programs that incentivize risk-taking, rapid experimentation, and cross-departmental teamwork—principles identified as hallmarks of innovative public agencies (Luo, 2024). Without these shifts, even well-funded AI initiatives risk faltering under legacy governance structures (Eastern Economic Corridor of Innovation, 2024).

SMEs are critical to Thailand’s economy, constituting 99.5% of firms and producing approximately 35% of GDP. ⁵⁵ However, they lag in innovation and global market access. Key constraints include limited financing for technological upgrades, a shortage of skilled workers, and burdensome regulations.

With labor force expansion slowing and soon reversing, growth must come from increased efficiency or value, essentially, innovation. If Thailand cannot boost SME productivity, growth will plateau around 2%–3%, barely above population growth, leaving little improvement in average incomes. The World Bank explicitly warns that “structural reforms on economic competitiveness are necessary to boost long-term growth,” underscoring that maintaining the status quo will result in subpar growth.

Thailand's digital economy constitutes only about 6% of overall GDP, compared with its regional peers. In contrast, Singapore's digital economy contributes nearly 18% of GDP, and South Korea's aggressive automation (with approximately 1,000 robots per 10,000 workers) has underpinned its manufacturing competitiveness. ASEAN peers such as Vietnam are targeting a 30% digital economy share of GDP by 2030 and view AI as "a new driver of breakthrough growth."

If Thailand fails to keep pace, it risks falling behind as others reap AI-driven productivity gains. By embracing AI and Industry 4.0 principles, Thailand could offset labor shortages, upgrade its industrial base, and develop new sources of growth across sectors. Consequently, Thailand risks falling into a prolonged middle-income trap and experiencing stagnation. Traditional engines like tourism and low-cost labor are widely viewed as insufficient to sustain growth through 2030, highlighting that a large-scale crucial to technology is not just desirable but a mandatory national challenge.

The role of MIND is central in supporting MDES and MHESI in the 5-Year National AI Strategy. Already positioned as a key driver of Thailand's industrial transformation, overseeing agencies such as the EECi innovation hub and DIP's SME support programs, MIND is well PLACED to provide the acceleration boost that Thailand's AI adoption requires.

MIND has championed the "Thailand 4.0" agenda, aiming to upgrade traditional industries, including automotives, electronics, and food processing, into high-tech fields such as robotics, biotech, and smart manufacturing. Its influence is evident in policies like generous incentives via the BOI for companies investing in advanced technology, such as up to 13-year corporate tax exemptions for R&D and automation projects.

However, institutional gaps and cultural factors may limit MIND's effectiveness. Coordination with other ministries, including Digital Economy, Education, and Science, has been uneven, and siloed bureaucracy slows decision-making. Within MIND and industry, a risk-averse culture and fear-of-failure mindset have at times hindered innovation.

While MIND's network of FTI, FTPI, and MASCI provides multiple channels to disseminate new standards and practices, these bodies must modernize their approach to accelerate technology adoption among businesses. Coordinated efforts across sectors are recognized as necessary to align innovation policies, yet executing whole-of-government initiatives remains a challenge. A first step would be to have these channel partners adopt AI internally in a comprehensive and committed manner.

Summary of MIND Strengths and Advantages

Direct Authority and Clear Jurisdiction:

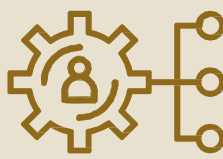
MIND has a distinct role in Thailand's key industrial sectors, providing the organizational capacity and authoritative mandate to implement AI policies and incentives rapidly and broadly.

Established Institutional Networks:

MIND's robust network, including EECi, DIP, FTPI, and FTI, ensures that industry-level insights, feedback, and buy-in can be leveraged effectively across all sectors and regions, enhancing implementation speed and success.



Capacity &
Mandate



Robust
Network



Deep Sectoral
Knowledge

Capacity for Industry-Specific Tailoring:

Given MIND's deep sectoral knowledge and existing policy structures, it can quickly create tailored incentives and programs that align closely with industry-specific needs, significantly accelerating adoption and effectiveness.

Summary of Potential Risks and Constraints

In pursuing these goals, MIND will need to consider a range of potential risks and constraints and develop appropriate mitigation strategies to address them.

Resistance to Change Among SMEs:

Many smaller and more traditional industries may hesitate to adopt AI technologies. MIND should thus prioritize strong SME engagement through the DIP and FTPI, proactively offering education, low-risk demonstration projects, and accessible financing options to mitigate this resistance. This remains a significant challenge.

Infrastructure Dependencies:

Some MIND-led initiatives may depend on infrastructure developments overseen by other ministries or agencies, such as digital infrastructure managed by the DEPA. To mitigate coordination risks, MIND should clarify collaboration terms and communicate infrastructure dependency requirements early in the strategy development process. This will be a critical factor for many AI-related initiatives, as they will inevitably require active involvement from multiple ministries. Accordingly, the establishment of an overarching AI collaboration framework across the Thai federal government is recommended. This framework may also include partnerships with relevant international organizations. MIND should thus define clear protocols and engagement mechanisms to facilitate effective inter-agency and international coordination.

Skills and Human Capital Gaps:

Although MIND can manage industry-focused skills initiatives, broader educational reforms required for AI readiness fall outside its direct mandate. As noted above, MIND must thus partner with the Ministry of Education at the policy level, as well as with local vocational training centers, universities, and industry bodies, including FTI and DIP, to ensure that required skills are developed rapidly and are closely aligned with industry needs.

Determining Industry Requirements:

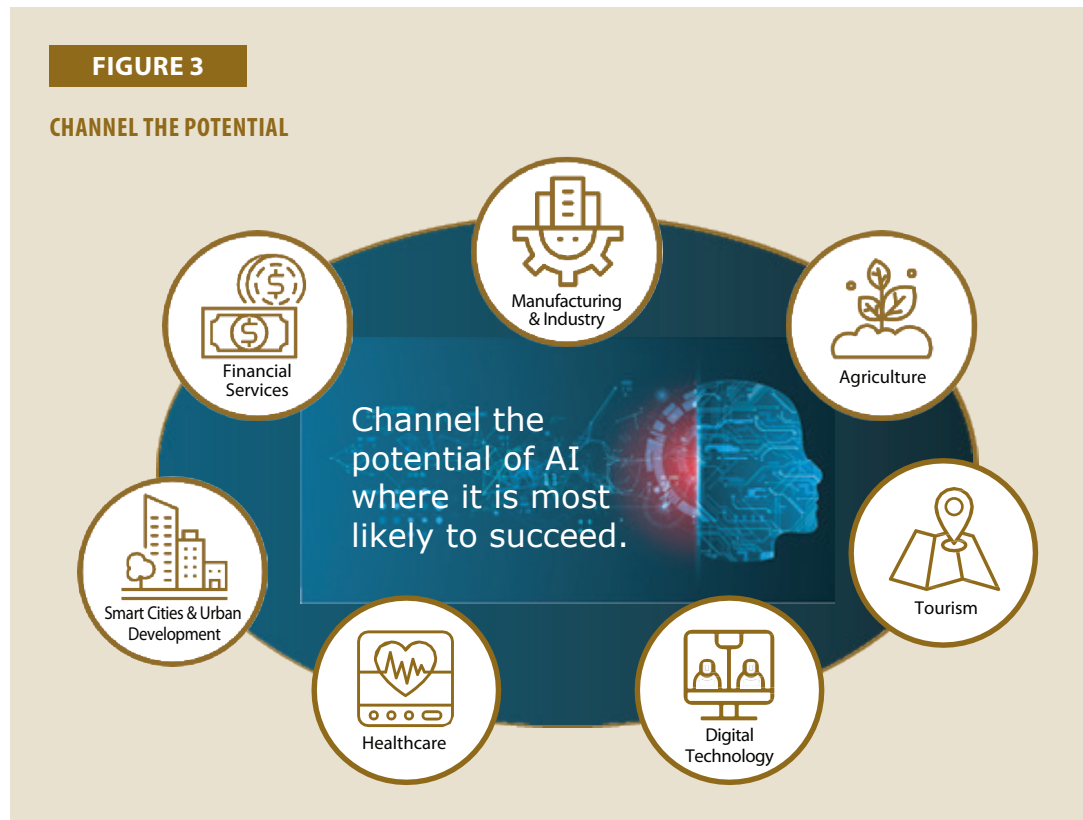
Each industrial sector will present distinct needs and opportunities. It is thus essential to assess these carefully to ensure that proposed policy interventions are appropriately tailored. This report identifies several priority areas for consideration; see Section 11 for further details.

**Economic Sector Focus Areas**

The roadmap identifies priority economic sectors in which AI can deliver both immediate and long-term value, stimulating growth while addressing critical societal needs.

Manufacturing and Industry

AI-enabled automation, operations management, and predictive maintenance should be leveraged to modernize production systems across all industrial sectors. Key focus areas include the following.



AI-Driven Automation and Robotics

As Thailand advances toward Industry 4.0, AI-driven automation has emerged as a top priority among manufacturing executives, engineers, and government bodies such as EECi.

Demonstration Factories and Pilot Projects: To address concerns related to cost and implementation complexity, the roadmap proposes the establishment of demonstration facilities where manufacturers can observe AI-powered robots performing tasks such as welding, packaging, and quality inspection. These “living labs” would be accessible to SMEs and would offer training opportunities alongside risk-sharing models.

Incentives for Adoption: Drawing on stakeholder interview feedback, policymakers plan to offer tax credits, grants, or subsidized loans to firms investing in AI-enabled machinery. This support is particularly important for smaller manufacturers that lack the capital reserves of large conglomerates.

Upskilling the Workforce: Union representatives and factory managers emphasized that robotic adoption must be accompanied by comprehensive training programs that enable workers to transition into higher-value roles, such as programming, maintenance, and process optimization.

AI for Predictive Maintenance

Unplanned downtime was frequently identified as a major source of lost productivity and profitability during interviews with manufacturing stakeholders.

Real-Time Monitoring: Sensors installed on production lines and connected to AI algorithms can identify anomalies in vibration, temperature, or output quality. Early warnings enable maintenance

teams to intervene before critical failures occur. Through coordinated efforts led by MIND, Thailand has the potential to establish a competitive advantage in this arena.

Sector-Specific Collaborations: Industries such as automotive, electronics, and food processing stand to benefit significantly from predictive maintenance solutions. The roadmap encourages the formation of public-private consortia to pilot AI-driven applications and facilitate the exchange of best practices.

Long-Term Reliability Gains: By reducing unexpected stoppages, firms can optimize production scheduling and ensure consistent product quality. This, in turn, strengthens Thailand's positioning as a reliable participant in global supply chains, a priority repeatedly highlighted by trade and export agencies.

AI-Optimized Supply Chain and Logistics

The industrial value chain, from raw material sourcing to final delivery, can be significantly enhanced through AI-driven analytics and, in the near term, AI agent-based systems.

Demand Forecasting and Inventory Management: Machine learning models can analyze market trends to help manufacturers align production volumes with demand, thereby reducing overstocking and minimizing the risk of shortages. During roadmap workshops, participants from the electronics sector emphasized that agile supply chains are critical in rapidly evolving markets.

Smart Routing and Transportation: AI applications can integrate traffic conditions, fuel costs, and loading constraints to optimize delivery routes, reducing transit times and lowering carbon emissions. Logistics experts from major Thai ports and transportation firms indicated that such solutions could generate substantial operational cost savings.

Resilience to Global Shocks: In an environment characterized by pandemics, geopolitical disruptions, and raw material shortages, AI-enabled contingency planning is increasingly vital. Predictive models can rapidly identify alternative suppliers or logistics routes, thereby minimizing operational disruption. Further detail is provided in Section X, which outlines a proposed pilot project in this arena.

Agriculture

AI-powered precision agriculture can optimize planting schedules, irrigation, and pest management (Food and Agriculture Organization. 2022a). Real-time sensor data and predictive analytics can increase yields, reduce resource waste, and strengthen resilience to climate variability. Key focus areas include:

Precision Agriculture and AI-Powered Farming

Agriculture remains a cornerstone of Thailand's economy, employing a substantial share of the workforce and underpinning national food security (World Bank, 2023a). Ethnographic interviews with farmers in rural provinces, alongside discussions with agritech entrepreneurs and policymakers, underscored the urgent need to enhance agricultural productivity while adapting to climate change. AI-driven analytics and IoT sensors offer a viable pathway through precision agriculture. By collecting data on soil conditions, weather patterns, and crop health, machine learning models can guide farmers on optimal planting timelines, irrigation scheduling, fertilization strategies, and pest management practices.

Climate Adaptation and Resilience: Multiple stakeholders, particularly smallholder farmers, voiced concerns regarding increasingly unpredictable weather patterns and pest outbreaks. 63 AI tools that analyze long-term climate and weather data can support anticipatory decision-making, enabling farmers to adjust cropping cycles and adopt climate-resilient crop varieties. This approach aligns with recommendations from environmental experts interviewed at MASCI, who emphasized the importance of embedding AI-based sustainability metrics into agricultural planning.

Pilot Projects in Key Regions: The roadmap recommends launching pilot projects in regions such as the Central Plains, which are dominated by rice production, and the Northeast, where diverse cash crops are prevalent.

These initiatives would involve collaboration among local agricultural extension officers and agritech startups to deliver AI-based decision-support tools. Targeted training workshops can help demystify AI applications, ensuring that farmers are able to interpret sensor outputs and machine learning forecasts effectively.



Socioeconomic Impact: By optimizing the use of water, fertilizers, and Labor, precision farming enhances yields while reducing operational costs. These efficiencies translate into higher farm incomes and improved environmental stewardship, as chemical inputs are minimized and water resources conserved. Interviews with farmer cooperatives highlighted that these combined economic and environmental benefits are essential for long-term rural development.

Smart Farming Logistics and Supply Chain Optimization

The potential of AI in agriculture extends beyond on-farm practices to encompass the entire agricultural value chain. Agribusiness representatives emphasized that post-harvest losses, inefficient distribution systems, and price volatility remain persistent challenges.

Reducing Post-Harvest Losses: AI-powered logistics platforms can predict harvest volumes, schedule transport, and coordinate storage facilities (United Nations Environment Programme, 2022). By matching supply with market demand more accurately, farmers can reduce spoilage and stabilize incomes.

Digital Marketplaces and Cooperatives: As recommended by stakeholders at DIP, government-supported AI-driven digital marketplaces can aggregate small-scale producers and connect them directly with buyers at fairer prices. This approach promotes inclusivity by enabling even remote farming communities to benefit from digital infrastructure and data-driven market access.

Real-Time Analytics for Price Stabilization: Predictive analytics drawing on diverse data sources, including weather conditions, consumer demand, and global commodity prices, can help farmers make informed decisions about when to sell or store their produce. Feedback from community workshops indicated that such data-driven insights significantly reduce reliance on traditional guesswork, thereby improving sector-wide resilience.

Tourism

AI-driven personalized services, ranging from multilingual chatbots to customized travel itineraries, can enhance visitor experiences while distributing tourist flows more evenly across destinations. Predictive analytics can further support capacity planning and sustainable destination management. Key focus areas include:

AI-Driven Tourism Experiences

Tourism functions not only as a major economic driver for Thailand but also as a global showcase of Thai culture and hospitality. Interviews with tourism boards, local guides, and technology startups consistently highlighted the potential of AI to deliver personalized, high-quality visitor experiences.

Multi-Language Chatbots and Concierge Services: AI-enabled chatbots capable of communicating in Thai, English, Chinese, and other priority languages can provide real-time travel guidance, cultural context, and customer support. 66 Stakeholders within Bangkok's tourism sector noted that accessible AI tools of this kind could significantly enhance the experience of independent travelers.

Mobile Applications for Customized Itineraries: By analyzing user preferences such as culinary interests, cultural activities, or adventure tourism, AI systems can generate dynamic itineraries that feature local festivals, eco-tourism sites, and lesser-known attractions. This capability supports the redistribution of tourist traffic away from congested hotspots, aligning with sustainability objectives raised by urban planners during roadmap consultations.

Stakeholder Partnerships: The strategy encourages the Tourism Authority of Thailand (TAT) to collaborate with AI startups in co-developing these digital tools. Workshop participants observed that pilot programs in major destinations such as Phuket and Chiang Mai could demonstrate early successes, encouraging wider adoption across other provinces.

Predictive Analytics in Tourism Management

At a macro level, AI-driven analytics can support more strategic tourism planning and more efficient resource allocation (Asian Development Bank, 2023a).

Forecasting Visitor Flows: By analyzing flight bookings, social media trends, and historical travel data, AI systems can forecast seasonal peaks and identify emerging destinations. Local governments can then prepare accordingly by deploying security services, maintenance resources, and targeted promotional campaigns where they are most needed.

Pricing and Inventory Optimization: Interviews with hotel associations and airline operators highlighted the importance of real-time demand forecasting. AI systems that dynamically adjust pricing based on occupancy rates and traveler demographics can increase revenue while maintaining competitive pricing, particularly during off-peak periods.

Sustainable Destination Management: AI tools can help prevent overtourism by redirecting visitors toward less-crowded sites and reducing pressure on high-traffic destinations.



This approach responds directly to concerns raised by cultural preservation advocates regarding the negative impacts of mass tourism on temples, national parks, and local communities.

AI-Augmented Medical Tourism

Thailand's reputation as a leading medical tourism destination is well established, and AI technologies can further reinforce this competitive advantage.

Personalized Patient Matching: By analyzing patient profiles and treatment preferences, AI platforms can recommend the most suitable hospitals or clinics. This reflects experiences shared by hospital administrators who are already piloting AI-based triage and appointment management systems.

Telehealth for Overseas Consultations: AI-driven telemedicine can support initial consultations, second opinions, and follow-up care, ensuring continuity of treatment before and after a patient's visit. This "extended care model" was recommended by healthcare stakeholders during interviews as a means of building trust and convenience for international patients.

Medical Tourism Outreach Support: Multilingual patient testimonials can help build international confidence; however, leading AI translation providers have been reluctant to fully support the Thai language, particularly for advanced capabilities such as lip-syncing and voice cloning.

Improved access to these technologies could strengthen medical tourism agencies' global marketing efforts. When combined with multi-language chatbots and concierge services that provide real-time assistance, these tools could significantly enhance Thailand's competitive position in medical tourism.

Digital and Technology Sector

As AI is likely to be a defining technology of the 21st century, alongside a broad set of complementary digital innovations, developing high levels of proficiency across these domains will be critical to Thailand's global competitiveness and domestic economic progress. Key focus areas include:

AI-Enhanced Software Development

The digital technology sector itself stands to benefit significantly from AI adoption, as local developers, startups, and IT service providers integrate machine learning tools into their workflows (National Innovation Agency, 2024c).

Accelerating Coding and Testing: AI-based code generation tools can automate repetitive programming tasks, while AI-driven testing systems can identify bugs or security vulnerabilities at earlier stages of development. Focus group discussions with young entrepreneurs and developers revealed strong enthusiasm for these productivity gains, particularly as a means for smaller Thai firms to compete internationally.

Upskilling Tech Talent: The roadmap encourages incubators supported by NIA to provide targeted AI training and mentorship in software engineering best practices. Stakeholders emphasized that even incremental improvements in developer productivity can generate substantial spillover benefits across the wider digital ecosystem.

AI for Quality Assurance: By applying NLP to user feedback and bug reports, software firms can prioritize fixes and feature enhancements more effectively. This iterative feedback loop, recommended by participants from the FTPI, supports rapid product evolution and closer alignment with user needs.

Developing Home-Grown AI Applications for Key Sectors

Thailand's technology entrepreneurs are well-positioned to develop AI solutions tailored to local conditions, whether in agriculture, tourism, healthcare, or finance.

Localized AI for Language and Culture: Interviewees, including academic experts, stressed the importance of AI systems that understand Thai language, regional dialects, and cultural contexts.

Examples include chatbots capable of communicating in Isan or Southern Thai, as well as AI-powered translation tools for government and public-service documentation. Locally developed solutions can address gaps that global platforms often fail to cover.

Incubators and Innovation Grants: The roadmap proposes hackathons, co-creation workshops, and targeted innovation grants to connect domain specialists with AI developers. This responds to a recurring observation from interviews that many foreign AI tools do not fully align with Thailand's specific regulatory, linguistic, and socioeconomic conditions.

Export Potential: Once validated domestically, these AI applications can be adapted for export to neighboring ASEAN markets with similar cultural and linguistic characteristics, thereby expanding Thailand's digital economy footprint.

Healthcare

Telemedicine, AI-assisted diagnostics, and digital patient management systems offer significant potential to improve care delivery and reduce disparities between urban and rural areas. These initiatives can also reinforce Thailand's standing in medical tourism. Key initiatives include:

AI-Powered Diagnostics and Telemedicine

Interviews with healthcare professionals, hospital administrators, and rural community leaders highlighted the transformative potential of AI in expanding access to care and improving diagnostic accuracy (World Health Organization, 2024a).

Remote Consultation Platforms: AI tools can assist clinicians by analyzing patient data, including medical images and diagnostic test results, and flagging potential concerns. In remote areas where access to specialists is limited, such systems can substantially elevate the quality of care. The experience of Thonburi Hospital with AI-supported queue management and telemedicine illustrates this potential.

Regulatory Integration: The roadmap calls for the development of clear regulatory guidelines for the certification and use of AI diagnostic tools. This responds to stakeholder concerns regarding liability, data protection, and clinical safety raised during strategy consultations.

Bridging Urban–Rural Gaps: Rural clinics can deploy AI-based triage systems to identify high-risk patients requiring urgent referral to tertiary hospitals. This can reduce waiting times and improve overall health outcomes.

It should be emphasized that AI-powered digital diagnostics present substantial opportunities at both individual and population levels to inform care pathways, budgeting and risk management, and clinical triage prioritization.

Disease Prediction and Public Health Management

Beyond individual clinical care, AI's large-scale data processing capabilities can inform more proactive and preventive public health strategies (Ministry of Public Health, Thailand, 2023).

Epidemic Surveillance: By analyzing aggregated data from hospitals and clinics, AI systems can detect abnormal spikes in symptoms or diagnoses, enabling earlier identification of potential disease outbreaks. Public health officials emphasized the value of this approach in strengthening Thailand's preparedness for pandemics and localized outbreaks, such as dengue fever. AI-generated analytics can also be used to project future disease prevalence and incidence across geographic areas and demographic risk groups.

Targeted Interventions: Predictive analytics enable government agencies to allocate vaccines, medications, and healthcare personnel more effectively. Interviews highlighted that such data-driven planning could be integrated with the national health insurance system to support more efficient and equitable resource deployment.

Chronic Disease Management: AI-enabled monitoring applications for chronic conditions such as diabetes and hypertension can support medication adherence and lifestyle modification, thereby reducing avoidable hospital readmissions. Healthcare experts participating in stakeholder workshops identified these tools as particularly important for managing the needs of Thailand's aging population.

Enhancing Medical Services and Medical Tourism

Thailand's established medical tourism sector can be further strengthened through AI-driven improvements in both clinical outcomes and patient experience.

Intelligent Treatment Planning: Advanced AI systems can compare individual patient profiles against extensive clinical databases to generate personalized treatment recommendations. Hospital leaders interviewed indicated that such technologies could help sustain Thailand's global reputation for high-quality medical care.

Streamlined Patient Journeys: AI-powered chatbots can manage initial queries, appointment scheduling, and follow-up communication. These services are particularly attractive to international patients who may face language or logistical barriers when seeking care abroad.

International Accreditation: To build confidence among foreign patients, the roadmap proposes the development of a recognized certification program for AI-based medical tools. This recommendation aligns with calls from healthcare providers to standardize AI deployment and ensure consistent levels of safety, quality, and accountability.

In general, AI can be applied to plan capacity and competency requirements across the health system, optimize current utilization, and support the introduction of new service offerings. Predictive models can also be used to project demand, supply, and pricing for specialized services across different populations and geographic regions.

Smart Cities and Urban Development

Integrated AI systems for transportation, public safety, and infrastructure maintenance can significantly enhance urban livability. Data-driven governance can further support transparent decision-making and more efficient allocation of public resources. Key focus areas include:

AI in Smart City Infrastructure

Urban planners, municipal officials, and environmental experts consistently emphasized that Thailand's rapidly expanding cities require AI-enabled solutions to address congestion, pollution, and resource management challenges (International Telecommunication Union, 2022).

Traffic Optimization: Real-time AI models can dynamically adjust traffic signals based on sensor data, reducing congestion, shortening travel times, and improving air quality. Transport authorities in Bangkok identified this as a priority area during interviews.

Public Service Coordination: Municipal services such as waste collection, street lighting, and public safety can be integrated through centralized AI-driven command centers. Local government leaders from Chiang Mai reported that pilot initiatives are already underway to consolidate data on energy use, emergency response, and population movement.

Data-Driven Governance: AI dashboards presenting city-wide indicators, such as water consumption, carbon emissions, and commuter patterns, enable evidence based policymaking at the local level. Civil society organizations welcomed these tools for their potential to enhance transparency and allow citizens to hold authorities accountable for service delivery.

Public Infrastructure Monitoring and Management

AI can also support proactive maintenance of critical urban infrastructure, reducing safety risks and long-term repair costs.

Predictive Maintenance of Roads and Bridges: By analyzing sensor and inspection data, AI systems can identify early signs of structural stress or deterioration in roads and bridges, alerting engineers before minor defects escalate into serious hazards.

Utilities and Resource Efficiency: Water and electricity networks can deploy AI tools to detect leaks, abnormal consumption patterns, and energy surges. This approach has been strongly recommended by the EECi, which has piloted AI-based monitoring systems in several industrial areas.

Budget Optimization: By prioritizing maintenance interventions based on AI-generated risk assessments, municipal authorities can allocate limited budgets more strategically. Local government representatives interviewed expressed strong support for this approach, noting its potential to improve fiscal efficiency while enhancing public safety.

Financial Services

AI can significantly improve the efficiency and reach of the financial services sector while advancing financial inclusion. Applications such as enhanced credit scoring, fraud detection, and customer service delivered through advanced analytics and localized chatbots can strengthen institutional performance. These improvements can also support the integration of unbanked populations into the digital economy, providing a powerful lever for broad-based and inclusive economic growth.

As widely recognized, the benefits of AI will not be confined to the sectors outlined in this roadmap. Through coordinated national efforts to adopt AI across Thailand, positive impacts are expected to extend across the entire economy. Key focus areas include:

Serving the Needs of the Unbanked

Addressing the needs of unbanked and underbanked populations emerged as a major priority during interviews with policymakers and fintech innovators (Bank of Thailand, 2024a).

Micro-Loans and Credit Scoring: AI can analyze non-traditional data, such as mobile phone usage patterns, utility payment histories, or digital transaction records, to construct credit profiles for individuals without formal banking histories. This approach was endorsed by the NESDC and community organizations as a means of stimulating entrepreneurship, particularly in rural and underserved areas.

AI Chatbots for Financial Literacy: User-friendly, localized AI chatbots can support financial literacy by guiding individuals through budgeting, saving, and borrowing options. Fintech startups interviewed suggested that such tools could substantially lower barriers to financial education and promote more responsible borrowing behavior.

Regulatory Sandboxes: To balance innovation with risk management, the roadmap proposes the establishment of regulatory sandboxes that allow fintech firms to test AI-enabled credit products under regulatory supervision. This approach addresses concerns raised by the Bank of Thailand (BOT) regarding consumer protection, while still enabling experimentation with innovative financial solutions.

Fraud Detection and Financial Security

As digital transactions continue to expand, robust cybersecurity and fraud prevention mechanisms are essential to maintaining trust in the financial system.

Real-Time Fraud Analytics: Machine learning systems can analyze transaction patterns in real time to identify anomalies that may indicate fraud or money laundering. Bank representatives and cybersecurity experts emphasized that AI-enabled threat intelligence sharing across institutions could help the sector stay ahead of increasingly sophisticated cyber risks.

Protecting Consumer Data: As AI systems process large volumes of financial data, strong data protection and privacy safeguards are critical. Stakeholders called for clear regulatory guidance on the permissible use of personal data by banks and fintech platforms, echoing broader demands for a comprehensive AI ethics and governance framework.

Enabling a Cashless Society: More effective fraud detection can enhance public confidence in mobile payment systems and e-commerce platforms. As noted by BOT officials during interviews, AI-driven security solutions could accelerate Thailand's transition toward a more cashless economy, expanding market access and reducing transaction costs.

Catalyzing Growth Through Targeted AI Interventions

By prioritizing these seven domains, namely agriculture, tourism, manufacturing, the digital and technology sector, healthcare, smart cities, and financial services, Thailand can direct AI's transformative potential to areas where it is both most urgently needed and most likely to deliver results. Each sector combines opportunities for near-term economic gains with longer-term societal benefits, ranging from improved rural livelihoods to enhanced global competitiveness of Thai industries and services.

Importantly, these focus areas are highly interconnected rather than independent. Cross-sector collaboration—such as agritech firms partnering with financial institutions to develop AI-enabled micro-loan models for farmers, or tourism authorities working with local AI companies to support smart city visitor experiences—can generate synergies that amplify overall impact. Equally critical are enabling policies, including investment in digital infrastructure, inclusive workforce development, and robust ethical and regulatory frameworks. Taken together, these measures ensure that AI-driven productivity gains are both substantial and sustainable, positioning Thailand as a regional leader in leveraging technology-enabled inclusive growth and shared prosperity.

AI Productivity Workforce Development at Scale

Developing an AI-proficient workforce at scale is a central component of many national AI strategies, as these skills will be critical for the future operations and competitiveness of firms across nearly all industries.

Recognizing this need, several countries have already established ambitious targets to train tens of thousands of specialists within 5-year horizons, mobilizing both public and private resources:

Malaysia – MyMahir Program (2023–2025): Aims to upskill 50,000 Malaysians in AI, programming, and data analytics by 2025, primarily through an online platform and academic partnerships (Rajaendram, 2025; Bernama, 2024). This rapid initiative, announced by the Prime Minister, leverages existing university programs and online courses to reach students nationwide.

India – FutureSkills PRIME (2019–2022): A public–private partnership between the government and the National Association of Software and Service Companies (NASSCOM) to reskill 400,000 IT professionals in emerging technologies, including AI, cloud, and data (YourStory, 2019). Backed by a US\$62 million budget in 2018, the program achieved an average cost of US\$155 per trainee. This low unit cost was enabled through online learning at scale and industry-sponsored content. By 2023, more than 860,000 students had enrolled in AI and data courses under this initiative (IANS, 2024).

South Korea: Designated 15 universities as AI-specialized engineering schools and four as research centers to expand the AI talent pipeline (International Trade Administration, 2024). McKinsey recommends cultivating 50,000 advanced AI professionals to lead in industrial AI adoption (McKinsey & Company, 2023a). Government funding of US\$1 billion supports core AI R&D and training initiatives. A shortage of 50,000 AI workers over five years are being addressed through university expansion and new visa programs for AI talent.

Singapore – TechSkills Accelerator (TeSA) and AI Apprenticeships: Since 2016, Singapore's TeSA program has trained over 17,000 individuals in high-demand tech skills, including AI. In 2024, Singapore launched a US\$15 million expansion focusing on AI talent, aiming to reskill 18,000 workers in three years (Kuzhanthaivel, 2024). Singapore's model blends mid-career upskilling (through professional courses co-funded by the government) and apprenticeships (the AI Apprenticeship Programme pairs trainees with industry projects). The program works closely with industry associations, such as SGTech, to ensure curriculum relevance.

Common success factors

Several success factors emerge from these international models:

1. **Beyond “Train-the-Trainer” Scaling:** To reach tens of thousands, countries utilize train-the-trainer approaches. For example, Intel’s AI for Workforce program in the United States (U.S.) enabled more than 110 community colleges by first training faculty champions (Intel, nd). This cascade model rapidly scales instructional capacity and could be replicated in Thailand’s technical universities and vocational institutes. Moving beyond this approach, Thailand could leverage AI to assist in teaching AI, allowing certified trainers to reach hundreds of thousands of students through pedagogical support tools.
2. **Public–Private AI Academies:** Many initiatives are joint efforts between government, academia, and industry. In Morocco, the Digital Morocco 2030 plan partners universities with companies like Oracle and Cisco to align curricula with industry needs (Quenum, 2024). Similarly, Malaysia’s Premier Digital Tech Institutions initiative links 42 university faculties with industry partners to produce job-ready graduates (Ministry of Digital Malaysia, 2024b). These academies often feature industry staff as adjunct trainers and offer industry-certified courses.
3. **Industry Co-Certification:** Linking training programs to industry certification enhances credibility. In Malaysia’s USAII Certified AI Programme, graduates earn dual certification from the U.S. AI Institute (Ministry of Digital Malaysia, 2024b). Such co-certification ensures that an AI productivity specialist has skills recognized by employers both domestically and internationally.

TABLE 5

INTERNATIONAL AI WORKFORCE DEVELOPMENT BENCHMARKS

Country/Program	Scale of Training Target	Timeframe	Cost per Trainee	Key Model
Malaysia – MyMahir	50,000 in AI/data skills (students)	3 years (2023–2025)	N/A (free online platform; gov-funded)	Online courses + Univ partnerships (Luo, 2024)
India – FutureSkills	400,000 IT professionals (AI, etc.)	3 years (2019–2022)	~US\$155	Centre approves Future Skills PRIME to reskill Indian IT Professionals (Food and Agriculture Organization, 2024a)
S. Korea – AI Universities	15 universities (thousands of grads)	5+ years (2019–2024)	High (Gov funds \$1B AI R&D incl. educ)	University capacity Expansion (Ministry of Agriculture and Cooperatives, 2023)
Singapore – TeSA/AIAP	~18,000 mid-career trainees (AI/data)	3 years (2024–2026)	~US\$830 per trainee	Govt subsidies + industry training (Tourism Authority of Thailand, 2024)
Ireland – Springboard+	~1,000 upskilling in data/AI annually	ongoing	~US\$3.3k (90% gov-funded)	University courses, part-time
Morocco – Digital 2030	45,000 tech professionals (incl. AI)	7 years (2024–2030)	N/A (mix of public & private funding)	University-company training programs (National Innovation Agency, 2024c)

4. **Cost-Sharing and Scholarships:** In ASEAN and Eastern Europe, training an AI specialist typically costs US\$200–800 per person for short courses, and US\$5,000–10,000 for intensive multi-month programs. Governments often subsidize these costs to encourage enrollment. For example, Vietnam’s Ministry of Information and Communications subsidized thousands of AI-related online course licenses for students, reducing per-person costs to under US\$100, a strategy Thailand could consider.
5. **Funding Large Cohorts:** To support sizable student and worker cohorts, governments provide subsidies or free training for priority groups, such as students and the unemployed, and encourage

companies to sponsor employees. India’s FutureSkills program, for instance, offers financial incentives up to 5,850 baht per learner (NASSCOM, nd). Many countries also offer scholarships for advanced AI degrees, such as Singapore’s SG Digital Scholarships, which cover local or overseas studies (Kuzhanthaivel, 2024).

- 6. Outcome Tracking: Leading programs track placement rates and productivity impact. Wipro in India reported that its NASSCOM FutureSkills partnership trained over 50,000 students and certified 25,000, feeding directly into hiring pipelines (Sarkar, 2024). Singapore observed that SMEs adopting digital solutions through its training grants achieved approximately 50% cost savings on average.

Overall, it is evident that governments across Asia and globally recognize the importance of skill development in technology domains. They have implemented programs to rapidly train tens of thousands of students and workers in AI and related skills. Accordingly, MIND should proceed with similar initiatives urgently to accelerate Thailand’s AI workforce readiness.

Partnership Opportunities for the Ministry of Industry

Approaches to Expand Efforts in AI Promotion

To enhance its capacity for AI development, MIND and its affiliates should leverage a wide range of strategic domestic and international partnerships. These collaborations can provide additional resources, expertise, and momentum to support workforce development and the adoption of AI across industries.

TABLE 6

PARTNERSHIP OPPORTUNITIES DOMESTIC INTER-AGENCY PARTNERSHIPS

	Potential Partner	Focus Area
1	MDES	Digital Infrastructure
2	MDES	SMEs
3	MHESI	Align curricula
4	AIEI	Reach more participants
5	MHESI	Innovation
6	OSMEP	SMEs
7	State Banks	Low-interest loans for SMEs

Within Thailand, a key opportunity lies in strengthening ties between MIND and other government bodies whose mandates intersect with the industrial transformation agenda.

Seven potential partnerships include:

- 1. Ministry of Digital Economy and Society (MDES): Collaboration is essential for AI and digital infrastructure goals. MDES, through agencies such as DEPA, the Electronic Transactions Development Agency (ETDA), and the National Digital Economy Committee, can support broadband and 5G rollout in industrial zones, provide digital transformation grants, and share data on digital adoption. Key goals for this partnership should include: (a) aligning funding instruments to channel resources into shared AI priorities, (b) co-developing national workforce targets that link AI education programs to real labor market needs identified by MIND, and (c) coordinating international engagement so Thailand presents a unified voice in ASEAN and global AI initiatives.
- 2. Joint Programs – “Smart Industry Initiative”: A program co-led by MIND and MDES could offer SMEs a comprehensive package combining infrastructure, training, and consulting services.
- 3. Ministry of Higher Education, Science, Research and Innovation (MHESI): Overseeing universities, vocational colleges, and research institutes such as the National Science and Technology Development

Agency (NSTDA), MHESI should align curricula with industry needs by embedding AI, electric vehicle (EV), and semiconductor topics into STEM, engineering, and technical courses.

4. Artificial Intelligence Engineering Institute (AIEI) and “Super AI Engineer” Project: Collaboration among NSTDA, DEPA, and private firms should be enhanced to reach more participants. For example, co-funded scholarships could be offered to AI specialists who commit to working in Thailand’s industries.
5. NSTDA and AI-Industrial Innovation Centers: MIND should support NSTDA, which runs EECi and other innovation hubs, to ensure the successful establishment of three new AI-industrial innovation centers. MIND would provide strategic guidance, while NSTDA contributes research expertise.
6. Office of SME Promotion (OSMEP): MIND could collaborate with OSMEP to support SMEs through initiatives such as a special fund or voucher system, enabling SMEs to acquire AI solutions or upgrade machinery for productivity and energy efficiency.
7. State Banks Partnerships: Collaboration with banks such as SME Bank or Government Savings Bank could provide low-interest “Industry 4.0 loans.” The high percentage of SMEs using personal funds for digitalization indicates that formal financing products are not sufficiently reaching them, highlighting the need for combined efforts with financial institutions and SME-focused agencies.

Public-Private Partnerships (PPPs)

PPPs represent the intersection of government leadership and private sector innovation. Ethnographic interviews and stakeholder workshops consistently emphasized that Thailand’s AI aspirations cannot be realized by government efforts alone. Businesses, universities, research institutes, and global technology firms bring complementary assets, ranging from capital and technical expertise to agile entrepreneurship.

By building strong, multi-layered partnerships, Thailand can accelerate AI adoption across sectors, create opportunities for Thai talent, and ensure that AI-driven growth benefits the nation broadly.

To achieve a goal of training 50,000 workers and 5,000 AI specialists, MIND could partner with large Thai conglomerates and multinational companies. Many firms, including PTT, Siam Cement Group (SCG), and the Chareon Pokphand (CP) Group, maintain corporate academies and training budgets. MIND can develop and deploy training materials to enhance workforce proficiency in AI. To reduce costs, MIND should leverage AI technologies to increase the productivity of training.

In the automotive sector, a PPP approach could establish a training center for EV manufacturing and maintenance, potentially as a joint venture between MIND and automotive companies including Toyota, Honda, BYD, and VinFast. While the curriculum could cover a broad range of topics, a dedicated segment on AI applications would be particularly effective. Support for AI-driven production and result-sharing across the industry could involve Japanese AI startups and research institutes such as Japan’s National Institute of Advanced Industrial Science and Technology (AIST) or RIKEN.

MIND could also create an “AI in Manufacturing” consortium, partnering with technology companies such as Microsoft, Google, and Huawei to pilot AI solutions at an accelerated pace.

Many of these technology firms also offer SME support programs (Asawapichayon, 2022). For example, Salesforce reports that Thai SMEs are leading in digital transformation, and alignment with MIND’s initiatives could significantly support scaling efforts.

In addition to these approaches, three core partnership strategies should be prioritized: (a) international collaborations, (b) startup ecosystem support, and (c) the establishment of AI innovation hubs and research institutes.



Collaborations with Global Technology Firms

Thailand's ambition to become a regional AI leader depends on rapidly acquiring advanced capabilities and expertise. Ethnographic interviews with policymakers in the Ministry of Digital Economy and Society (MDES), as well as executives from leading tech companies, highlighted the value of alliances with top-tier international AI firms. These collaborations can take several forms:

Memorandums of Understanding (MOUs): By signing formal agreements with global tech companies, the Thai government can negotiate commitments to establish local AI research labs, innovation centers, or regional headquarters. Officials from the Eastern Economic Corridor of Innovation (EECi) referenced Singapore's model, where clear incentives and co-investment opportunities attracted multinational tech firms.

Knowledge Transfer and Training Programs: Interviewees from DEPA and local universities emphasized the importance of ensuring that foreign partnerships benefit Thai professionals and students. Under such agreements, international AI experts could offer workshops, mentor Thai engineers, or provide internship placements to local students. This approach accelerates the development of homegrown expertise, something industry stakeholders identified as essential for Thailand to achieve self-sufficiency in AI research and development.

Sector-Specific Collaborations: Different tech companies specialize in various AI subfields. The roadmap encourages targeted partnerships in high-impact sectors, for example, agriculture-focused collaboration with drone or satellite-imaging leaders, a healthcare AI lab with firms specializing in advanced diagnostics, or an urban mobility project with companies focusing on traffic analytics. By concentrating on these domains, collaborations can yield tangible results quickly, further motivating both public and private partners.

Ensuring Mutual Benefits and Protecting National Interests While global collaborations bring cutting-edge technology and investment, interviews also highlighted concerns regarding data sovereignty and cultural differences. To address these:

Local Capacity Building Requirements: Each partnership agreement should include clauses mandating the hiring or training of Thai engineers, data scientists, and researchers.

This ensures that knowledge remains in Thailand, reducing long-term dependence on foreign expertise.

Data Governance Protections: Foreign partners must comply with Thailand's data privacy and cybersecurity regulations, especially when handling sensitive national or personal data. Policymakers emphasized that adherence to these standards is critical for maintaining public trust.

Balanced Negotiation: The government should adopt a strategic approach to negotiations, ensuring that partnerships advance Thailand's broader AI roadmap objectives, such as inclusive growth, sustainability, and ethical AI practices, rather than solely facilitating foreign market access.

Strengthening the AI Startup Ecosystem

Startups are often the engine of AI innovation, offering fresh ideas and agile development processes. However, many Thai AI startups face challenges in securing early funding, technical mentorship, and real-world testing opportunities. Stakeholders, including founders and investors, highlighted these obstacles during roadmap consultations. Strategies to address these include:

Dedicated AI Innovation Funds or Grants: Establish specialized funding pools targeting AI-focused ventures, potentially managed by the NIA or through public-private venture capital funds. Interviews noted that similar programs in South Korea spurred waves of successful AI startups.

Incubators and Accelerators: In partnership with universities or major tech firms, the government should expand existing incubator and accelerator programs. These programs provide AI entrepreneurs with technical resources, mentoring from experienced experts, and introductions to potential customers or investors. Startup founders emphasized the need for access to advanced computing infrastructure, such as GPUs or cloud credits, to efficiently train AI models.

Tax Incentives for Investors: Targeted tax breaks for angel investors and venture capitalists can increase investment in early-stage AI companies. Policymakers plan to introduce such a fiscal incentive, a measure strongly supported by the startup community to boost capital inflows.

Driving Local AI Innovation Through Challenges and Competitions

To maintain a continuous pipeline of new AI ventures, the roadmap envisions nationwide competitions or hackathons addressing local problems, from agricultural optimization to public health solutions. By offering prize money, publicity, and follow-up support, these events can:

Encourage Youth Engagement: University students and recent graduates can form teams, apply AI skills, and potentially develop prototypes into startups. Stakeholders noted that these competitions help identify high-potential talent early.

Foster Collaboration with Established Companies: Large Thai conglomerates or international firms could sponsor specific challenges, providing mentorship and real-world data. This creates a two-way exchange: startups gain practical experience, and established businesses acquire fresh insights into emerging AI solutions.

Promote Social Impact: NGOs and civic groups emphasized that AI should address societal needs in addition to profit-making industries. Competitions align with public interest goals, such as rural healthcare, disaster management, and environmental protection, and can catalyze innovations that benefit broader communities.

AI Innovation Hubs and Research Institutes

Bangkok often dominates Thailand's tech scene, but multiple stakeholders, especially from rural provinces, expressed concerns about the over-concentration of resources and opportunities in the capital. To foster inclusive growth, the roadmap proposes establishing regional AI innovation hubs, each focused on domain-specific applications relevant to the local economy:

Agriculture-Focused Hubs: Located in farming-intensive areas, these hubs could support AI-driven precision agriculture, soil monitoring solutions, and supply chain analytics.

University extensions or local research centers can collaborate with farmers, cooperatives, and agritech startups.

Smart City Labs: In urban centers such as Chiang Mai or Rayong, AI innovation hubs could focus on traffic management, pollution control, and public service optimization. Local municipalities and tech companies can co-develop pilot projects using real-time city data to refine AI models.

Healthcare Innovation Centers: Linked to major hospitals or medical universities, these centers could specialize in telemedicine, AI diagnostics, and advanced medical tourism solutions. Hospital administrators emphasized that AI is crucial to expanding Thailand's global reputation in healthcare.

Interdisciplinary Research Institutes and University Partnerships Bridging academia and industry is essential to sustain cutting-edge AI research and translate breakthroughs into market-ready solutions:

AI Research Institutes at Universities: Universities are encouraged to establish dedicated AI institutes bringing together computer scientists, data engineers, domain experts, and social scientists. Such interdisciplinary setups are more effective in addressing real-world challenges. Academic leaders interviewed for the roadmap recommended multi-year government grants to support research with tangible commercialization pathways.

Spin-Off Companies and Technology Transfer: Technology transfer offices and innovation labs can help researchers patent AI innovations and spin off startups. This approach mirrors successful models in Silicon Valley and Israel, where academic research feeds directly into entrepreneurial ecosystems.

Public-Private Co-Funding Models: Government and private companies can jointly contribute to these institutes, sharing infrastructure and resources. For example, a manufacturing conglomerate might sponsor robotics research at a university lab, ensuring rapid industrial application of academic findings. Conversely, government seed funding can de-risk experimental projects, encouraging corporate participation.

Ensuring Sustainable, Inclusive Growth

The roadmap envisions these hubs and institutes as both technology incubators and community anchors:

Local Workforce Development: Each hub can offer certification programs, internships, or apprenticeships for local students and mid-career workers, mitigating the urban-rural digital divide and ensuring AI-driven prosperity reaches smaller towns.

Community-Centered Innovation: Hubs should collaborate with local government and civil society groups to identify region-specific challenges, such as drought management or tourism diversification, that AI can help solve. Interviews emphasized that AI must address societal needs, not just corporate interests.

Avoiding a One-Size-Fits-All Approach: Each region has distinct economic and cultural characteristics. Hubs should thus have flexibility in structure, funding, and management, ensuring local priorities guide AI development rather than a centralized model from Bangkok.

Industry Associations and Clusters

MIND should develop partnerships with sector-specific associations, including the Thai Auto Parts Manufacturers Association, Thai Electronics and Computer Association, Thai Semiconductor Industry Association, and the Federation of Thai SME Associations:

- **Automotive Section:** MIND could help transform traditional auto parts suppliers into EV parts suppliers, including technology transfer for motors or battery components. This leverages existing clusters while introducing advanced technology.
- **Petrochemicals and chemicals:** MIND could collaborate with the Chemical Industry Club (under FTI) and the Thai Energy Ministry's EPPO to launch an AI for Process Optimization program. Global chemical tech companies, such as Siemens and Honeywell, could pilot AI projects aimed at reducing emissions in Thai manufacturing facilities.

International Partnerships – Technology and Knowledge Transfer

Thailand has numerous international partners interested in supporting industrial development.

1. **Japan:** Japan remains a major partner through organizations including JICA, NEDO, and METI. Initiatives such as “Connected Industries” align with Thailand’s Industry 4.0 and provide a basis for strong collaboration.
2. **JICA:** Can provide expert volunteers or comprehensive technical cooperation on productivity and AI, similar to support given for FTPI and quality programs (Japan International Cooperation Agency, 2023).
3. **Japanese Firms:** Companies with large factories in Thailand could serve as demonstration sites for advanced AI technologies.
4. **Germany:** Through GIZ Thailand and the German-Thai Chamber of Commerce (GTCC), Germany could support energy efficiency initiatives. Its dual vocational training model could be adapted for Thai AI and EV technician training. Fraunhofer Institutes may collaborate with EECi centers using an application-driven research approach and could co-brand AI-industrial innovation centers.
5. **US and EU:** With global semiconductor supply chain diversification, Thailand could attract midstream semiconductor investments for assembly, testing, and specialty fabs. Companies like Intel, AMD, and automotive semiconductor makers could join joint task forces.
6. **American Tech Firms:** Google, IBM, and Microsoft are already active in AI upskilling in ASEAN. Thailand could invite these firms to partner in training and adoption programs. For instance, Microsoft could extend its AI Business School to manufacturing, or IBM could bring its AI Garage to an EECi center.
7. **Regional Cooperation:** Under ASEAN, working groups exist on smart manufacturing, the digital economy, and electric vehicles. MIND could leverage these to share expertise in non-competitive areas and form alliances with Malaysia’s MITI or Vietnam’s Ministry of Industry and Trade, potentially jointly attracting larger-scale regional investment, such as fabrication facilities.

Partnerships to Leverage Thailand’s Strengths in Tourism and Healthcare

Leveraging sectors where Thailand already excels can significantly boost AI adoption and training.

Healthcare and Medical Tourism: Thailand is a regional hub for medical tourism. MIND could partner with large hospital networks and medical device manufacturers to establish an AI in Healthcare Manufacturing program. This initiative could also attract foreign AI experts and healthcare providers to Thailand, enhancing knowledge transfer and local capabilities.

Generative AI for Outreach: Medical tourism clinics heavily rely on online platforms to attract international visitors. Generative AI could be applied to automatically translate testimonial videos into a viewer’s native language, improving global outreach and engagement for clinics across Thailand.

Partnerships for Smart City Initiatives

Bangkok and Phuket are already implementing smart city initiatives using AI and IoT technologies. MIND should ensure that industrial AI initiatives are fully integrated and supportive of these smart city frameworks.

Industrial Integration: Industrial zones should be incorporated into smart city planning, including integration into smart energy grids and logistics systems. Partnerships with city authorities and the Ministry of Transport can optimize logistics efficiency and resource utilization.

Ecosystem Development: These collaborations create an ecosystem where industrial AI contributes to national digital transformation, attracting talent and innovation that accelerate progress.

Climate Finance and Green Partnerships

Thailand's environmental targets, 20% emissions reduction and a 25% increase in resource efficiency, offer opportunities to leverage global climate finance for industrial AI applications.

Multilateral Cooperation: MIND can collaborate with organizations such as UNDP, World Bank, and ADB to fund industrial energy efficiency and pollution reduction initiatives. For example, the World Bank supports credit lines for SME energy upgrades; MIND could sponsor a project where ADB provides loans or grants for factories to implement AI-driven energy management systems or waste-reducing technologies.

Private Climate Funds: Partnerships with private climate-focused funds can support upgrades in heavy industries, such as steel, cement, and chemicals, by deploying AI optimization for energy and resource efficiency.

Technical assistance can be obtained by establishing knowledge partnerships on climate with the International Energy Agency or Japan's NEDO, which has already implemented smart energy city work in Thailand.

Conclusion: Leveraging Partnerships for a Thriving AI Ecosystem

There are numerous partnership opportunities. By engaging with a diverse mix of government agencies, local industry, international allies, and financial institutions, MIND can significantly enhance its capacity to define and execute projects, ensure that a large number of people attain proficiency in AI, and make substantial progress toward its ambitious goals.

Public-private partnerships are the cornerstone of Thailand's AI roadmap, creating a synergy where the government sets strategic directions and provides enabling policies, whereas businesses, universities, and global tech players bring innovation, capital, and specialized expertise. By forging strong alliances with international AI firms, cultivating a robust startup ecosystem, and establishing decentralized innovation hubs, Thailand can accelerate its AI journey in a way that is inclusive, regionally balanced, and aligned with national priorities.

These partnerships must be essentially built on mutual trust, clear incentives, and transparent governance. As emphasized by many interviewees, success depends on ensuring that benefits flow both ways: global firms gain a strong foothold in a dynamic market, Thai professionals acquire innovative skills, startups receive the support needed to flourish, and government agencies access homegrown AI solutions for public services. With a well-orchestrated collaboration framework, Thailand can transform into a vibrant AI hub, one where the public and private sectors jointly drive sustainable economic growth, social progress, and international competitiveness.



RECOMMENDED GOALS FOR THE MINISTRY OF INDUSTRY

The Ministry of Industry should gain global recognition for its efforts to enhance and accelerate Thailand's adoption of AI and the realization of its associated benefits. Based on the discussions above regarding capacities, gaps, and potential partnerships, this section outlines recommended actions for MIND and its affiliates to achieve substantial progress toward the 2025–2030 goals.

Summary of Proposed AI-Related Goals for the Ministry of Industry: 2025–2030

Drawing upon the topics covered in this report, the following are suggested goals for MIND in advancing AI adoption across Thai industrial sectors:

1. Industrial Productivity and Competitiveness

Increase Overall Industrial Productivity: Boost productivity across MIND priority sectors (Automotive, Electronics, Petrochemical, Chemical, Plastics, Textiles, Iron and Steel, Rubber) by 15% through targeted AI and automation implementations by 2030 (Federation of Thai Industries, 2024).

- Measurement Metric: Productivity Index (FTPI standard) (Thailand Productivity Institute, 2023).

2. AI Pilots, Adoption and Integration in Priority Sectors

Broad AI Adoption in Large Industries: Achieve at least a 60% adoption rate of advanced AI systems in operational areas, including predictive maintenance, robotics, automation, and supply chain optimization, among large enterprises in MIND sectors by 2030 (Department of Industrial Promotion, 2024).

- Measurement Metric: Percentage of large enterprises using AI (annual industry survey).

AI Adoption in SMEs: Ensure at least 40% of SMEs in key industrial sectors adopt AI-driven tools and digital platforms by 2030 (Asian Development Bank, 2023b).

- Measurement Metric: SME Digital Adoption Rate (FTI/DIP annual survey).

AI Pilots leading to New Ventures: Launch at least 80 targeted AI pilot projects across priority sectors, including agriculture, healthcare, manufacturing, tourism, and energy, by 2030, to scale 30% of these pilots into full production deployments.

- Measurement Metric: Number of sector-specific AI pilot projects launched; percentage of pilots transitioned to full-scale implementation.

3. Automotive and Electric Vehicle (EV) Leadership

EV Production Goals: Reach an annual production of at least 1 million EVs by 2030, with at least 500,000 designated for domestic sale (Thailand Board of Investment, 2024a).

- Measurement Metric: Annual EV production volume (units/year).

4. Semiconductor and Electronics Investment

Investment Attraction: Secure 250 billion baht of new investments specifically in semiconductors and electronics manufacturing by 2030, enhancing Thailand's regional positioning in the IT sector (Ministry of Industry, 2025a).

- **Measurement Metric:** Total value of investments committed (Baht).

5. Sustainable Industrial Practices

Carbon Emissions Reduction: Achieve at least a 20% reduction in carbon emissions across industrial operations in MIND sectors by deploying AI-driven green manufacturing processes by 2030 (National Economic & Social Development Council, 2024).

- **Measurement Metric:** Industry-specific emission reporting (% CO2 reduction).

Waste and Resource Optimization: Improve resource efficiency, including material usage and energy consumption, by 25% in priority sectors through AI-driven optimization by 2030.

- **Measurement Metric:** Energy and material use efficiency ratio.

6. Workforce Development and Capability Building

AI Industrial Training and Skills Development: Train and certify at least 50,000 industrial workers and 5,000 AI specialists through MIND-led vocational programs in AI and automation skills by 2030.

- **Measurement Metric:** Number of certified workers/specialists as reported in annual MIND training statistics.

7. Regional Industrial Leadership

ASEAN Innovation and Leadership: Establish Thailand as an ASEAN hub for AI-driven industrial innovation through the creation of at least three internationally recognized AI-industrial innovation centers or demonstration sites by 2030.

- **Measurement Metric:** Number and international ranking of innovation centers.

8. SMEs Digital Inclusion and Growth

Digital Infrastructure and Accessibility: Enhance at least 70% of industrial SMEs in priority sectors have access to affordable, reliable digital infrastructure for AI integration by 2030.

- **Measurement Metric:** SME digital connectivity rate as measured in annual DEPA and DIP surveys.

Establish a Dedicated AI Steering Committee and Monitoring Framework

Effective collaboration among key government ministries is essential to ensure the success of the broad range of AI initiatives. Therefore, we recommend that MIND establish a high-level, permanent AI Transformation Steering Committee, chaired by a senior MIND official, possibly the Minister of Industry, with representatives from key ministries including Digital Economy, Higher Education/Science, Energy, Finance, FTI, and academia (Ministry of Labour, 2024a).

This committee would oversee the development of a detailed five-year master plan and its execution, helping eliminate silos between agencies and ensuring strong collaboration. It should meet regularly to review progress on each goal, troubleshoot inter-ministerial issues, and adjust strategies as needed.

The committee should also form sub-committees aligned with each goal, including an “AI Adoption Task Force,” “EV and Battery Task Force,” “Semiconductor Investment Task Force,” and “Green Industry Task Force.” Each sub-committee should include relevant specialists (for AI: MDES/DEPA, NSTDA, private tech firms; for EV: auto industry representatives, Energy Ministry, and so on) (Ministry of Industry, 2024b).

Alongside this framework, a Monitoring and Evaluation process should be established, potentially within MIND’s planning division or the National Productivity Board, to collect data on KPIs. MIND could also maintain a real-time dashboard for ongoing monitoring and reporting, alongside annual progress reports to update the industry, government, and public. This unit would use the identified metrics and data sources to provide evidence-based feedback.

By institutionalizing coordination and monitoring, MIND enhances accountability and becomes an effective coordinating force, ensuring that the efforts of all groups are well-aligned toward shared targets.

Secure and Allocate Resources Strategically

Develop a budgeted action plan for the five-year period that explicitly aligns funding allocations with each strategic goal. For example:

1. Increase funding to DIP and FTPI programs that directly enhance productivity and AI adoption. This could include expanding the Industrial Transformation Fund to provide grants or matching funds for SMEs implementing AI or efficiency-related projects. In parallel with new incentives offered by the Board of Investment of Thailand, MIND could administer a dedicated upgrade fund with eligibility criteria linked to measurable outcomes, such as a 15% productivity improvement or verifiable carbon emissions reduction.
2. Advocate for the inclusion of these initiatives in the national budget and stimulus packages. For instance, the proposed training of 50,000 workers could be incorporated into the national Human Resource Development budget or a post-COVID recovery fund, framed explicitly as an investment in future-proofing the industrial workforce.
3. Leverage international development assistance by preparing targeted proposals for organizations such as the World Bank, Asian Development Bank (ADB), Japan International Cooperation Agency, and Deutsche Gesellschaft für Internationale Zusammenarbeit, focusing on priority themes such as “Green AI in Manufacturing” and “SME Digital and AI Adoption (World Bank & Asian Development Bank, 2024).”
4. Prioritize internal resource allocation. MIND may need to strengthen its institutional capacity by hiring or training a dedicated cadre of “Industry 4.0 Extension Officers” within DIP, who would work directly with factories to support the implementation of AI and digital solutions.
5. Coordinate with the Eastern Economic Corridor Office to allocate a portion of its innovation budget to AI-industrial centers and workforce training initiatives in the EEC region, where many pilot factories are located.

Launch AI Capacity-Building Programs for SMEs

SMEs often face cost and risk barriers that hinder the adoption of AI and other advanced digital technologies. To address these constraints, many governments have implemented scalable incentive models that combine grants, subsidies, and technical support to stimulate widespread adoption.

Achieving AI adoption rates of 40% or higher among industrial SMEs is an ambitious target and will require substantial and sustained support. This challenge is not unique to Thailand, and there are numerous international examples that provide valuable lessons.

Technology Voucher Programs: Technology vouchers provide SMEs with credit or reimbursement for approved technology expenditures, thereby reducing upfront cost and removing a key barrier to adoption. For example, Hong Kong's Technology Voucher Programme (TVP) provides up to HKD600,000 per SME, covering 50% of project costs. This relatively high cap allows even capital-intensive AI projects, such as machine vision deployment in factories, to be partially funded. Since its launch in 2016, the TVP has seen strong uptake, demonstrating that matching grants can catalyze SME investment in AI, IoT, and automation. Similarly, EU "Industry 4.0" innovation voucher schemes in countries such as Portugal and Austria have offered EUR5,000–20,000 to SMEs for digital consultancy or solutions, effectively jump-starting first-time adoption in more traditional firms.

Grants and Co-Funding Schemes: Many governments establish dedicated co-funding mechanisms that invest alongside SMEs in AI digital projects. The United Kingdom's Made Smarter pilot in manufacturing (2019–2021) supported more than 300 SMEs through match-funded grants, with total investments reaching GBP22.5 million (UK Department for Business & Trade, 2023). On average, participating SMEs received approximately GBP 75,000 in public support, matched by private investment, enabling the adoption of AI-enabled robotics, analytics software, and related technologies. Positive productivity and employment outcomes led to the nationwide expansion of the program.

Italy's Transition 4.0 initiative takes a tax incentive approach, offering tax credits covering 40%–50% of eligible digital investment costs, scaling by firm size (Leadstec, 2023). This mechanism functions similarly to a grant at the point of tax filing and has proven critical in encouraging SMEs to invest in AI and automation technologies.

Blended Finance and Soft Loans: Some countries have adopted blended financial models that combine public funding with concessional loans or private capital. For example, the World Bank and ADB have supported SME digitalization credit lines in countries such as Vietnam and Indonesia, where local banks provide low-interest loans for technology upgrades and governments subsidize interest payments or guarantee part of the risk.

An illustrative case is Malaysia's SME Technology Transformation Fund, which offers loans at 2% interest for SMEs adopting approved Industry 4.0 solutions, supported through government-funded interest rate buy-downs. Although loans alone may not attract all SMEs, combining them with partial grants or voucher-style rebates has been shown to significantly increase uptake (European Commission, 2024a).

Micro-Grants and Voucher-Style Support: For micro and small enterprises, simpler and more accessible grant schemes have proven effective. Singapore's Productivity Solutions Grant (PSG) offers SMEs subsidies of up to 70% for pre-approved digital solutions, including AI-based software, capped at SGD30,000 per year. By maintaining a vetted list of solutions and vendors, the program streamlines adoption and minimizes administrative burden. More than 70,000 applications were supported in the early years of the PSG, highlighting strong demand when processes are simple and predictable.

Germany's Go Digital program similarly provides small grants of EUR5,000–16,000 for SMEs to engage consultants to implement AI or digital process improvements, effectively functioning as an "AI voucher" for expertise (Amazon Web Services & OECD, 2023).

AI Innovation Accelerators for SMEs: Beyond direct financial support, governments can establish accelerator or sandbox programs that combine funding with technical mentorship.

These programs invite SMEs to propose AI pilot projects, with selected firms receiving grants or stipends alongside access to experts, datasets, or computing infrastructure.

SMEs often face cost and risk barriers that make it difficult for them to adopt AI. Governments must implement scalable incentive models.

For example, AI Singapore’s 100 Experiments program co-funds AI prototype projects of up to SGD250,000 per firm and provides engineering teams to support solution development, significantly reducing experimentation risk. Complementing this approach, Singapore’s 2025 Budget introduced an Enterprise Compute Initiative allocating USD150 million (THB5.2 billion) to provide SMEs with access to advanced computing resources and AI sandbox environments. By reducing cloud and high-performance computing costs, this initiative directly addresses infrastructure constraints. Such accelerators typically aim to support several SMEs over a multi-year period, generating demonstrable success cases that can catalyze broader AI adoption across industry clusters.

Percent of GDP and Budget Commitments: Ambitious SME digitization agendas are typically supported by substantial public funding relative to overall economic size. For example, the EU’s post-COVID Recovery Fund required member states to allocate at least 20% of total funding to a digital transformation initiative. Within this framework, Italy earmarked approximately EUR47 billion, equivalent to about 2.5% of GDP, primarily for SME digital upgrades and innovation.

Similarly, Singapore allocated roughly 0.8% of GDP, or about SGD4 billion, to a top-up of its National Productivity Fund in 2025, explicitly to expand SME grants for AI and automation. These benchmarks suggest that achieving AI adoption rates of approximately 40% among SMEs may require sustained public funding on the order of 0.5%–1% of GDP per year over several years, delivered through a combination of grants, incentives, and enabling programs. The potential returns are significant, as estimates from Amazon Web Services and the Organization for Economic Co-operation and Development indicate that widespread AI adoption could add hundreds of billions of dollars in output in a medium-sized economy (Eurostat, 2024).

Adoption Rates and Targets: To date, only a limited number of economies have approached AI adoption levels of approximately 40% among SMEs. Notably, Ireland reported that around 40% of SMEs were actively using some form of AI by early 2025, supported in part by the accessibility of generative AI tools. Across Europe, the share of firms using AI increased from roughly 25% to nearly 38% in 2023, indicating accelerating momentum. Several countries have also articulated explicit adoption targets. For example, the United Arab Emirates set a goal for 50% of SMEs to implement at least one AI solution by 2025 as part of its AI strategy. International experience suggests that ambitious targets are typically accompanied by higher budget allocations and well-coordinated implementation programs (European Commission, 2023b).

In implementing these approaches, governance quality and administrative simplicity are critical to success. Effective programs such as Singapore’s PSG and Hong Kong’s TVP are characterized by streamlined application processes and outreach to raise awareness among SMEs. Many countries have also established digital innovation hubs or one-stop service offices where SMEs can access information on vouchers, grants, and training in a single location (World Bank, 2024c). Blended approaches that combine modest grants, advisory support, and peer learning networks consistently produce stronger adoption outcomes.

Based on the international examples summarized in Table N, we recommended that Thailand consider implementing a coordinated suite of targeted programs under a unifying umbrella, such as “Thailand’s Industry AI Transformation Initiative.”

Key SME and Industry Programs

SME Digital and AI Upgrade Program: Identify several thousand high-potential industrial SMEs to participate in a structured, five-year transformation program. DIP, in collaboration with DEPA, could manage this initiative through annual cohorts.

RECOMMENDED GOALS FOR THE MINISTRY OF INDUSTRY

The program should establish a curated library of vetted AI applications and solutions relevant to a broad range of SME sectors, enabling business owners to more easily identify high-performing technologies applicable to their operations. These solutions would also serve as practical case studies and peer-learning resources.

Each participating SME would receive a diagnostic assessment of readiness, followed by an implementation roadmap and subsidized access to consultants or approved vendors offering AI solutions such as AI-based quality control or predictive maintenance systems.

Within two to three years, the program should aim for at least 40% of participating SMEs to integrate AI solutions, directly contributing to the national SME adoption target. Given that lack of digital skills (62.7%) and high costs are consistently cited as major barriers, the program should integrate training and financial support to directly address these constraints.

Large Enterprise AI Leadership Program: Work with FTI to encourage large enterprises to mentor and support supply-chain SMEs in implementing AI solutions to improve productivity and resilience.

Introduce an “AI Innovation Award” to recognize large firms that achieve demonstrable AI integration and productivity gains. By targeting AI adoption among 60% of large firms, this program can leverage positive competition and structured knowledge exchange. A specific milestone could be that by 2027, at least half of the major manufacturers have completed at least one AI pilot project.

Workforce Upskilling Initiatives: Coordinate with the Ministry of Labour’s Skill Development Department to design and deliver new courses in AI, robotics maintenance, EV assembly, and related fields. Consider launching a national “500-5-5 Training Plan,” targeting 500,000 workers trained over five years through five regional training hubs.

TABLE 7

SME AI ADOPTION INCENTIVE MODELS

Model	Description and Example	Scale/Impact	Source/Note
Voucher (Matching) Grant	Govt pays % of cost for tech adoption (e.g., Hong Kong TVP – 50% up to HK\$600k)	Leadstec: Why Every SME Should Consider Tech Vouchers	>8,500 projects funded (2016-2023); boosted IT investment in SMEs (Bernama, 2024).
Tax Incentives	Tax credits or super-deductions for digital investment (e.g., Italy Transition 4.0 – tax credit 50% for small companies)	Investment Policy Monitor - Provides grants to support investment projects in digital innovation, clean technologies, and biotechnology	UNCTAD Investment Policy Hub (McKinsey & Company, 2023a).
Dedicated Grant Fund	Direct grants for approved projects (e.g., UK Made Smarter – match funding ~50% for AI/automation equipment)	300 SMEs, £22.5M total +1600 jobs, productivity	Pilot in NW England (YourStory, 2019).
Soft Loans	Low-interest loans for tech (e.g., Malaysia SME Tech Fund – loans at 2% interest for digital tech)	>200 SMEs financed in first phase; slower uptake than grants (due to debt aversion).	Often coupled with partial grants to entice SMEs (NASSCOM, nd).
Innovation Sandbox	Cohort programs give grants + mentorship (e.g., AI Singapore 100E – SGD250k co-funding + experts for AI pilots)	50 projects (SMEs & MNCs); many prototypes deployed, some scaled commercially.	Intensive model; selection is competitive (NASSCOM, nd).
Digital Innovation Hubs	One-stop centers (often EU-funded) offering training, test-before-invest support, and brokerage of finance (including vouchers)	EU network ~200 hubs; aim to serve 70% of SMEs by 2030 Europe’s digital decade: 2030 targets	European Commission Cloud and AI for 75% of EU companies by 2030, says Commission (Intel, nd).

Upgrade five existing training centers in the North, Northeast, Central, East (EEC), and South into Industry 4.0 Academies equipped with modern machinery and digital infrastructure, in collaboration with technology vendors supporting hardware and software.

Adopt a train-the-trainer model through FTPI, initially preparing approximately 500 master trainers in AI and advanced manufacturing. Each master trainer would then train 100 or more workers locally, including instructors from vocational colleges and MIND institutes. To develop a pipeline of advanced AI specialists, strengthen partnerships with universities by offering scholarships or stipends for students enrolled in AI-related MSc and PhD programs, conditional on a minimum of three-year service commitment within the Thai industry after graduation.

In parallel, expand the Super AI Engineer program by funding an additional cohort focused on industrial applications. Through partnerships with corporate sponsors such as SCG and Siam Commercial Bank, the program could be scaled to produce at least 5,000 certified AI engineers annually.

Green and Lean Program: Integrate AI-driven efficiency through joint efforts by FTPI and the Department of Alternative Energy Development and Efficiency under the Ministry of Energy. Target high energy-intensive industries such as steel, cement, and petrochemicals by recruiting 100 factories to commit to a 20% emissions reduction by 2030. Support would include energy audits and AI-enabled process optimization, such as intelligent control of furnace temperatures.

Provide formal recognition, such as Green Industry Level 5 awards, to firms that achieve performance targets. In parallel, promote the adoption of ISO 50001 Energy Management and ISO 14051 Material Flow Cost Accounting standard through the Management System Certification Institute (MASCI), emphasizing the role of AI tools in meeting compliance requirements.

As part of performance validation, require participating companies to report baseline and post-implementation energy intensity metrics. These data should be consolidated into a central repository to track progress toward the national targets of 20% carbon reduction and 25% resource efficiency improvement.

Accelerate EV and Semiconductor Ecosystem Development

Although MIND cannot directly build EV charging infrastructure or semiconductor fabrication plants, it can undertake a range of supportive actions to catalyze ecosystem development, including the following initiatives.

EVs: Work with the National EV Committee to ensure continuity of consumer incentives until price parity with internal combustion engine vehicles is achieved. MIND should advocate for the continuation of tax incentives and consider supporting a Zero Emission Vehicle mandate for government fleets to stimulate domestic EV demand.

Facilitate local supply chain development by supporting certification of domestic suppliers to provide EV components to new original equipment manufacturers. DIP and FTI could jointly establish an “EV Supplier Club,” guiding traditional manufacturers in transitioning toward EV components, such as producing motor housings instead of engine blocks.

Provide targeted grants to support the retooling of SME factories to meet EV manufacturing requirements.

In parallel, coordinate with the Ministry of Energy Thailand on a Battery Manufacturing Partnership. The joint venture between PTT and Foxconn illustrates this approach, and MIND could encourage additional joint ventures by identifying strategic gaps, such as battery cell component manufacturing.

Attract further industry investment by supporting initiatives that reduce EV component cost through productivity improvement, including AI-enabled enhancements.

Host an international EV and Battery Summit in Thailand to signal national commitment and attract global firms. This platform could highlight recent investments, such as the reported USD1.44 billion committed by Chinese automotive manufacturers (Irish Department of Enterprise, Trade and Employment, 2024).

Semiconductors and Electronics: Given the Board of Investment (BOI) of Thailand's target of THB500 billion in semiconductor investment by 2029, establishing a dedicated "Silicon Thailand" task force would be beneficial. This task force, formed in collaboration with BOI and the Eastern Economic Corridor (EEC) Office, should engage directly with leading global firms to better understand requirements for new facilities and upgrades to existing operations.

Using these insights, MIND can help prepare investment-ready industrial sites, potentially within the EEC or designated science parks, equipped with essential infrastructure such as clean rooms, high-quality power supply, and advanced water treatment systems to reduce setup time for new facilities.

Pursue strategic partnerships by inviting leading semiconductor firms, such as TSMC or UMC, to establish a packaging facility or design centers. Incentives could include tailored fiscal support and, where appropriate, equity co-investment through Thai state agencies or sovereign investment vehicles.

Strengthen human capital by sponsoring Thai engineers for hands-on training at fabrication facilities in Taiwan or Singapore, thereby increasing the availability of a high-skilled domestic workforce.

Within the broader electronics sector, prioritize emerging segments such as smart electronics for IoT devices and automotive electronics.

Additionally, MIND could launch a Semiconductor Incubator Program at one of the planned innovation centers to support startups and SMEs engaged in chip design or advanced electronics, in collaboration with global technology firms. As a near-term priority, finalize and publicize the national semiconductor strategy currently under development. MIND should ensure that this strategy includes clear policy commitments and is communicated to potential investors by early 2025 to provide confidence and predictability.

Enhance Data Systems and Benchmarking

Implement the data collection and monitoring capabilities outlined in earlier sections to enable evidence-based policymaking and performance tracking.

The National Statistical Office of Thailand and MIND should initiate or advocate for targeted policy adjustments to address regulatory barriers that limit effective AI and digital technology deployment.

Work with the Ministry of Natural Resources and Environment Thailand to develop clear guidelines governing the use of AI and digital technologies in environmental compliance. For example, permitting the use of digitally generated monitoring data in official environmental reporting would simplify compliance processes and enable greater automation.

Encourage the introduction of incentives for green manufacturing, such as tax credits for factories that reduce emissions or invest in resource efficiency improvements. This effort would require coordination with the Ministry of Finance (MOF) of Thailand.

Update factory and labor regulations to ensure they are future-ready. For instance, revising the Factory Act to explicitly permit and encourage the use of autonomous robots and AI systems while ensuring safety regulations would reduce legal uncertainty and increase firm confidence in deploying AI on production floors.

Coordinate with the Ministry of Labor to update occupational and skills standards. Formally recognizing new roles, such as AI system technician or EV drivetrain specialist, within national qualification frameworks would legitimize training programs and support appropriate wage recognition.

Finally, advocate for a national industrial broadband initiative to ensure that all major industry estates and SME clusters have access to high-speed internet by 2027. A Cabinet resolution could formally underscore the strategic importance of this infrastructure for industrial AI adoption (Ghoshal & Setboonsarng, 2025).

Focus on Communication and Change Management

To consolidate the impact of the initiatives outlined above, MIND should implement a proactive and coordinated communications strategy. Many of these goals require shifts in mindsets among SME owners, workers, and public officials. As such, launching targeted awareness campaigns jointly with the FTI and Digital Economic Promotion Agency (DEPA) on the benefits of AI and digital technologies would help showcase success stories and encourage wider adoption. Communications should deliberately include Thai-language media to reach factory managers and operators who do not regularly follow English-language sources.

Celebrating milestones can further build industry confidence, public support, and sustained momentum. For example, publicizing the completion of AI specialists training cohorts or the rollout of the 100,000th EV from a Thai assembly line can reinforce progress, maintain political backing, and motivate additional firms to participate in AI-related initiatives.

To strengthen internal advocacy capacity, MIND should also invest in training its own officers in data analytics and digital tools so that they are better equipped to champion these changes across programs and stakeholders.

MIND can be a leading force in Thai society to help the nation surf this massive wave rather than getting swept away by it.

Across all communication and change management efforts, the emphasis should be on speed and integration. Progress will depend on moving quickly while partnering effectively across the Thai government, with the domestic private sector, and with international collaborators.

It is also important to establish a clear linkage across programs. For instance, investments should be aligned with current and anticipated industry needs and market opportunities; digital infrastructure rollout should be directly connected to SME usage; and productivity gains should be linked to sustainability objectives so that initiatives reinforce one another rather than operating in isolation.

By following this roadmap, the Ministry of Industry Thailand and its partners can significantly increase the likelihood of not only meeting, but exceeding, the ambitious targets set for 2025–2030. This integrated approach would help propel Thailand's industrial sector toward a more productive, innovative, and sustainable future, enabling the country to remain on par with, or even ahead of, global leaders.

AI is arriving and bringing with it a profound wave of change. With deliberate leadership and coordinated action, MIND can position itself as a central force in ensuring that Thailand harnesses this transformation effectively rather than being overtaken by it.



PRINCIPLES OF IMPLEMENTATION

This section focuses on implementation principles for AI initiatives and policies that will enable AI-driven transformation in ways that resonate with Thailand’s unique cultural, social, and economic landscapes (National Economic and Social Development Council, 2024).

Align with National and Global Context

Stakeholders from the National Economic and Social Development Council (NESDC) to the MDES agree that AI cannot be a standalone effort; it must be woven into Thailand 4.0 and the 20-Year National Strategy to generate tangible gains in sectors such as agriculture, healthcare, and manufacturing, rather than resulting in isolated pilot projects. At the same time, leaders at EECi and DEPA caution that the global AI race is accelerating, and that Thailand must keep pace without merely mimicking models from Silicon Valley or Seoul.

By combining cutting-edge competitiveness with Thai ethical traditions and community-first values, Thailand can align its domestic development objectives with a bold and culturally grounded approach to AI governance. This approach positions the nation not only as a follower, but as an innovator on the global stage (Ministry of Digital Economy and Society, 2023a; United Nations Development Programme, 2023; World Bank, 2022b).

National Development Goals: Conversations with stakeholders at the Office of the NESDC and the Ministry of Digital Economy and Society (MDES) underscored that AI must not operate in isolation. Instead, it should be harmonized with broader national agendas, including Thailand 4.0, which prioritizes transitioning the country from a resource-driven economy to one powered by innovation and technology. Several interviewees, including policy experts at NESDC, emphasized the importance of aligning AI investments with the 20-Year National Strategy to ensure sustained, long-term impact in priority sectors such as agriculture, healthcare, and manufacturing.

TABLE 8

THE 10 PRINCIPLES:

1. Align with National and Global Context
2. Implement a Clear Strategic Framework
3. Define National AI Strategy and Governance Policy
4. Create the Critical Nationwide Digital Infra- structure
5. Integrating AI into Digital Society Policies
6. Ethical AI and Transparency Guidelines
7. Define an Effective Governance Model and Multi-Stakeholder Ecosystem
8. Focus on Human Capital and Education
9. Digital Infrastructure as the Backbone
10. AI Research and Innovation Ecosystem.

This alignment enables more efficient allocation of resources and helps avoid the pitfall of “random acts of AI,” namely, isolated initiatives that lack cohesive policy support and strategic direction (Chan & Suriya, 2023).

Global AI Landscape: Equally important is positioning Thailand within the rapidly evolving global AI environment. Discussions with private-sector leaders, including those at the EECi and the DEPA, highlighted a growing sense of urgency. Advanced economies are already using AI to enhance competitiveness, and Thailand risks falling behind if it does not act decisively.

However, rather than simply replicating Western or East Asian models, retired General Jerdwut Kraprayoon advocated leveraging Thailand's unique cultural assets, particularly its Buddhist ethical principles, to shape a form of AI governance that is globally competitive and distinctly Thai. The perspective reinforces a dual mandate: keep up with international AI developments while carving out a leadership role in ethical and culturally informed AI adoption (Organization for Economic Co-operation and Development, 2023b).

The three pillars of Thailand's AI future are Inclusivity, Sustainability, and Innovation

Implement a Clear Strategic Framework

Across every conversation, from village halls in Isan to boardrooms in Bangkok, three imperatives consistently emerged as the bedrock of Thailand's AI vision: Inclusivity, Sustainability, and Innovation (KPMG Thailand, 2023; Phasuk, 2024). Inclusivity demands more than city-centric broadband deployment. It requires AI systems to use local dialects, support micro-grants for entrepreneurs in remote provinces, and equip smallholder farmers and rural clinics with culturally attuned tools so that no one is left on the wrong side of the digital divide. Sustainability reminds policymakers that every model developed must respect Thailand's forests, rivers, and Buddhist ethos of balance. This includes embedding real-time environmental monitoring into ISO-aligned frameworks and safeguarding community traditions even as technology advances. Innovation, meanwhile, represents the catalyst that transforms homegrown ideas into global breakthroughs, whether through AI-enabled telemedicine for mountain communities or precision agritech for rice paddies. Together, these three pillars form a strategic narrative that ensures Thailand's AI journey not only accelerates economic growth but also uplifts its citizens across regions and preserves the harmony that defines our nation (PwC, 2022).

Inclusivity: One of the most prominent themes across interviews, particularly those conducted during community workshops in rural provinces, was the imperative to make AI work for everyone. As a guiding principle, inclusivity extends well beyond equitable access to technology. It involves designing AI systems that are responsive to linguistic, cultural, and socioeconomic diversity. Stakeholders from the DIP and NIA emphasized that SMEs, smallholder farmers, and rural healthcare providers often lack the financial and technical capacity to adopt AI solutions. Accordingly, the strategic framework should integrate micro-grants, localized capacity-building, and region-specific AI applications, such as local-language chatbots, to bridge persistent urban-rural divides (International Telecommunication Union, 2024a).

Sustainability: Environmental and social sustainability emerged as recurring priorities, reflecting heightened awareness of climate risks and resource constraints. Interviews with organizations such as the MASCI and academics from Thai universities consistently underscored that AI initiatives should pursue short-term gains at the expense of long-term environmental or societal well-being. Indeed, MASCI is already exploring how AI can be integrated into ISO compliance and sustainability certification processes, enabling continuous environmental monitoring and real-time analytics to support greener industrial operations. Sustainability also encompasses cultural preservation. As rural communities adopt AI-enabled systems, local traditions and ways of life must be protected, a concern closely aligned with Buddhist principles of harmony and balance (ADB, 2023c).

Innovation: Innovation was highlighted in every interview, ranging from EECi's efforts to accelerate smart factory adoption to the TDRI's interest in macroeconomic modeling of AI's impact. In this context, innovation does not simply mean importing foreign technologies. Rather, it entails fostering domestic

research and development, encouraging creative problem-solving, and enabling startups to scale. AI-powered solutions in healthcare, tourism, and agriculture can be tailored to Thailand's specific needs, whether through telemedicine for remote clinics or precision farming tools designed for small-scale rice producers. By embracing experimentation and measured risk-taking, Thailand can cultivate intellectual property and technical expertise that differentiate it in the global AI landscape (Boston Consulting Group, 2024a).

Defining National AI Strategy and Governance Policy

Stakeholders across government, industry, and academia consistently emphasized the necessity of a unifying national AI strategy that establishes clear objectives, delineates institutional roles, and specifies implementation mechanisms. A formal National AI Policy, anchored by the Prime Minister's Office or an equivalent high-level authority, is thus required (EEC Office, 2024; Hoppe et al., 2023; Deloitte, 2022).

Defining Clear Leadership: At present, multiple agencies, including MDES, NESDC, and DEPA, manage AI-related initiatives in relative isolation. A national AI policy can designate a central coordinating entity or establish a National AI Steering Committee to ensure coherence across government. Such a body would be responsible for overseeing budget allocations, facilitating inter-ministerial coordination, and prioritizing high-impact AI initiatives (Royal Thai Government Gazette, 2023).

Articulate Investment Priorities: Drawing on insights from interviews with industrial leaders and academic researchers, the policy should identify priority sectors, including agriculture, healthcare, manufacturing, and tourism, where AI adoption is most urgent. Clear prioritization will enable more effective targeting of public funding, fiscal incentives, and international partnerships (Telenor Research, 2023).

Build Capacity Within Government: Effective execution of AI initiatives requires ministries and local governments to possess adequate technical expertise and organizational capacity. Interviewees from EECi and DIP noted that many public officials currently lack sufficient AI literacy to evaluate, procure, or manage AI projects. Accordingly, the national policy should mandate structured capacity-building programs, including the establishment of dedicated AI units or inter-ministerial task forces capable of championing and supervising implementation (International Labour Organization, 2024a).

Mandate Periodic Reviews: A national AI strategy should function as a living policy instrument rather than a static document. As recommended by government economists interviewed for this study, the policy should require regular progress reporting and outcome evaluations. These reviews would ensure continued alignment with national development goals and enable timely responses to emerging challenges, including ethical risks, regulatory gaps, and rapid technological change (Accenture, 2024).

Embedding Responsible AI Principles

Across workshops and community dialogs, participants consistently expressed concern about the potential risks associated with AI, ranging from privacy breaches to biased or opaque decision-making. In response, the national AI policy will incorporate the following measures (European Commission, 2024b; McKinsey Global Institute, 2023b).

Require Risk Assessments for Critical AI Deployments: In sensitive domains such as law enforcement, healthcare, and financial services, public agencies will be required to conduct structured risk assessments before deploying AI systems. These evaluations should explicitly weigh anticipated benefits against potential harms, including discrimination, privacy violations, and unintended social impacts (Robinson et al., 2022).

Promote Transparency in Public Sector AI: Citizens have a legitimate right to understand how government AI systems affect them, whether through algorithms to determine welfare eligibility or AI-enabled traffic management platforms. The policy will therefore encourage appropriate public disclosure of AI use cases, data sources, and performance indicators, subject to security and confidentiality constraints.

Align with Thai Cultural Values: Building on interviews with retired General Jerdwut Kraprayoon and cultural experts, the policy will ensure that AI applications reflect Thai social norms and values, including kindness, compassion, and community well-being. This may involve issuing specific guidelines for AI use in culturally sensitive or socially significant contexts.

Clarifying Data Ownership and Privacy Protections

Data is a foundational input for AI systems, but it also raises complex questions regarding privacy, consent, and national data sovereignty. During interviews, representatives from the MASCI, hospitals, and technology startups uniformly emphasized the urgency of establishing clear and enforceable data governance rules.

Strengthening Data Privacy Laws: Building on the Personal Data Protection Act (PDPA), the government should refine existing regulations to address AI-specific challenges, including automated profiling, algorithmic inference, and large-scale data aggregation. Civil society organizations participating in ethnographic interviews stressed the importance of robust enforcement mechanisms and accessible avenues for citizens' redress in cases of misuse.

Ownership and Licensing Models: AI systems frequently rely on data drawn from multiple sources, including government agencies, private firms, and individuals. The policy framework should therefore define clear data ownership and licensing agreements, ensuring that data contributors are appropriately compensated or acknowledged. This issue was particularly salient for agribusiness stakeholders, who expressed concern that shared datasets, such as farm yields or supply chain information, could be monetized without farmers' informed consent.

Enabling Secure and Responsible Data Sharing

Stakeholders from the DIP and NIA noted that without efficient data-sharing mechanisms, many AI initiatives stall due to fragmented datasets and institutional silos. To address this constraint, the policy framework will pursue the following actions.

Facilitate Anonymized Data Exchanges: Government agencies can establish secure data platforms or data trusts that remove personally identifiable information, enabling large datasets to be shared safely for AI research and development. This approach balances privacy protection with innovation and was strongly supported by both industry representatives and privacy advocates.

Open Data Initiatives: Non-sensitive datasets, including information on traffic flows, weather patterns, or aggregate agricultural outputs, can be released under open data licenses. Interviewees, especially from academic and startup communities, emphasized that access to high-quality public data can significantly accelerate domestic AI innovation.

Cybersecurity and Data Sovereignty: As AI systems increasingly process sensitive personal and strategic data, robust cybersecurity safeguards are essential. The roadmap envisions dedicated guidelines covering encryption standards, incident response protocols, and secure cloud infrastructure. Government agencies and private technology firms should also conduct joint cybersecurity exercises, reflecting recommendations from financial sector stakeholders concerned about growing cyber risks to digital services.

Inter-Ministerial Coordination:

AI and digital transformation initiatives cut across traditional ministerial boundaries, spanning manufacturing, education, industry, finance, and ICT, among others. Achieving policy coherence, therefore, requires formal mechanisms for inter-ministerial coordination and integrated execution, rather than fragmented or siloed approaches.

International experience demonstrates that high-level coordinating bodies and cross-agency strategies are essential to ensuring that all arms of government work in concert on AI policy.

Central Coordinating Committees or Councils: Many countries have established national AI councils or steering committees chaired by senior political leaders to align policies across ministries. For

example, Japan created a Strategic Council for AI under its Cabinet Office, bringing together ministers responsible for economy, communications, and education to implement a holistic AI strategy covering research and development, talent development, and industrial application. The ROK similarly launched the Presidential Committee on the Fourth Industrial Revolution in 2017, which united multiple ministries and private-sector experts to guide AI and Industry 4.0 initiatives. This top-down approach signaled that AI was a national priority and enabled joint programs, including coordinated education reforms to build AI talent.

Joint Ministerial Units: As discussed elsewhere in this report, the UK's Office for AI provides a useful illustration of an inter-ministerial execution unit. Reporting jointly to the Secretaries of State for business and digital affairs, it ensured that economic and technological objectives were balanced. The Office for AI coordinated with the Treasury on funding, the Department for Education on skills programs such as the AI scholarship program, and the Cabinet Office on ethics, effectively acting as a central coordination node. It also convened an AI Council of external experts to advise ministries. Canada offers a related example through its AI Advisory Council, which, although advisory in nature, was jointly convened by the innovation ministry and the Treasury Board to influence both innovation policy and public-sector AI adoption.

Dedicated Ministry versus Mainstreaming: Some countries designate a lead ministry for AI while embedding responsibilities across other ministries. France's AI strategy, for instance, is led by the Ministry of Economy and Finance, but includes explicit actions for the Ministry of Higher Education on curricula and the Ministry of Labor on workforce training. To maintain coherence, France appointed an inter-ministerial coordinator for AI under the Prime Minister, who regularly convenes representatives from relevant ministries to review alignment with the national AI plan. Germany adopted a comparable approach. Its 2018 national AI strategy was jointly drafted by the ministries responsible for education and research, economic affairs, and labor, and is overseen by an inter-ministerial committee that meets semi-annually to align research funding, industrial support, and labor market policies.

Cross-Agency Funding Pools: Policy coherence is often reinforced through joint funding mechanisms. Under Singapore's National AI Program, initiatives are financed through central funding pools administered by the National Research Foundation and digital government funds, but implemented by multiple agencies. For example, an AI healthcare project may be jointly sponsored by the health ministry and AI Singapore. This model reduces duplication and encourages shared ownership. Thailand's AI initiatives could adopt a similar pooled-budget approach, such as an AI workforce fund jointly managed by MIND and MHESI, or an SME digitalization program co-funded by MIND and MDES.

Stakeholders across government, industry, and academia consistently emphasized the necessity of a unifying national AI strategy that establishes clear objectives, delineates institutional roles, and specifies implementation mechanisms.

Coherence in Policy Documents: A clear indicator of effective coordination is when strategies produced by different ministries explicitly reference and reinforce one another.

Estonia provides a strong example, as its industrial digitalization roadmap, education digital strategy, and national AI strategy were developed under a unified vision. Malaysia's National Fourth Industrial Revolution (IR) Policy, released in 2021, was similarly produced by a cross-ministry task force, enabling individual ministries to develop action plans that feed into a common framework. In this model, the Ministry of Science leads AI R&D, while the Ministry of Human Resources oversees reskilling, with both reporting progress to a single national council.

Inter-Ministerial Execution Teams: At the operational level, some countries deploy joint teams to deliver specific initiatives. The Netherlands, for example, formed a cross-agency team for its public-private

“AI Innovation Hubs,” combining officials from economic affairs and regional authorities. Finland’s widely cited “Elements of AI” citizen training program was jointly developed by the ministries responsible for economic affairs and education, using a shared project team. This structure enabled broad outreach by leveraging both education systems and industry networks.

Legal and Regulatory Coherence: Effective coordination also requires alignment across regulatory regimes. AI governance often intersects with mandates of justice, digital, and industry ministries, particularly in areas such as data protection and ethics. Singapore’s AI governance framework illustrates this approach, having been developed collaboratively by the Government Technology Agency (GovTech) and the Personal Data Protection Commission (PDPC), with oversight from a ministerial Smart Nation committee. At the regional level, the EU promotes coherence by encouraging member states to adopt comprehensive national AI strategies and by advancing a coordinated plan on AI across countries.

High-Level Champions: The presence of a senior political champion is widely regarded as best practice. In the UAE, the appointment of a Minister of State for AI created a cabinet-level role dedicated to coordinating AI initiatives across sectors, from education to industry. Similarly, some governments appoint chief digital or chief data officers with cross-government mandates to drive AI adoption in public services, ensuring consistent messaging and leadership by example.

TABLE 9

GOVERNANCE STRUCTURES FOR AI POLICY

Country	Coordination Body	Members/Lead	Function
UK	Office for AI	Joint BEIS+DCMS (now DSIT)	Implements AI Strategy, reports to two ministries, and convenes AI Council.
Singapore	Smart Nation Ministerial Committee	PM, DPMs, Ministers (IMDA, GovTech under PMO).	Whole-of-gov oversight of digital; sets KPIs (Digital Govt Blueprint)
Malaysia	National AI Office (under Min. Digital) ([Announcements	Ministry of Digital Economy	Minister of Digital chairs, MIND, Education co-opted.
European Union	EU Coordinated Plan on AI	European Commission + all Member States (national AI reps).	Aligns national AI strategies, shares best practices; monitored annually.
Japan	AI Strategy Council	Cabinet Office lead; ministers of METI, MIC, MEXT; academia & industry reps.	High-level strategy setting and inter-ministerial alignment on AI R&D, education, and industry.
UAE	Minister of State for AI (Office of AI)	Dedicated AI Minister (reports to PM) + cross-gov working group.	Centralizes AI initiatives, from gov services to industry, ensuring unified direction.

Communication and Joint Stakeholder Engagement: Coordination also requires ministries to present a unified interface to industry and civil society. Joint consultations, for example, involving both MIND and MDES when engaging manufacturing associations, can reduce confusion and prevent overlapping programs. Many countries institutionalize this approach through PPPs, such as France’s Hub France IA or Germany’s Plattform Industrie 4.0, which bring together multiple ministries and industry representatives to coordinate standards, talent initiatives, and pilot projects.

See Section 13 for further discussion of PPPs.

Drawing on these international examples, it is recommended that Thailand establish a formal inter-ministerial coordination mechanism for AI. A National AI Steering Committee, chaired by the

Prime Minister or a Deputy Prime Minister and including MIND as a core member, could align efforts across MDES, MHESI, MOF, and other relevant agencies. The objective would be to ensure policy coherence, so that education reforms produce skills aligned with industry needs, digital infrastructure reaches key industrial zones, and data regulations enable innovation while maintaining trust and compliance.

Creating the Critical Nationwide Digital Infrastructure

For Thailand's long-term economic competitiveness, it is essential to establish a robust and inclusive digital infrastructure that is accessible nationwide, encompassing major cities as well as regional and rural areas. Such infrastructure must serve the needs of large enterprises and SMEs, enabling productivity growth, digital adoption, and innovation across the economy. The examples below illustrate how various countries have pursued nationwide high-speed internet coverage as a foundation for digital transformation.

Nationwide Broadband Programs: Comprehensive national broadband strategies are now standard practice among digitally advanced economies. Malaysia's JENDELA initiative, for example, focused on expanding 4G mobile broadband coverage to more than 96% of populated areas, effectively ensuring that nearly all industrial hubs and communities are connected. By the end of 2022, Malaysia had achieved 96.9% 4G coverage and increased average mobile speeds to above 100 Mbps. For the remaining areas lacking terrestrial connectivity, satellite broadband was deployed to 839 rural communities.

Similarly, the ROK and Japan have long-standing broadband programs. Today, more than 70% of broadband subscriptions in these countries are fiber-optic, and even rural factories typically have access to fiber or 5G connectivity in all populated areas by 2030.

Investment Levels and Public–Private Partnerships (PPPs): Delivering nationwide digital infrastructure generally requires sustained multi-billion-dollar investment and close public–private collaboration. Malaysia allocated approximately RM28 billion over five years for JENDELA, combining government funding with telecommunications operator investment to upgrade towers, fiberize base stations, and deploy satellite services. Nigeria is pursuing a similar approach, targeting 70% internet penetration by 2025, up from 44% in 2024, through substantial investment in rural fiber and 4G expansion. Many countries also rely on Universal Service Funds, financed through levies on telecom operators, to support connectivity in underserved SME and rural areas. Thailand's own Universal Service Obligation (USO) program, Net Pracharat, extended free Wi-Fi access to rural villages, providing basic connectivity that local entrepreneurs and microenterprises could leverage. Rollout strategies are typically sequenced. Operators prioritize dense urban and industrial areas where immediate demand from factories and technology parks ensures a commercial return, while governments incentivize extension to underserved regions through subsidies or coverage obligations. Cluster-focused rollout is also common. Vietnam, for instance, ensured that all major industrial parks and export processing zones received fiber broadband early, recognizing that these clusters host thousands of SMEs.

Urban Hubs and Industrial Parks: Prioritizing connectivity in key industrial zones can rapidly increase the share of SMEs with high-quality internet access. The ROC and India implemented targeted programs to connect industrial parks with fiber infrastructure. In Eastern Europe, EU structural funds were used to extend broadband to industrial towns. Latvia achieved more than 70% broadband usage by accelerating rollout in smaller cities. Ensuring 5G coverage in manufacturing zones has also become a priority. Germany's 5G Strategy reserved spectrum for industrial use, enabling private 5G networks in major factories and ensuring that SMEs within supply chains can connect to advanced digital networks.

Rural Innovation Hub Models: Infrastructure alone does not guarantee effective usage. Many countries complement connectivity investments with physical or virtual innovation hubs that

help rural businesses adopt and utilize digital technologies. These hubs often provide high-speed internet, shared laboratories for IoT and AI experimentation, and hands-on training. Ireland launched regional innovation hubs offering gigabit internet, co-working space, and on-site advisors to support rural startups and SMEs. The Scotland 5G Centre established rural testbed hubs where agrifood SMEs can experiment with 5G- and AI-enabled solutions such as precision farming, supported by technical experts. In developing economies, a comparable approach can be seen in telecenter networks. Malawi's rural innovation hub initiative focuses on basic digital skills for youth and small business owners, creating a pipeline of digitally capable entrepreneurs. India's Common Service Centers program, comprising more than 400,000 kiosks nationwide, provides rural citizens and businesses with internet access and digital public services.

Sequencing and Clustering Strategies: Many governments adopt a phased approach, first ensuring connectivity in all major cities and industrial districts, then addressing the remaining 20%–30% rural areas through targeted interventions. Thailand could follow this model by completing 5G and fiber coverage in the EEC, major industrial estates, and SME-dense provinces, and subsequently extending high-speed internet to secondary provinces and industrial villages through grants or PPPs. An alternative strategy is “leapfrogging” in remote areas. Mexico and Indonesia have used satellite broadband to connect remote manufacturing sites, such as mining or plantation operations, achieving near-universal business connectivity in challenging geographies.

Typical Coverage Metrics: Countries leading in digital infrastructure report very high levels of SME connectivity. The ROK effectively has near-universal business broadband coverage, supported by extensive 4G availability and the world's highest fiber penetration. European surveys indicate that in digitally advanced countries such as Denmark and Sweden, more than 90% of SMEs have broadband access, and approximately 75% use at least basic digital tools.

Investment Sequencing and Economic Returns: In dense industrial areas, a single fiber backbone or 5G tower can serve dozens of SMEs at relatively low cost, while connecting a single remote factory may cost tens of thousands of dollars. Governments, therefore, often subsidize these high-cost marginal connections. For example, Malaysia subsidized satellite broadband kits for remote villages at approximately RM40,000 each (around THB300,000), a cost that becomes manageable once the majority of the population is covered through market-driven fiber or 4G deployment. Overall, an emerging economy may need to invest on the order of USD1–2 billion per year (THB30–60 billion), combining public and private funding, to substantially improve SME connectivity. The economic returns can be significant. Studies indicate that every 10% increase in broadband penetration can raise GDP by approximately 1%–2% in developing countries, with a substantial share of these gains driven by improved SME productivity.

Public Wi-Fi and Community Networks: As a complementary measure, some governments provide free or low-cost public Wi-Fi in industrial towns, markets, and community centers. Thailand's Net Pracharat program deployed free Wi-Fi hotspots in all sub-districts, enabling microenterprises and cottage industries to access e-commerce platforms and online knowledge. Similarly, the Philippines and Indonesia have implemented “Free Wi-Fi for All” programs in provincial public places. Although these networks are not a substitute for dedicated factory broadband, they ensure that even the smallest enterprises can participate in the digital economy.

Integrating AI into Digital Society Policies

Thailand's push for a “Digital Government” and the broader Thailand 4.0 agenda provide a strong foundation for AI adoption; however, AI must be more explicitly embedded within these strategies. Interviews with local government officials and policy analysts revealed a consistent observation: AI remains an afterthought in many existing digital policies.

TABLE 10

DIGITAL INFRASTRUCTURE COVERAGE AND INVESTMENT

Country	SME Digital Coverage	Notable Investments (Year)	Strategy
Malaysia	~97% 4G coverage (pop areas); pushing 5G 52% users in).	JENDELA Phase1: RM21 bn (2020–22); Phase2: RM10 bn (2023–25).	Urban-first, subsidy for rural (satellite for 839 villages)
The ROK	~100% of SMEs on broadband (4G/LTE 99.9%, fiber to most businesses).	Govt ~\$1 bn for rural broadband early 2010s; Private 5G ~\$20 bn (2019–22).	Early universal service; aggressive 5G in cities.
Nigeria	~45% internet penetration (est. SMEs lower); target 70% by 2025	>US\$0.5 bn in rural fiber (2022–24) via broadband plan; Starlink/ Satellite introduced.	Leapfrog with wireless, public–private partnership.
EU (average)	~78% SMEs with basic digital connectivity; 34% using cloud/AI (2023)	Cloud and AI for 75% of EU companies by 2030, says Commission	
Thailand (2022)	~95% 4G pop coverage; ~44% broadband uptake in SMEs (est.).	Ongoing: Net Pracharat (3 bn baht USO fund), 5G rollout (operators > 100 bn baht).	Good backbone, need last-mile to rural SMEs.

Incorporating AI in E-Government Plans: Ministries and provincial administrations should receive clear directives from MDES enabling them to systematically assess how AI can streamline public services. For instance, AI-enabled chatbots could manage citizen inquiries, whereas predictive analytics could improve resource allocation and service planning. DEPA and other digital agencies can provide standardized technical guidelines to ensure interoperability and consistency across ministries.

Cross-Sectoral Policy Synergy: From healthcare modernization to education reform, each sectoral master plan should include AI-specific objectives and measurable milestones. This approach reduces policy duplication and fragmentation. As participants in stakeholder workshops noted, a well-coordinated framework ensures that AI solutions scale beyond pilot phases and deliver broader societal impact.

Infrastructure Development: The effectiveness of AI initiatives depends heavily on robust digital infrastructure, including 5G networks and local data centers. By explicitly referencing AI in broadband expansion and data center strategies, the government signals that connectivity investments are intended not only to expand internet access, but also to enable advanced AI-driven services.

Fostering Local AI Ecosystems

A recurring theme in interviews with technology entrepreneurs was the need for a more supportive and coherent AI ecosystem. Accordingly, the policy framework should:

Encourage Regional AI Hubs: By designating specific regions (e.g., the EEC) as AI innovation zones, the government can cluster startups, research institutes, and investors in a shared environment. Incentives such as simplified business licensing and subsidized office space can further attract talent and capital.

By designating specific regions (e.g., the EEC) as AI innovation zones, the government can cluster startups, research institutes, and investors in a shared environment to further attract talent and capital.

Promote AI Adoption in SMEs: SMEs often lack the financial and technical capacity to deploy AI solutions. Policies should thus include targeted grants, voucher schemes, and technical consulting

services to support AI adoption among SMEs, an approach strongly endorsed by DIP and local chambers of commerce.

Skill-Building and Outreach: In parallel with broader education reforms discussed earlier, digital society policies should fund AI literacy initiatives aimed at the general public, ensuring that citizens understand both the benefits and risks of AI. Municipal governments could host AI fairs or sponsor hackathons that connect developers with real-world community challenges.

Ethical AI and Transparency Guidelines

Ethnographic interviews revealed widespread concerns that AI systems could unintentionally reinforce social inequalities or cultural insensitivity. For example, AI-based credit scoring systems that rely on incomplete or biased datasets may disproportionately disadvantage marginalized groups. The policy framework should therefore:

Mandate Fairness Audits: Public and private AI systems used in sensitive domains such as hiring, lending, or medical diagnosis should undergo regular fairness audits to identify and mitigate bias. These audits should examine training datasets, algorithmic decision processes, and outcomes to ensure that no population group is systematically disadvantaged.

Promote Diverse Data Collection: To reduce bias, guidelines should encourage the use of representative datasets that reflect the full diversity of Thai society, including rural populations, ethnic minorities, and varying socioeconomic groups. Interviewees from rural non-governmental organizations (NGOs) emphasized the importance of ensuring AI systems perform effectively in non-urban contexts.

Explainability and Accountability

Transparency emerged as a central requirement for building public trust in AI. Civil society stakeholders emphasized that citizens should have the right to understand how AI-driven decisions affect them.

Explainable AI Requirements: When AI systems influence high-stakes decisions such as social welfare eligibility, parole assessments, or medical diagnoses, agencies and companies must provide accessible explanations of the system's logic. These explanations should include simplified summaries for non-technical audiences, rather than relying solely on technical documentation.

Human Oversight Mechanisms: Even where AI systems are deployed, final accountability must remain with human decision-makers. The policy roadmap should establish safeguards ensuring that authorized officials retain the ability to review, challenge, or override AI-generated outputs.

Public Ethics Committee or Ombudsman: The government may consider establishing a dedicated body to address complaints and disputes related to AI-driven decisions. This body could investigate allegations of bias, privacy breaches, or unethical AI practices, thereby reinforcing accountability mechanisms.

Linking Ethics to Funding and Regulatory Approval

To ensure compliance, ethical AI guidelines must be enforceable. Reflecting recommendations from industry experts and economists at TDRI, the framework should include:

Ethical Compliance as a Funding Criterion: Startups and government contractors seeking AI-related public funding should be required to demonstrate adherence to national ethical AI standards. This condition ensures that public resources support only responsible and trustworthy AI initiatives.

Regulatory Pathways for AI Systems: AI applications with significant societal implications, such as medical diagnostic tools or autonomous vehicles, may require a formal regulatory approach. As part of this process, regulators should verify compliance with established ethical and transparency requirements.

Defining an Effective Governance Model and Multi-Stakeholder Ecosystem

Thailand's AI ambitions risk dilution due to fragmented governance and overlapping institutional mandates, a concern highlighted by Dr. Athipong of the NESDC. Without clear leadership, strategic initiatives may stall or operate at cross-purposes. To address this challenge, this report proposes establishing a high-level National AI Steering Committee within MIND. The committee would comprise senior government officials, industry leaders, and academic experts, with responsibility for setting strategic priorities, coordinating budgets, and ensuring cross-ministerial alignment.

Coordinated Governance: A central theme emerging from multiple interviews was concern about institutional fragmentation. Several government agencies, including MDES, DEPA, and NESDC, each oversee aspects of the AI agenda, yet often operate in silos. Dr. Athipong from NESDC emphasized that in the absence of clear leadership, AI initiatives risk stalling, resulting in duplicated efforts or conflicting regulatory approaches. To address this challenge, the report recommends establishing a high-level National AI Steering Committee within MIND. The committee would comprise senior government officials, industry leaders, and academic experts, with responsibility for setting strategic priorities, coordinating budgets, and ensuring cross-ministerial alignment. This governance mechanism is discussed in greater detail in the following section on MIND.

Specialized Task Forces: Dedicated task forces should support the Steering Committee by addressing specific areas such as data governance, AI ethics, talent development, and sectoral deployment. These groups should include representatives from government agencies, private firms, universities, and civil society organizations. For example, a data governance task force might involve MASCI for ISO compliance, MIND for manufacturing data oversight, and environmental NGOs to integrate sustainability considerations.

Inclusive Stakeholder Engagement: Transparency and inclusivity are essential to effective AI governance. Interviewees from startups and rural communities reported limited access to policy discussions. To address this gap, the governance model should institutionalize open forums, online consultations, and regional roadshows. Activities such as hackathons and AI-focused town halls can help surface grassroots innovation and foster public trust.

Focus on Human Capital and Education

Strengthening Formal Education: Human capital development is critical to achieving national AI readiness. Interviewees from DEPA, academia, and research institutions emphasized the need to modernize curricula across primary, secondary, and tertiary education. This includes introducing foundational coding, data literacy, and AI concepts at early stages of schooling, consistent with proposals such as FutureLab's initiative to train one million individuals in AI fundamentals. Pilot programs in selected provinces can serve as testbeds for curricula that combine theoretical instruction with applied problem-solving.

Upskilling and Reskilling: Mid-career professionals, SME employees, and public-sector workers all require accessible AI training opportunities. Leaders at DIP noted strong interest among SMEs, coupled with a shortage of personnel capable of implementing AI solutions. Similarly, the healthcare sector's expanding use of telemedicine and AI-assisted diagnostics necessitates targeted training for administrators and clinicians. PPPs can play a central role in addressing these gaps.

Interviewees proposed establishing co-branded AI training centers, for example, partnerships between DEPA and major technology firms, offering modular and affordable courses in data analytics, machine learning, and AI ethics. Online platforms delivered in the Thai language, complemented by in-person workshops, would help ensure equitable access for both urban and rural learners.

Certification and Career Pathways: To enhance effectiveness, standardized AI certification pathways should be jointly developed by the government and industry. Drawing on international best practices,

including Singapore's AI skills framework, certifications could range from basic AI literacy to advanced machine learning specialization. As noted by Dr. Chinawut from DEPA/MDES, fiscal incentives such as enhanced tax deductions for training expenses can encourage employer participation. Additionally, TDRI's interest in monitoring AI's macroeconomic impact could extend to tracking certified AI professionals across sectors, providing indicators of workforce readiness.

Public Awareness and Engagement: AI awareness initiatives should extend beyond formal education and professional training. Nationwide AI fairs, hackathons, and youth innovation challenges can demystify AI, stimulate creativity, and showcase successful applications. Collaboration between local governments and civil society organizations is essential to ensure participation from rural and disadvantaged communities. By presenting AI as an enabler of opportunity rather than a threat to employment, Thailand can support a broader cultural shift toward innovation-driven growth.

Digital Infrastructure as the Backbone

Creating a world-class AI workforce requires an end-to-end strategy, beginning with the integration of coding and data science into primary and secondary education and extending to hands-on AI modules piloted in selected provinces, with the long-term objective of training millions in foundational AI skills.

Equally important is the upskilling of mid-career professionals, SMEs, and public-sector personnel through co-branded training centers and Thai-language online platforms. This approach ensures that telemedicine administrators, factory managers, and rural entrepreneurs alike can effectively apply machine learning tools. To consolidate these gains, the government and industry should jointly design clear certification pathways, supported by fiscal incentives and real-time tracking of accredited AI specialists, to guide career progression from entry-level literacy to advanced specialization. Finally, nationwide AI fairs, hackathons, and innovation challenges can help demystify AI technologies and promote a cultural shift toward viewing AI as an engine of opportunity rather than disruption.

Nationwide Connectivity: Robust digital infrastructure is the essential backbone upon which AI solutions depend. Representatives from EECi and technology startups consistently emphasized that inconsistent connectivity and limited broadband coverage in rural areas hinder AI deployment. The government's commitment to expanding high-speed internet, through partnerships with telecommunications providers, local cooperatives, and satellite-based solutions, must therefore be both ambitious and inclusive. Interviewees cited instances in which rural telemedicine pilot projects failed due to inadequate connectivity, underscoring the direct relationship between infrastructure readiness and AI effectiveness.

5G Rollout and Advanced Networks: High-bandwidth, low-latency networks are critical for advanced AI applications such as real-time analytics, autonomous vehicles, and robotics. The expansion of 5G was repeatedly identified as a priority, with officials from DEPA noting that many Thai factories continue to rely on outdated network infrastructure, limiting their ability to adopt AI-enabled production systems. A phased rollout strategy, beginning in industrial zones within the EEC, followed by urban centers and subsequently rural regions, allows for efficient resource allocation while progressively expanding national coverage.

Cloud Computing and Data Centers: Beyond connectivity, the interviews highlighted the need for resilient cloud computing and data center infrastructures. AI systems often require significant computational capacity, particularly for training large-scale models. Encouraging global cloud service providers to establish local data centers would enhance performance while addressing concerns related to data sovereignty, an issue raised by several stakeholders, including MASCI. In parallel, public investment in a national cloud platform can provide SMEs, researchers, and government agencies with affordable access to AI experimentation environments, reducing entry barriers.

Security and Resilience: Cybersecurity is an integral component of digital infrastructure. As AI adoption expands across sectors, the potential attack surface for cyber threats also increases. Strong collaboration among cybersecurity agencies, private technology firms, and research institutions is therefore essential to develop AI-enhanced security tools and protocols. Regular security audits, vulnerability assessments, and workforce training programs can help protect Thailand's AI ecosystem from malicious activity and sustain public trust in digital services.

AI Research and Innovation Ecosystem

Developing a dynamic AI R&D ecosystem was repeatedly identified as critical to sustaining long-term leadership and reducing reliance on imported technologies. Interviewees from TDRI, universities, and the private sector highlighted gaps in advanced AI research capacity within Thailand. Although collaborative initiatives exist, including joint AI laboratories with multinational technology firms, stakeholders agreed that a more coordinated effort is needed to support frontier research. Priority areas include NLP, particularly for Thai and regional dialects, advanced robotics, healthcare diagnostics, and climate-focused AI applications.

Establishing World-Class AI Centers: Creating or expanding AI research institutes in partnership with leading Thai universities and international research organizations should be a strategic priority. These centers would support fundamental research while offering specialized postgraduate programs, producing PhD-level experts capable of driving domestic innovation. The experience of EECi in scaling pilot projects before full deployment provides a useful model, as research centers test advanced AI solutions in real-world industrial contexts, ranging from manufacturing to biotech.

Innovation Hubs and Incubators: Translating research outcomes into commercial products and services requires a strong innovation pipeline. NIA's "Groom-Grant-Growth-Global" model offers a structured pathway, beginning with mentorship and early-stage funding and progressing toward growth capital and international market access. Ms. Nantaphorn from the FTPI noted that many SMEs struggle with digital transformation and require hands-on guidance to deploy AI effectively. Innovation hubs or incubators, particularly within the EEC or major university campuses, could address this need by providing shared workspaces, specialized AI hardware, and access to mentors and venture capital networks.

Commercialization and Intellectual Property: Intellectual property (IP) remains an underemphasized element of AI innovation. Policies that simplify IP registration processes, provide tax benefits for research-intensive projects, and safeguard Thai-developed AI technologies in international markets are essential. Academic and industry stakeholders view IP protection as a mechanism for fostering local ownership of AI innovations, including algorithms and specialized hardware.

Over time, building a strong portfolio of Thai AI patents can enhance the country's standing within ASEAN as a center of AI excellence.

Conclusion: The Foundation for AI-Driven Transformation

Thailand's ability to assume a regional leadership role in AI implementation will depend on cohesive policymaking, cross-sector collaboration, and sustained investment in both human capital and digital infrastructure. When implemented with transparency and cultural sensitivity, the policies outlined in this framework can bridge existing gaps, accelerate innovation, and advance national AI proficiency within a broader vision of equitable and sustainable development.

As the global AI landscape continues to evolve, Thailand's strategies must remain adaptive and responsive to emerging technological and societal developments. The potential rewards of such an inclusive and flexible approach are substantial. Thailand can move beyond a follower position to become a regional trailblazer, demonstrating how AI can drive economic growth, support environmental stewardship, and improve quality of life while remaining grounded in national cultural and ethical values.

Throughout this project, one consistent theme emerged: trust is foundational. Citizens, businesses, and international partners will only embrace AI if they are confident that it serves the public interest, respects privacy, and upholds fairness. This policy framework, informed by multi-stakeholder engagement, seeks to ensure that AI development in Thailand aligns with principles of inclusivity and social responsibility while meeting global standards of innovation and accountability. If implemented effectively, these policies can secure Thailand's position as a regional AI leader and ensure that the benefits of AI extend to all segments of society.



INCLUSIVITY AND REGIONAL DEVELOPMENT

AI-driven growth must be equitable and geographically inclusive, benefitting all regions and communities rather than remaining concentrated in urban centers. During ethnographic interviews and regional stakeholder workshops, local leaders, NGOs, and community organizations consistently emphasized the importance of tailoring AI initiatives to ensure that rural areas, smaller cities, and vulnerable populations are not left behind. This section outlines how Thailand can leverage AI to reduce regional disparities, strengthen social outcomes, and ensure that economic benefits extend across society, not solely to already advantaged groups (FutureLab Consulting, 2025; United Nations Development Programme, 2024b).

AI for Rural Development

Rural communities in Thailand face distinct challenges, including limited access to healthcare, under-resourced schools, and persistent infrastructure gaps. At the same time, interviews with local officials, farmers, and community-based organizations revealed a strong interest in AI-enabled tools that can directly address these constraints (National Statistical Office of Thailand, 2024).

AI-Enhanced Education: Rural schools often lack access to specialized teachers and advanced curricula. AI-powered e-learning platforms, adaptable to local linguistic and cultural contexts, can help address these gaps. For example, interactive AI tutors can support STEM instruction, track student progress, and deliver personalized feedback. During a workshop in a northeastern province, educators observed that such tools could significantly increase engagement among students with limited exposure to modern teaching methods (United Nations Educational, Scientific, and Cultural Organization, 2023).

Telemedicine for Underserved Clinics: Many rural healthcare facilities struggle to recruit and retain medical specialists. AI-driven telemedicine platforms and diagnostic support tools can help bridge this gap by enabling remote consultations, early disease detection, and faster referrals to urban hospitals. Nurses working in community health centers expressed a strong interest in AI systems capable of interpreting patient data, such as vital signs or X-ray images, to support timely clinical decision-making (World Health Organization, 2024b).

Precision Agriculture and Market Information: As discussed in earlier sections, AI applications can help farmers optimize planting schedules, monitor crop health, and access real-time market pricing information. Trained rural extension workers can support smallholder farmers in adopting these tools and practices. This approach not only improves productivity but also helps mitigate climate-related risks, aligning with sustainability priorities highlighted by environmental NGOs during stakeholder consultations (Food and Agriculture Organization of the United Nations, 2023; Ministry of Digital Economy and Society, Thailand, 2025).

Smart Village Initiatives and Infrastructure Optimization

In many interviews, local officials described “smart village” initiatives in which community centers or local schools function as digital hubs equipped with broadband connectivity and AI-enabled resources. These hubs can:

Offer Shared Devices and Training: Community members can learn about AI applications, ranging from telemedicine to e-commerce, through hands-on training sessions. Several rural leaders noted that such

shared spaces can foster grassroots innovation by providing access to tools that individuals may not be able to afford independently.

Enable Data-Driven Infrastructure Planning: AI can analyze satellite imagery and demographic data to identify underserved villages, thereby guiding government investments in roads, electricity networks, and internet connectivity. Local authorities, particularly in remote provinces, welcomed the use of AI-based geospatial analytics to direct infrastructure budgets toward areas where they can generate the greatest impact (World Bank, 2024d).

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Boost Local Entrepreneurship: Rural artisans, small-scale producers and tourism operators can leverage AI-driven platforms to reach wider markets. Government agencies can support this process by offering training in digital marketing, AI-supported price comparison tools, and the development of direct-to-consumer sales channels.

Integrating AI into Rural Development Programs

To ensure long-term sustainability, the roadmap recommends embedding AI components within existing rural development strategies:

Capacity-Building for Extension Workers: Government extension staff in agriculture, education, and healthcare should receive targeted AI training. This “train-the-trainer” approach enables them to disseminate knowledge, support adoption, and troubleshoot AI tools within local communities.

Flexible Funding Mechanisms: Through community grants or micro-loan schemes, local leaders can propose AI-related projects tailored to regional needs. For instance, clusters of villages could jointly invest in AI-enabled irrigation monitoring systems, improving water efficiency across multiple farms.

Monitoring and Evaluation: AI can also support program oversight by tracking progress in real time. Dashboards could display indicators such as improvements in agricultural output, changes in student performance, or reductions in preventable diseases, allowing policymakers to refine rural AI initiatives responsively.

AI for Social Welfare and Equity

Ethnographic interviews with officials from social development agencies highlighted how reliance on manual data analysis often results in delayed or imprecise welfare interventions. Integrating AI technologies can address these limitations by enabling the following (FutureLab Consulting, 2025):

Targeted Assistance Programs: Machine learning models can analyze socioeconomic indicators—household income, employment status, and health records—to identify individuals or communities most in need of support. This approach reduces inefficient spending and supports timely interventions for challenges such as child malnutrition and housing insecurity (Organization for Economic Co-operation and Development, 2024a).

Predictive Analysis for Emerging Crises: During the COVID-19 pandemic and similar disruptions, AI systems demonstrated the potential to detect rising unemployment or increases in medical claims earlier than traditional methods. Such insights allow local authorities to deploy job training initiatives, emergency assistance, or mental health services before conditions worsen (McKinsey Global Institute, 2024).

Real-Time Impact Assessment: AI dashboards can monitor service uptake, track beneficiary outcomes, and assess program effectiveness across regions. Civil society organizations noted that transparent, data-driven monitoring strengthens accountability and enhances public trust in welfare systems.

User-Friendly AI Platforms for Citizen Engagement

Many marginalized populations face difficulties navigating complex government service systems. AI-enabled tools can simplify these interactions:

Chatbots and Virtual Assistants: Multilingual AI applications can guide users through application processes for welfare benefits, housing support, and educational scholarships. Community organizers noted that language barriers often discourage older adults and non-Thai speakers from seeking assistance (GovTech Singapore, 2023).

Community Helplines: AI-assisted call centers can triage inquiries, identify urgent needs, and route callers to the appropriate agencies. This approach can significantly reduce response times, particularly during emergencies or natural disasters.

Mobile-First Solutions: Given the widespread use of smartphones, especially in rural areas, mobile AI applications can enable citizens to check benefit eligibility, submit documentation, and schedule appointments with social service offices. Grassroots NGOs emphasized that mobile platforms are often the primary digital access point for remote communities.

Ensuring Ethical and Transparent Use of Social Data

While AI can enhance the effectiveness of social programs, interviewees also raised concerns about data misuse and privacy risks. Addressing these concerns requires:

Clear Data Governance Policies: Public agencies must anonymize sensitive information, obtain informed consent where appropriate, and conduct regular audits to detect biases that could exclude or misclassify vulnerable populations.

Accountability Mechanisms: Citizens should have the right to challenge AI-driven decisions—such as the denial of welfare benefits—through a clear and transparent appeals process. This safeguard is particularly important for marginalized communities.

Community Involvement: Local leaders and civil society organizations can participate in oversight committees that review the deployment of AI tools in welfare programs. Their involvement helps ensure that AI systems remain people-centered, culturally appropriate, and responsive to community needs.

Inclusive AI Strategies for Marginalized Groups

Women, ethnic minorities, and persons with disabilities often encounter additional barriers to accessing digital technologies. Several interviewees, including activists and social workers, emphasized the importance of designing AI solutions that explicitly account for the needs of these groups (UN Women, 2024):

Localized Language Support: Thailand's diverse linguistic environment includes multiple dialects and minority languages. AI chatbots, educational platforms, and telehealth services should therefore be capable of accommodating these linguistic variations to ensure equitable access (Eberhard et al., 2023).

Assistive AI for Persons with Disabilities: Voice-based interfaces, image recognition tools, and text-to-speech technologies can enable individuals with visual or hearing impairments to access information, communicate more effectively, and engage with public services on more equal terms.

Women in AI Development: The roadmap supports scholarships, mentorship initiatives, and professional networking opportunities aimed at increasing women's participation in AI research, entrepreneurship,

and leadership roles. Interviewees noted that diverse development teams are more likely to produce inclusive and socially responsive AI solutions, a view supported by existing innovation research (Hewlett et al., 2022).

Collaborating with NGOs and Grassroots Organizations

In many contexts, NGOs and community-based organizations already maintain trusted relationships with marginalized populations. To scale inclusive AI adoption effectively, the policy framework should encourage:

Public–Private–NGO Partnerships: Government agencies can collaborate with civil society organizations and private developers to pilot AI interventions tailored to specific community needs. For instance, an NGO supporting migrant workers could work with AI developers to design a multilingual job-matching platform that reflects migrants’ legal and social realities.

Training Community “Digital Champions”: By equipping local volunteers, educators, or activists with AI literacy and basic technical skills, these individuals can serve as local resource persons. Their roles may include troubleshooting applications, explaining digital rights, and advocating for inclusive technology adoption within their communities.

Culturally Sensitive Pilot Programs: In communities with distinct cultural or religious practices, AI initiatives must be introduced in ways that respect local norms and values. For example, an AI-enabled telemedicine program in a predominantly Muslim area should actively involve religious and community leaders to address concerns related to privacy, trust, and ethical use of data.

Balancing Urban–Rural Development

Thailand’s metropolitan areas, particularly Bangkok, are often the first to benefit from emerging technologies. Stakeholders from less-developed regions expressed concern that rapid AI adoption could exacerbate existing digital divides if left unchecked. To counter this (Thailand Development Research Institute, 2024):

Equitable Resource Allocation: Public funding for AI-related infrastructure, including data centers and advanced connectivity, should incorporate explicit provisions for smaller cities and rural areas. Reserving a portion of national AI innovation grants for projects originating outside Bangkok could help ensure that local entrepreneurs and institutions across the country have meaningful opportunities to participate in AI-driven growth.

Regional AI Competitiveness Index: Drawing on suggestions from economists at TDRI, the government could develop a regional AI competitiveness index. This index would track indicators such as the number of AI startups, public-sector AI deployments, and trained AI professionals across provinces. By highlighting regional disparities, the index can guide targeted policy interventions and incentivize local authorities to strengthen their AI ecosystems (Thailand Development Research Institute, 2025).

Shared Success Stories: Successful AI pilot projects implemented in one province, such as AI-supported supply chain solutions for farmers, can be documented and disseminated nationally. Sharing these experiences encourages replication, peer learning, and a sense of collective progress, helping bridge perceived divides between urban technology hubs and rural communities.

Migration and Job Opportunities

AI-driven automation may alter labor patterns, particularly as manufacturing and agriculture become more technology-intensive. Nevertheless, interviews with rural youth and community leaders indicated openness to new employment pathways, provided that appropriate training and incentives are available (International Labour Organization, 2024b):

AI-Related Jobs in Rural Areas: Establishing regional AI hubs, as discussed in Section 6, can generate employment opportunities in areas such as data labeling, software support, system maintenance, and

robotics operations. These roles may encourage younger workers to remain in, or return to, their home provinces rather than migrate to major cities.

Support for Traditional Sectors: AI applications should be positioned as complementary to, rather than substitutes for, traditional livelihoods such as artisanal crafts, cultural tourism, and small-scale agriculture. For instance, AI-driven e-commerce tools can help local artisans reach global markets while preserving cultural authenticity and local identity.

Conclusion: Creating an Inclusive AI-Driven Future for All Thais

Inclusivity and regional development constitute both the ethical foundation and strategic direction of Thailand's AI roadmap. By deploying AI to support rural transformation, strengthen social welfare systems, and empower marginalized populations, Thailand can ensure that digital progress extends beyond a limited set of urban centers. Ethnographic interviews consistently revealed that communities seek technology solutions aligned with their lived realities, whether improving healthcare access in remote clinics, simplifying access to government benefits, or expanding educational opportunities for all children.

For inclusive AI initiatives to succeed, they must be fully integrated with broader policy frameworks, PPPs, and human capital strategies outlined earlier in this roadmap. From capacity-building for extension workers to community-driven AI hubs, these measures reinforce a central guiding principle: AI adoption should enhance human well-being, not merely productivity indicators. If implemented with care and commitment, Thailand can emerge as a leading example of how emerging economies leverage AI to achieve balanced growth, preserve cultural heritage, and advance social equity, ensuring that no community is left behind in the digital era.

ENVIRONMENTAL SUSTAINABILITY

Sustainable development is not merely a policy priority for Thailand; it is an imperative closely intertwined with the nation's cultural identity and long-term development vision. In an era of rapid technological change, the strategic deployment of AI offers a significant opportunity to protect natural resources, address climate change, and strengthen disaster management capacities (United Nations Environment Programme, 2023). As Thailand moves toward an innovation-driven future, maintaining a strong commitment to environmental stewardship remains essential. Rooted in enduring values reflected across Thai history and philosophy, progress is understood not only as technological advancement but also as the ability to imagine alternatives and act responsibly. Within this context, Thailand's National AI Roadmap for Sustainable Productivity of Industries articulates a vision in which technological progress and ecological preservation reinforce one another rather than compete.

Drawing on extensive ethnographic interviews and stakeholder consultations, this chapter examines how AI can be leveraged to advance climate action (International Energy Agency, 2024), promote responsible resource management, and mitigate the impacts of natural disasters, while supporting economic growth that remains consistent with Thai cultural values and environmental ethics.

AI for Climate Action and Resource Management

Within the domain of environmental stewardship, AI is increasingly recognized as a powerful tool for transforming large volumes of data into actionable policy insights. One of its most prominent applications lies in reducing carbon emissions. By applying AI algorithms to energy consumption data from industrial facilities and commercial buildings, policymakers can identify inefficiencies and design targeted energy-efficiency interventions (Food and Agriculture Organization, 2022b). For instance, AI-driven smart grids (Department of National Parks, Wildlife and Plant Conservation, 2023) can adjust energy distribution in real time based on demand patterns and the availability of renewable energy sources, thereby optimizing energy use and reducing dependence on fossil fuels. Stakeholders from both environmental agencies and industrial sectors emphasized that, without robust data-driven insights, climate policies risk remaining aspirational rather than effective.

Beyond energy systems, AI also plays a critical role in resource conservation (World Bank, 2023b) across agriculture and forestry (Chen & Li, 2024). Machine learning-enhanced satellite imagery and sensor networks enable continuous monitoring of deforestation, water use, and crop conditions. This integration of technologies converts raw environmental data into early warning signals, equipping authorities with timely information to respond to emerging signs of environmental degradation (Asian Disaster Preparedness Center, 2023). Ethnographic interviews with rural communities highlighted a strong sense of urgency, as smallholder farmers expressed concern about increasingly unpredictable weather patterns (Thai Meteorological Department, 2024) and declining soil quality (International Renewable Energy Agency, 2023). Integrating AI into resource management frameworks can therefore support a virtuous cycle in which sustainable practices are encouraged, monitored, and enforced through real-time analytics, helping to ensure that economic development does not undermine environmental integrity.

Furthermore, this document underscores the importance of establishing a nationwide environmental data system, conceived as a centralized platform for aggregating, analyzing, and sharing data from multiple sources. Such a system would enhance cross-sector coordination and enable more precise calibration of environmental policies. For example, by using AI to analyze historical climate trends alongside real-time satellite observations, policymakers could set more realistic and measurable targets

for emissions reduction and conservation. This data-driven approach shifts environmental governance from a reactive posture to a proactive one, strengthening Thailand’s capacity to respond decisively to climate risks while building long-term resilience (Office of the National Economic and Social Development Council, 2024).

AI in Disaster Prediction and Response

Thailand’s exposure to natural disasters—including floods, droughts (Ministry of Agriculture and Cooperatives, 2024), and severe storms—underscores the need for advanced and predictive disaster management systems (National Hydroinformatics Center, 2023). In this context, AI serves as a critical enabler of more accurate and responsive early warning mechanisms. Contemporary AI models trained on large datasets encompassing meteorological patterns, satellite imagery, and historical disaster records can detect subtle indicators that precede major events. By correlating real-time rainfall data (UNESCO, 2024a) with terrain characteristics and drainage capacity, for example, AI systems can estimate flood risks and potential impacts at a localized level. These predictive capabilities are directly linked to life-saving outcomes, as they provide authorities with additional time to evacuate at-risk populations and reinforce essential infrastructure.

AI’s contribution to disaster management extends beyond forecasting to include real-time response coordination. During emergencies, AI-powered analytics can synthesize incoming data from social media, emergency communications, and sensor networks to generate a comprehensive situational overview. This integrated perspective allows emergency services to prioritize resources and deploy assistance where it is most urgently required. Interviews with disaster management officials indicated that, while early warning systems already exist in Thailand, their accuracy and timeliness could be substantially improved through AI integration. One official noted that AI can fundamentally alter response dynamics by enabling coordinated action rather than fragmented reactions, thereby reducing both human and economic losses.

To translate these capabilities into practice, the National AI Roadmap calls for embedding AI tools within existing national disaster preparedness frameworks. This process will require close collaboration among meteorological agencies, disaster response units, and technology providers. Regular simulation exercises and community education initiatives are proposed to ensure that AI-generated alerts lead to effective action on the ground. These measures not only strengthen the technical reliability of disaster management systems but also enhance public trust in their use. By incorporating feedback from real-world disaster responses into system design, continuous improvement can be institutionalized, allowing AI-enabled disaster governance to adapt to evolving risks and technological advances.

Conclusion: AI in Environmental Management

The environmental sustainability pillar of the AI roadmap emphasizes the integration of advanced technologies with Thailand’s longstanding commitment to nature, community, and intergenerational responsibility. It reflects a recognition that national progress cannot be assessed solely through economic indicators, but must also be evaluated in terms of ecosystem resilience and environmental health, upon which long-term prosperity ultimately depends. Through the strategic deployment of AI for climate action, resource management, and disaster prediction and response, Thailand can pursue a model of development that is both adaptive and transformative.

Strategic deployment of AI offers a significant opportunity to protect natural resources, address climate change, and strengthen disaster management capacities.

This vision is grounded in a commitment to actionable, evidence-based policy interventions. By investing in advanced data infrastructures, establishing a comprehensive national environmental data repository, and applying AI analytics across the full environmental policy cycle, Thailand can transition

from reactive crisis management to proactive and preventive governance. Moreover, incorporating community feedback and ethnographic insights into AI-enabled systems ensures that technological solutions remain responsive to lived realities—supporting farmers, strengthening disaster preparedness, and safeguarding natural assets.

Clear metrics and measurable targets, including a 15%–20% reduction in carbon emissions, demonstrable declines in deforestation rates, and shorter disaster response times, will serve as benchmarks for success. When combined with continuous stakeholder feedback, these indicators will help ensure that environmental initiatives remain adaptive, transparent, and effective over time.

Ultimately, the environmental sustainability strategy within the AI roadmap extends beyond environmental protection alone. It seeks to redefine progress by aligning economic growth with ecological preservation. By embedding AI systematically into environmental policymaking, Thailand is well-positioned to emerge as a global leader in sustainable development, demonstrating that technological innovation and environmental stewardship can coexist in a mutually reinforcing and balanced manner. This is the roadmap’s core promise: a future in which AI advances not only industrial productivity, but also environmental resilience, cultural continuity, and societal well-being.

WORKFORCE ADAPTATION AND SOCIAL SAFETY NETS

In an era marked by rapid advances in AI and automation, the nature of work is undergoing a profound transformation. This shift presents significant challenges alongside unprecedented opportunities. As Thailand advances its national AI agenda, the National AI Roadmap for Sustainable Productivity of Industries places strong emphasis on proactive workforce adaptation and the strengthening of social safety nets. Insights drawn from ethnographic interviews, stakeholder workshops, and consultations with labor representatives and industry human resource (HR) leaders consistently highlight that the human dimension of AI adoption is not peripheral, but central to sustainable digital transformation. As articulated by R. Edward Freeman, while technology may drive productivity, it is human values, agency, and resilience that ultimately shape national progress (Brynjolfsson & Mitchell, 2023).

Comprehensive Workforce Upskilling and Reskilling

At the core of this transition lies the urgent need for large-scale workforce upskilling and reskilling. Stakeholders across sectors, ranging from manufacturing to administrative services, emphasized that AI and automation will displace certain roles while creating new occupations that require different and often more advanced skill sets (International Labour Organization, 2024c). Workshop participants noted that factory workers engaged in repetitive tasks could, with appropriate training, transition into roles such as robotics maintenance technicians or data analysts capable of interpreting AI-generated insights. Similarly, administrative staff responsible for routine clerical work could move into supervisory roles that involve managing and collaborating with AI systems, ensuring that human judgment complements machine efficiency (Frey & Osborne, 2017).

In response, the roadmap proposes the establishment of a national, continuously adaptive reskilling framework aligned with evolving technological demands. This framework would identify sectors and job roles most susceptible to AI-driven disruption—including repetitive manufacturing, basic administrative work, and customer service functions—and develop targeted training programs for affected workers. For example, employees facing displacement due to increased automation could participate in structured, on-the-job training programs that combine technical instruction in automated system maintenance with foundational data literacy. This dual emphasis on practical and analytical competencies reflects a recurring message from ethnographic interviews: workers must be equipped not merely to coexist with machines, but to collaborate with them productively (McKinsey Global Institute, 2023c).

Industry collaboration is essential to the success of this approach. The roadmap calls for sustained partnerships among government agencies, private-sector firms, and educational institutions to develop scalable, sector-specific training programs. These partnerships would support mid-career training scholarships and offer financial incentives, such as tax benefits, for firms that invest in workforce reskilling rather than workforce reduction. Stakeholders consistently emphasized that sustained investment in human capital represents the most effective safeguard against technology-driven unemployment. By institutionalizing these collaborations, Thailand can ensure that workforce development progresses in parallel with AI innovation, preserving employment while creating new, higher-value opportunities (Organization for Economic Co-operation and Development, 2024b).

To ensure that reskilling initiatives are both cost-effective and scalable, the roadmap also highlights the use of AI as a delivery mechanism for training. AI-driven learning platforms can generate personalized

curricula, simulations, and assessments tailored to individual learners' backgrounds and skill levels. This approach enables workers with prior technical knowledge to bypass introductory material and focus on advanced competencies, whereas automated grading and progress tracking reduce administrative burdens associated with traditional training models (Ministry of Labour, Thailand, 2024b).

By leveraging AI to support AI education, Thailand can accelerate workforce transformation at scale. Personalized learning pathways allow a limited number of trainers to oversee large cohorts of learners, driving human attention toward areas where judgment, mentoring, and hands-on instruction are most valuable. This blended model lowers per-participant costs while ensuring that workers progress systematically through increasingly complex skill levels, equipping them with the technical and analytical capabilities required to thrive alongside intelligent systems (World Bank, 2023c).

Strengthening Social Safety Nets for the AI Era

While proactive training initiatives are essential, the rapid pace of technological change also necessitates stronger social safety nets to support workers during periods of transition (Davenport & Ronanki, 2024). As AI and automation reshape the employment landscape, temporary displacement and skills mismatches are likely to occur, even in well-prepared economies. Recognizing this reality, the roadmap sets out a comprehensive approach to reinforcing Thailand's social protection systems so that workers can adapt without facing undue economic insecurity (Gartner, 2024a).

This approach calls for a systematic review and, where necessary, enhancement of existing unemployment benefits, severance arrangements, and job placement services to ensure their continued relevance in a rapidly evolving labor market. Drawing on feedback from labor unions and civil society representatives during ethnographic interviews, the roadmap proposes the introduction of targeted assistance mechanisms. One such proposal is the adoption of wage insurance schemes, which would provide partial income support to displaced workers during retraining periods, enabling them to acquire new skills without immediate financial strain. Furthermore, expanded public works programs could offer interim employment opportunities that combine income support with structured skill development (European Commission, 2023c).

Equally important is the establishment of clear and transparent communication between employers and employees regarding the anticipated impacts of AI adoption. Stakeholder interviews consistently highlighted concerns about insufficient notice and limited information when AI-related changes affect jobs. Enhancing transparency through advanced notification requirements and the inclusion of employee representatives in transition planning can help preserve trust and reduce uncertainty. By institutionalizing these practices, the government can encourage more constructive dialog between employers and workers and promote fair, proactive management of workforce transitions (National Science and Technology Development Agency, 2024a).

Institutionalizing Continuous Learning and Feedback

A central element of effective workforce adaptation is the systematic incorporation of feedback and adaptive learning mechanisms. The roadmap envisions a framework in which continuous input from implementers and beneficiaries of AI initiatives is actively collected and used to refine training programs and social support measures over time (Taleb, 2012).

As AI projects are implemented by local governments, businesses, and community organizations, their practical experiences—including successes and unforeseen challenges—will be captured through surveys, periodic workshops, and structured outreach coordinated by the National AI Advisory Board. This stream of real-world feedback enables policymakers to assess which initiatives are delivering intended outcomes and where adjustments are required, whether in program design, delivery methods, or resource allocation (Autor, 2024).

In this context, the adaptive learning model resembles an agile approach to policy implementation, where iterative cycles of feedback, evaluation, and improvement become standard practice. For instance, if a pilot training program in manufacturing demonstrates gains in productivity and job satisfaction, it can be rapidly scaled to other sectors. Conversely, if implementation challenges emerge in specific regions or industries, programs can be recalibrated or supplemented with targeted support. This iterative process not only improves effectiveness but also empowers workers by giving them a voice in shaping the evolution of workforce strategies (Susskind & Susskind, 2023).

The Role of Multi-Stakeholder Engagement

Ethnographic interviews consistently underscored that a successful transition into the AI era must be a collective endeavor. This insight underpins the roadmap's emphasis on institutionalizing multi-stakeholder engagement, bringing together representatives from government, industry, academia, and civil society to regularly assess and guide workforce adaptation efforts (Harvard Business School, 2024). Establishing formal forums for engagement, including annual roundtables, regional workshops, and digital consultation platforms, ensures that the perspectives of workers, employers, and community leaders are systematically incorporated into policy decisions. As one labor representative noted during a workshop, "Our voices must be part of this journey, not silenced by the pace of progress." Such inclusive engagement mechanisms are critical for sustaining public trust and ensuring that the AI roadmap evolves in a manner that is both responsive and equitable (Asian Development Bank, 2023d).

Long-Term Vision for Workforce Transformation

Beyond managing short-term disruptions, the roadmap articulates a long-term vision for transforming the nature of work in Thailand. The objective is not simply to respond to technological change, but to reshape how people work, learn, and develop over decades. AI should enhance human creativity and judgment rather than replace them, enabling factory workers to become skilled technicians, office staff to act as strategic collaborators with intelligent systems, and rural entrepreneurs to convert data into new economic opportunities. Achieving this vision requires embedding AI-driven learning across the entire skills ecosystem. Intelligent training platforms can use AI to deliver AI education by generating personalized lesson plans, simulations, and virtual laboratories that adapt to each learner's pace and strengths. By automating routine content delivery, assessment, and progress tracking, these systems allow a limited number of human mentors to support large numbers of learners, reducing costs while accelerating skill acquisition and freeing experts to focus on hands-on coaching and leadership development.

This approach must be supported by forward-thinking policy measures, including public-private training partnerships, modular and on-demand learning programs, continuous updates to school and university curricula, and strengthened social safety nets such as portable benefits and career transition grants. Together, these elements form a dynamic ecosystem in which lifelong learning becomes the norm and skills remain aligned with evolving technological demands.

Taken together, this comprehensive strategy ensures that as jobs evolve, the support structures surrounding workers evolve in tandem. By transforming disruption into opportunity, Thailand can foster shared prosperity and build a future in which technological advancement serves people, culture, and community in a balanced and sustainable manner.



AI IMPLEMENTATION TIMELINE AND ROADMAP

Translating Thailand's AI vision into actionable outcomes requires more than aspirational goals. It demands a meticulously structured timeline that unfolds in deliberate, interlocking phases. This roadmap is designed not only to generate early successes but also to establish scalable, long-term foundations for integrating AI across Thailand's industrial and societal systems. Drawing on extensive ethnographic interviews and stakeholder consultations, the phased implementation plan emphasizes iterative learning, adaptation, and the integration of cultural values with technological innovation (Asian Development Bank, 2023; Brynjolfsson & McAfee, 2014).

Short-Term (1–3 Years): Laying the Foundations and Establishing Early Successes

In the initial phase, the focus is on establishing critical infrastructure and governance frameworks that will support AI integration. Over the next one to three years, efforts will center on laying the groundwork for all subsequent AI initiatives (Davenport & Ronanki, 2018). This involves two main strategies: deploying foundational digital infrastructure and launching “quick-win” pilot projects in selected sectors that promise tangible, measurable outcomes (Organization for Economic Co-operation and Development, 2019).

Key actions include expanding broadband networks (UNESCO, 2024) and accelerating 5G deployment in priority regions, particularly in areas where connectivity has historically been a barrier to digital adoption. These measures will provide the necessary backbone for AI systems and enable more ambitious projects in later phases. Concurrently, the government will launch AI education and workforce training programs, designed with input from both urban and rural stakeholders (World Bank, 2023c). Ethnographic interviews underscored that without early capacity-building, AI adoption risks stalling. Accessible, contextually relevant training modules will help narrow the talent gap, which currently produces only about 200 AI specialists annually against a rapidly growing demand (PwC, 2020).

Pilot projects will be selected to demonstrate practical AI benefits. In agriculture, precision farming initiatives will use AI analytics to optimize irrigation and fertilization, aiming to increase crop yields. In tourism, AI-powered chatbots (McKinsey Global Institute, 2023c) and personalized recommendation engines will be trialed in destinations, such as Phuket and Chiang Mai, to enhance visitor engagement and satisfaction. These early projects, deliberately designed for measurable impact, will serve as flagship demonstrations of AI's potential, fostering public confidence and creating a compelling narrative of success. Simultaneously, essential governance structures, including the National AI Steering Committee (Organization for Economic Co-operation and Development, 2024b), will be established. This body will oversee core policies on data governance, AI ethics (Susskind & Susskind, 2023), and sector-specific regulations, ensuring that the digital environment supports sustained innovation (World Economic Forum, 2023a).

Translating Thailand's AI vision into actionable outcomes requires more than aspirational goals. It demands a meticulously structured timeline that unfolds in deliberate, interlocking phases.

Medium-Term (3–6 Years): Scaling Success and Deepening Integration

Building on short-term foundations, the medium-term phase focuses on expanding successful pilots and embedding AI more deeply across sectors and government functions (Davenport & Ronanki, 2018). The emphasis shifts from isolated projects to systemic transformation, integrating AI into both public and private operations (Asian Development Bank, 2023; UNESCO, 2022).

During this period, AI solutions will scale in critical sectors such as healthcare, manufacturing, and urban management. Telemedicine and diagnostic systems piloted in selected clinics will expand geographically, improving healthcare access and reducing urban–rural disparities. Similarly, robotics (Gartner, 2024) and automation initiatives that demonstrated efficiency gains in early manufacturing pilots will be rolled out across additional factories to replicate these results nationally (Thailand Board of Investment, 2024b).

This phase also prioritizes nurturing the emerging AI ecosystem. PPPs, innovation hubs, and research centers established in the short term will begin to yield results. Startups and SMEs supported by early-stage funding and capacity-building programs are expected to evolve into key contributors to Thailand’s AI landscape. By this stage, the country is anticipated to emerge as a recognized ASEAN player, 170 with strong AI governance, a skilled workforce, and a growing portfolio of AI-enhanced public services (Accenture, 2023a).

Integral to the medium-term strategy is a mid-phase review. Approximately halfway through this period, an in-depth evaluation using data from the National AI Dashboard (European Commission, 2023) and KPI reports will guide course corrections. Ethnographic interviews highlighted the ability to adjust strategies based on real-time metrics and stakeholder feedback.

The roadmap plan below is designed to help government ministers visualize the actions required for a nation or organization to navigate the AI revolution. The framework is organized around five major thematic areas, adapted from Oxford Insights and the United Nations Educational, Scientific, and Cultural Organization (UNESCO): Readiness, Infrastructure, Human Capability, Technology and Innovation, and Promoting AI.

Connections between themes illustrate interdependencies and demonstrate how tasks can be effectively sequenced. Each theme is represented as a horizontal band spanning five years, with specific actions identified to elevate national capacity to a high proficiency level. The vertical bands indicate phases of AI development, as described in the previous chapter.

This roadmap is typically developed through several months of planning workshops, known as design sprints, which refine and detail the plan. These workshops require the active participation of multiple ministries, incentivized to collaborate and break down silos in both processes and data systems. Importantly, the roadmap is fully “Agile,” designed to be adaptive and responsive to a rapidly evolving AI landscape and other dynamic environmental factors is crucial for sustaining momentum and ensuring the roadmap remains agile in a rapidly evolving technological environment (United Nations ESCAP, 2022).

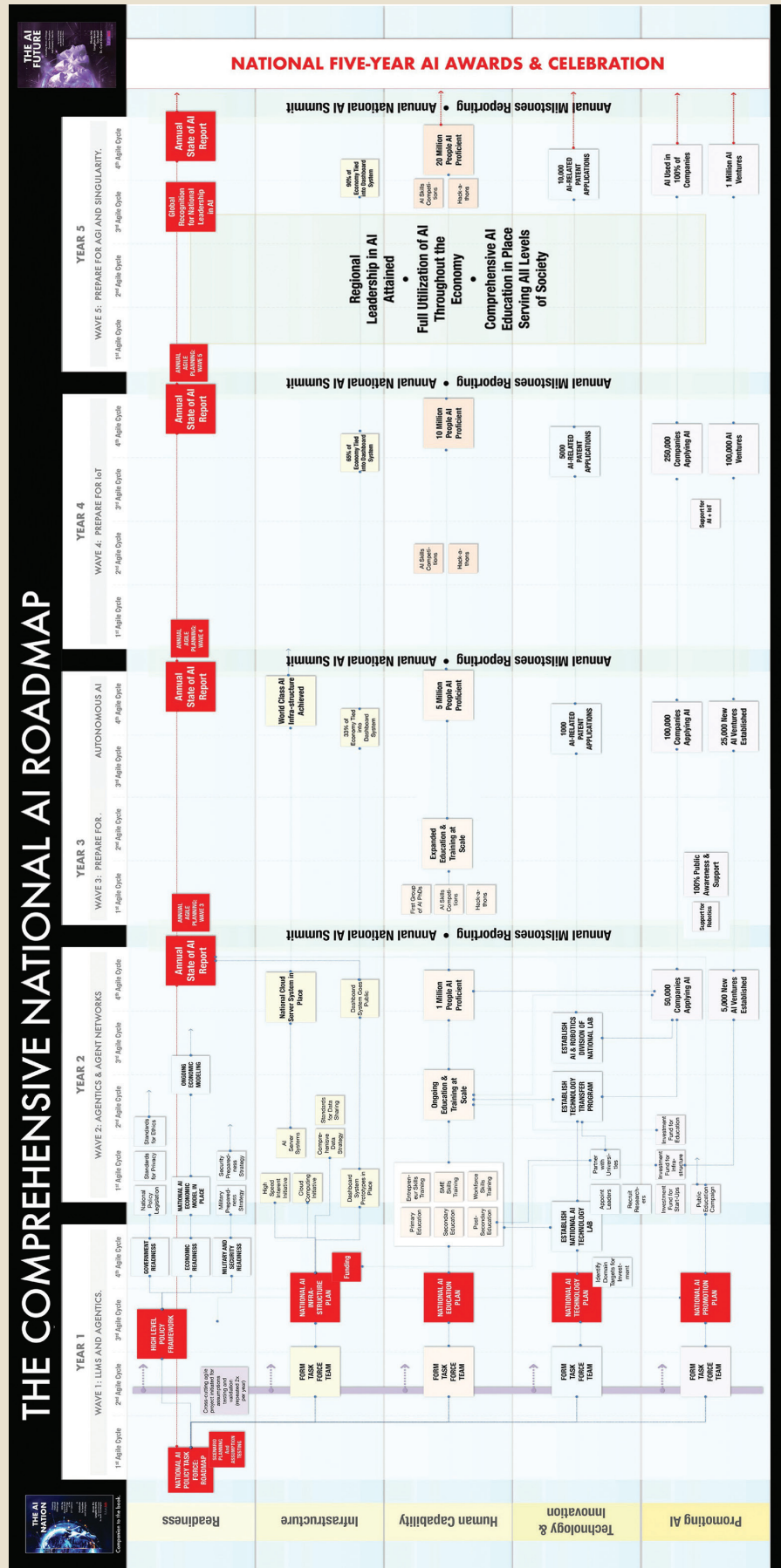
Long-Term (Beyond 6 Years): Consolidation, Continuous Improvement, and Global Leadership

The long-term objective, beyond six years, is to fully embed AI into Thailand’s national industrial ecosystem and consolidate the country’s position as a regional AI innovation hub (European Commission, 2021). By this stage, AI will no longer be viewed as an experimental add-on; rather, it will become an integral component across key sectors, including smart agriculture, autonomous, and personalized education (Gartner, 2023a).

This phase is characterized by continuous improvement and iterative refinement, focusing on ensuring that policies, systems, and infrastructures established in earlier phases are maintained, optimized, and

FIGURE 4

THE COMPREHENSIVE NATIONAL AI ROADMAP



evolved in line with technological advances and shifting economic landscapes. The government's commitment to annual digital infrastructure investment will persist, while educational and training programs will be continuously updated to meet the demands of emerging AI technologies (McKinsey Global Institute, 2023d).

This timeline is not a static blueprint; it is a living, evolving strategy that must be continuously refined through robust monitoring, stakeholder feedback, and adaptive learning.

Sustainability and public trust remain central long-term objectives. As the AI ecosystem matures, attention will shift toward addressing more sophisticated challenges, including AI-driven labor market shifts (Harvard Business School, 2024) and advanced autonomous systems.

Maintaining ethical governance and transparent accountability will be crucial. To this end, periodic evaluations, independent audits, and continuous stakeholder engagement will be institutionalized. An enduring National AI Advisory Board, supported by task forces and regular reviews, will ensure that the roadmap remains a living strategy, adaptable to emerging realities and informed by lessons learned from ongoing implementation (Boston Consulting Group, 2022).

Long-term strategic planning also aims to position Thailand as a regional AI leader. This includes not only domestic proliferation but also the export of successful AI solutions to neighboring countries. By fostering world-class research centers, attracting international investment, and actively participating in global discussions on AI ethics and governance, Thailand intends to influence international standards while showcasing its model of culturally attuned, sustainable AI adoption. Within a decade, Thailand aspires to be recognized as a regional hub of AI excellence, capable of driving innovation both domestically and across ASEAN and beyond (IBM, 2021).

Conclusion

The AI Implementation Timeline and Roadmap represents a dynamic, phased plan reflecting Thailand's commitment to a measured, adaptive, and inclusive approach to AI integration.

In the short term, the focus is on establishing critical infrastructure, launching pilot projects, and setting up robust governance frameworks (Google, 2023). In the medium term, successful initiatives will be scaled and deeply integrated into both government and industry operations, with an emphasis on continuous evaluation and capacity building. Lastly, the long-term vision is to fully embed AI in all aspects of national productivity, ensuring sustained innovation, public trust, and global competitiveness (MIT Technology Review, 2024).

This timeline is not a static blueprint; it is a living, evolving strategy that must be continuously refined through robust monitoring, stakeholder feedback, and adaptive learning. By rigorously tracking progress, celebrating early wins, and promptly addressing gaps, Thailand can ensure that its National AI Roadmap remains a potent instrument for driving sustainable, inclusive industrial transformation, reflective of both its cultural heritage and its ambition for global leadership in the digital era (World Bank, 2024e).



MONITORING AND EVALUATION FRAMEWORK

True progress begins when someone dares to think differently, sees beyond what is, and imagines what could be (Office for Artificial Intelligence, 2023). In the spirit of this visionary philosophy, the Monitoring and Evaluation Framework for Thailand's National AI Roadmap is conceived as an expansive and dynamic instrument of continuous learning, strategic adaptation, and collective accountability. It is designed not only to track progress but also to serve as an engine of transformation, ensuring that AI initiatives evolve responsively, remain aligned with national objectives, and ultimately drive sustainable productivity while honoring Thailand's rich cultural heritage.

Drawing on extensive ethnographic interviews, immersive stakeholder workshops, and real-time participatory feedback, this framework embodies a comprehensive, data-driven, and adaptive approach (Smart Nation and Digital Government Group, 2024). These intertwined channels of insight and evaluation allow the roadmap to function as a living strategy—one that evolves, iterates, and adapts in response to the challenges and opportunities of an ever-changing digital landscape.

Governance

Implementing an AI productivity strategy requires more than programs and funding; it also requires a governance mechanism to track progress, enforce accountability, and adjust tactics (European Commission, 2024c). Many nations have established dedicated units or committees within government to monitor AI adoption and its impact using defined KPIs and dashboards. Key practices include:

Dedicated AI and Digital Transformation Units: Many governments establish teams to coordinate AI initiatives (Organization for Economic Co-operation and Development, 2024c). For instance, the UK's Office for AI was created as a joint unit of the Department for Business, Energy and Industrial Strategy (BEIS) and the Department for Digital, Culture, Media and Sport (DCMS) to oversee AI strategy delivery. The Office's mandate included implementing the AI Sector Deal and reporting progress to both ministries and the Cabinet. By positioning a single office across multiple ministries, the UK reduced siloed execution, pooled resources from both ministries, and enabled coordinated education, innovation, and adoption policies. Similarly, Singapore's Smart Nation and Digital Government Group, housed in the Prime Minister's Office, provides an integrated structure uniting multiple agencies to drive digital initiatives. It tracks KPIs in the Digital Government Blueprint, such as digital transaction rates and cloud adoption, and reports them publicly. This reflects a broader trend of situating AI and digital coordination units at a high level (e.g., the Prime Minister or Deputy Prime Minister's office) to empower cross-ministry data and strategy implementation.

Key Performance Indicators (KPIs) and Dashboards: Effective monitoring begins with clearly defined KPIs for AI adoption and productivity (Ministry of SMEs and Startups, Republic of Korea, 2024). Singapore's annual Digital Economy Report, for example, tracks the AI adoption rate among SMEs, which rose from 3.5%–4.2% between 2018 and 2023, as well as the proportion of firms adopting various digital solutions. Outcomes are updated yearly through surveys and analysis. Europe's Digital Economy and Society Index (DESI) tracks the percentage of firms using AI, big data, and cloud services annually by country. An AI monitoring dashboard typically includes:

1. Input metrics (e.g., number of AI training sessions held, number of AI solution providers serving SMEs) (French Prime Minister's Office, 2023).

2. Adoption metrics (e.g., percentage of SMEs using at least one AI application, broken down by sector and region) (Malaysia Productivity Corporation, 2023).
3. Outcome metrics (e.g., productivity growth in SMEs using AI versus those not using AI, cost savings achieved, and new products or patents resulting from AI) (World Economic Forum, 2024b).
4. Data reliability: multiple sources are used, including program data from grants or voucher uptake, and independent statistics such as surveys conducted by national statistics agencies or chambers of commerce (Infocomm Media Development Authority & Department of Statistics Singapore, 2023). Many countries publish these KPI dashboards annually to maintain transparency and stakeholder engagement.

True progress begins when someone dares to think differently, sees beyond what is, and imagines what could be.

See also Section 13.2 and Appendix H for further discussion of the AI dashboard.

Frequency and Reporting Mechanisms: Annual reporting is commonly used to capture broad adoption and impact metrics, as changes and data gathering typically require time (Federal Ministry for Economic Affairs and Climate Action, 2023; International Telecommunication Union, 2024b). For example, the OECD AI Observatory compiles annual indicators on AI startups, investments, and adoption among member countries, which national ministries use for benchmarking. However, for internal management, some metrics are tracked quarterly.

For instance, the ROK's Ministry of SMEs tracks the number of manufacturers adopting AI solutions under its Smart Factory program quarterly and reports these figures to its steering committee. The governance structure often includes quarterly or biannual inter-ministerial meetings to review the dashboard. In France, the Interministerial Directorate for Digital Affairs, led by the Prime Minister, meets periodically to review progress on AI and digital KPIs across sectors such as education and the economy, ensuring that issues are addressed promptly.

Validation and Evaluation: Ensuring data accuracy and confirming that programs are delivering results is critical (Ministry of Industry, Thailand, 2025b). Independent evaluation is necessary to assure the validity of reported data. For example, the UK Office for AI commissioned an academic review of the AI Council's recommendations and the government's progress, which was presented to Parliament. Validation methods include third-party audits of KPI data (for example, verifying that an SME labeled as "AI-adopting" has indeed implemented an AI solution, potentially through an audit or site visits) and the use of external benchmarks. Many countries also engage international indices or consulting studies for validation. If the World Economic Forum or the International Telecommunication Union (ITU) publishes reports on a country's AI readiness or productivity, the national dashboard will cross-reference them. In Singapore, collaboration between the Infocomm Media Development Authority (IMDA) and the Department of Statistics ensures rigorous methodology in calculating the digital economy's GDP contribution and productivity effects.

Institutional Roles: Most governance frameworks assign a senior leader responsibility for each major KPI or set of KPIs. In Thailand, MIND could, for example, nominate the Deputy Permanent Secretary as the responsible leader for AI productivity targets, working with counterparts in MDES and other departments, thereby creating a clear line of responsibility for each metric tracked on the dashboard (United Nations ESCAP, 2024). In the UK's Office for AI, director-level officials in participating departments share this responsibility, ensuring cross-department coordination.

Feedback and Adaptation: Effective frameworks treat monitoring as a tool for learning and adapting policy. For example, in Germany's "Mittelstand 4.0" centers, regional disparities were addressed when

noticed (Department for Business & Trade, 2023). If, by year two, the dashboard shows SME AI adoption lagging behind targets, the ministry can investigate causes and adjust programs accordingly. The ROK's approach is notable: when slower AI adoption among SMEs was observed, the government increased training support and included AI solutions in SME loan guarantee programs. Similarly, monitoring Industry 4.0 adoption in Germany led to an expansion of subsidized initiatives to accelerate technology uptake.

Integration with Productivity Metrics: Since MIND's goal is to boost productivity through AI, the monitoring framework should integrate traditional productivity indicators (Brynjolfsson & McAfee, 2024a). This includes tracking sectoral output per worker, unit costs, and attributing changes partly to digital adoption. Some countries already apply this approach. The Malaysia Productivity Corporation (MPC) monitors productivity growth by sector and correlates it with technology adoption rates, presenting findings annually to the National Productivity Council. A unified dashboard could, for example, display "Rubber sector productivity +5% (target +3%) alongside 50 new AI use-cases implemented." This approach ties the AI strategy directly to tangible economic outcomes.

Institutionalizing a monitoring and execution framework involves establishing a central coordinating unit, defining multi-dimensional KPIs, implementing regular reporting, and supporting adaptive management. Doing so transforms a strategy into a living process that can accelerate progress toward AI-driven productivity goals.

The National AI Dashboard

Management guru Peter Drucker famously said, "You can't manage what you don't measure." At the heart of our monitoring efforts is the establishment of a robust set of clear, measurable performance indicators. These KPIs enable Thailand to better measure and manage AI. The indicators are designed to capture both quantitative progress and qualitative transformations resulting from AI adoption. They encompass a diverse range of measures: the number of AI projects deployed across various industrial sectors, the growth rate of the AI-trained workforce, the surge in AI startups and innovation hubs, and tangible improvements in public service delivery attributable to AI technologies. Each metric is intended to be rigorous in quantification while sensitive to the nuanced, context-driven impacts identified during stakeholder engagements.

Many governments use color-coded scorecards (red/yellow/green) to indicate whether targets are on track. KPI frequency depends on the metric: infrastructure rollout may be assessed quarterly because the number of 5G base stations or fiber kilometers can be continuously measured, whereas AI usage surveys are typically annual.

The dashboard should also be linked to a formal reporting mechanism. Implementing these metrics likely require new laws mandating the submission of relevant statistics, so a dedicated government unit should receive and manage this information. All reporting should be conducted via an online portal that aggregates and anonymizes data automatically.

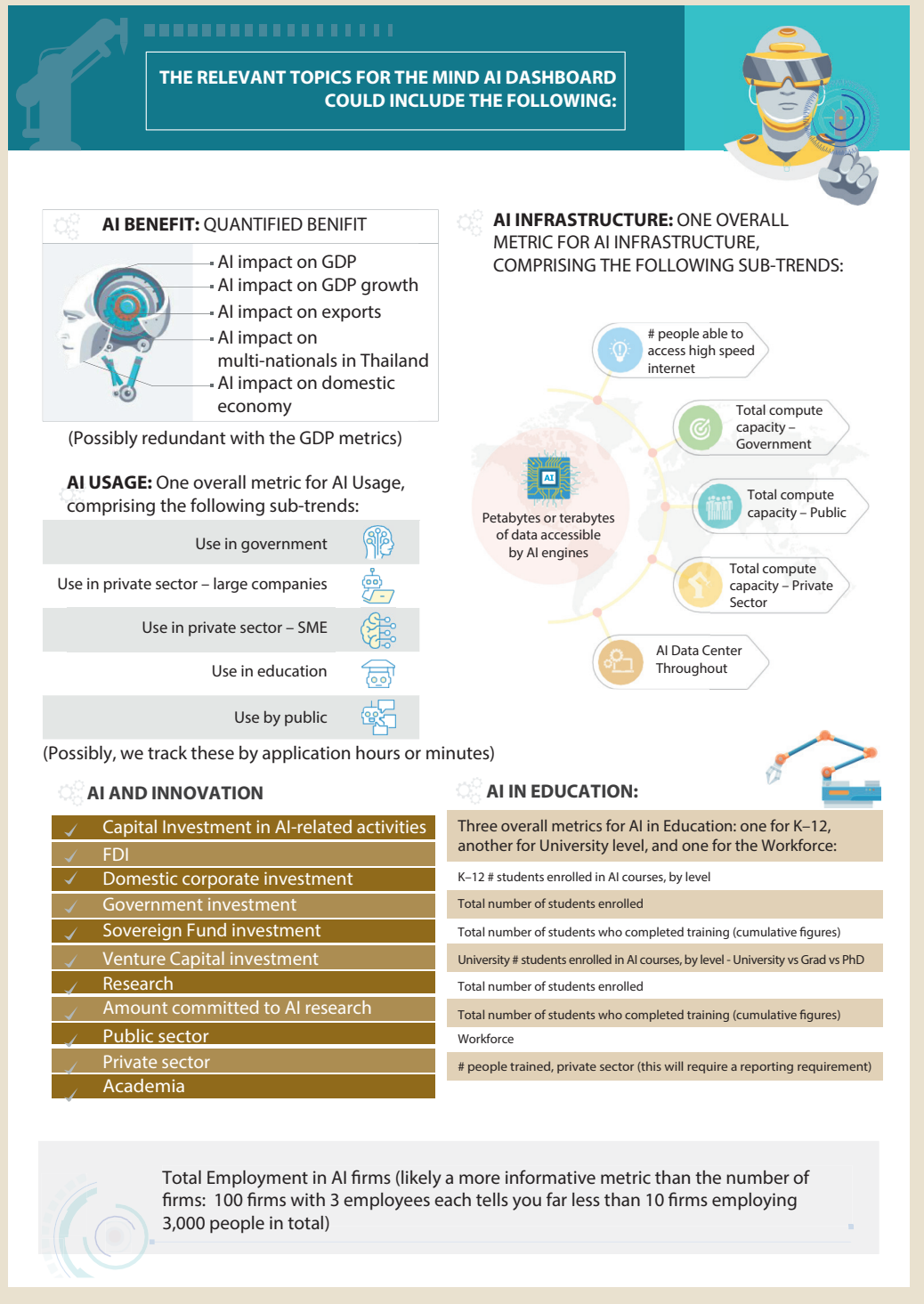
The responsible government unit (e.g., Office for AI) would publish quarterly and annual progress reports to the Cabinet and Parliament, while continuously updating a public-facing dashboard online.

Management guru Peter Drucker famously said, "You can't manage what you don't measure." This dashboard would enable Thailand to better measure and manage AI.

With advanced visualization tools, including dynamic charts, heat maps, and trend lines, the dashboard provides a comprehensive and intuitive snapshot of performance. Accessible to both authorized stakeholders and the public, it facilitates transparency and enables timely corrective action.

FIGURE 5

AI DASHBOARD DATA SOURCES



For instance, if AI-enabled project growth or workforce upskilling falls short of defined targets, the dashboard serves as an early warning, prompting deeper investigation and strategic recalibration. Continuous visibility allows the dashboard not only to gauge performance but also to celebrate early successes and motivate efforts to address emerging gaps. Please refer to Appendix H for further discussion of this topic.

National AI Advisory Board for Continuous Oversight

Complementing the technical robustness of our dashboard is the creation of a permanent National AI Advisory Board. This multidisciplinary body, comprising representatives from government, industry, academia, and civil society, embodies the collaborative spirit necessary to steer Thailand's national AI strategy. The Advisory Board will convene regularly to review detailed KPI reports, assess dashboard analytics, and deliberate on strategic adjustments.

Its mandate is comprehensive: to ensure that every AI initiative remains aligned with Thailand's long-term strategic goals while maintaining agility in the face of new challenges.

The Board's responsibilities include commissioning periodic evaluations—whether annual or biannual—that critically assess the state of AI development across the nation. These evaluations, informed by both internal insights and independent external reviews, provide a holistic perspective on progress, enabling benchmarking against international standards. By continuously scrutinizing outcomes and identifying potential risks or opportunities, the Advisory Board ensures the roadmap is perpetually refined and recalibrated. This proactive oversight responds directly to stakeholder calls for accountability, ensuring the roadmap remains a dynamic strategy rather than a static document.

Feedback Loops and Adaptive Learning

Central to our Monitoring and Evaluation Framework is an unwavering commitment to adaptive learning, a process in which feedback is actively used to guide the evolution of our strategy. The framework incorporates formal feedback loops designed to capture the on-the-ground experiences of implementers and beneficiaries across sectors. As local governments, businesses, and community organizations roll out AI initiatives, their real-time experiences—ranging from successes to unforeseen challenges—will be systematically captured through structured surveys, interactive workshops, and facilitated focus group discussions.

These feedback loops ensure that every aspect of AI deployment—whether in smart agriculture, healthcare, urban management, or industrial production—is continuously evaluated. For example, if a pilot project in precision agriculture yields notable improvements in water efficiency and crop yield, this success will be documented, analyzed, and scaled across similar agricultural contexts. Conversely, if an AI initiative in urban traffic management reveals unanticipated operational issues, immediate adjustments can be made by reallocating resources or redesigning underlying systems.

The framework institutionalizes adaptive learning. Regular stakeholder roundtables, an online suggestion portal, and dedicated outreach by the Advisory Board establish ongoing channels for feedback. These mechanisms ensure that insights from frontline experiences are targeted into the next cycle of strategic planning rather than lost in the policy process. Continuous engagement reinforces public trust and empowers stakeholders, making their perspectives integral to refining the AI strategy.

Specialized Task Forces and Independent Evaluations

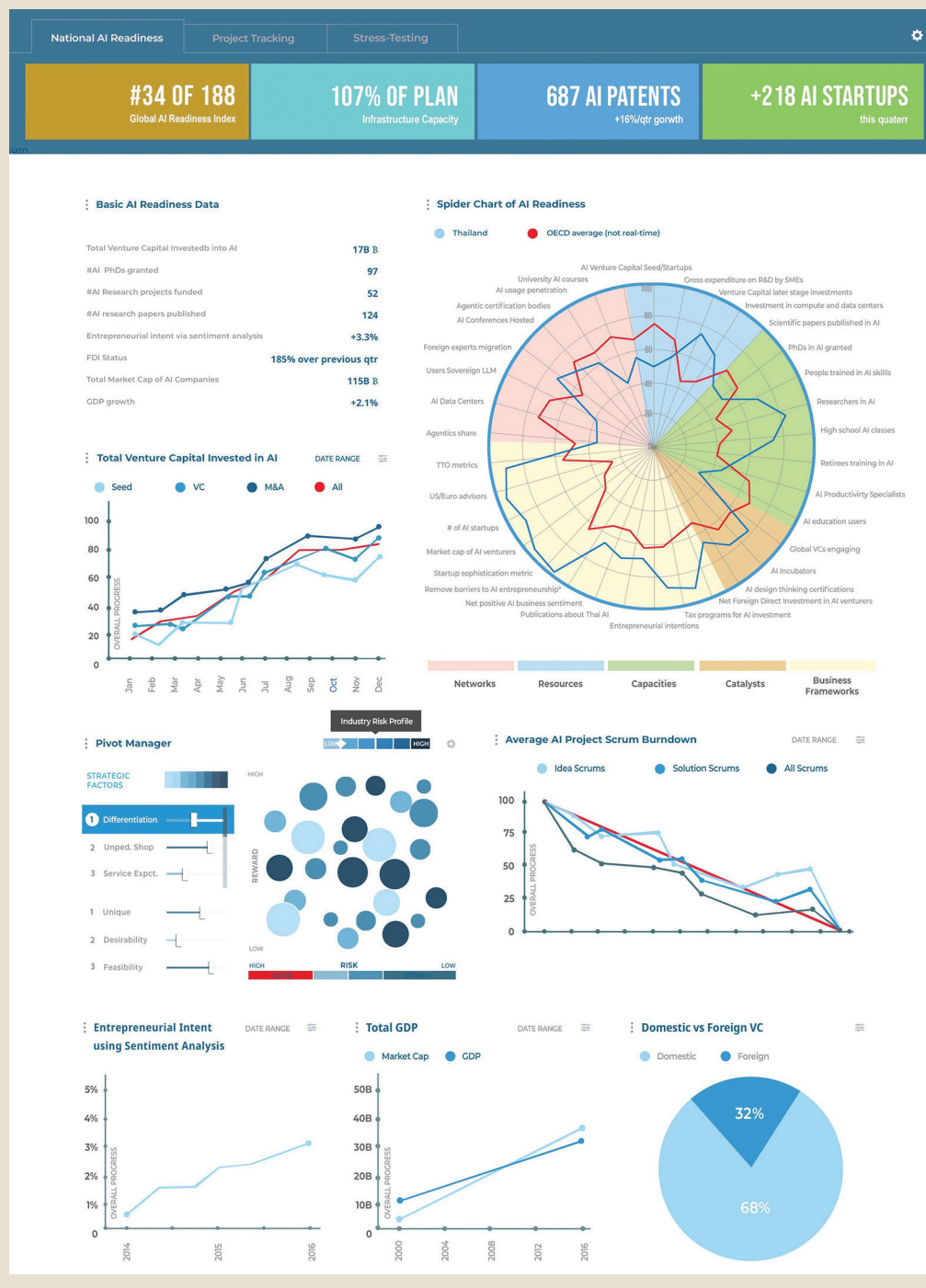
To add precision and expertise to monitoring efforts, specialized task forces will be established under the National AI Advisory Board. These task forces will focus on critical thematic areas—including data governance, ethical compliance, workforce development, and sector-specific innovations—providing in-depth analysis of emerging trends and challenges. Their role is to deliver targeted, actionable recommendations to inform strategic adjustments. For instance, a task force dedicated to ethical compliance might analyze how AI-driven decisions impact societal fairness and propose necessary regulatory updates. A workforce development task force might assess the effectiveness of training programs and suggest enhancements based on real-world outcomes.

In parallel, periodic independent evaluations will be commissioned to provide objective, third-party assessments of progress. Engaging respected external experts ensures impartial benchmarks for performance measurement. These independent reviews validate internal findings, uncover blind spots, and maintain alignment with global best practices. Insights from external evaluations will feed into the

iterative feedback loops, keeping the roadmap robust, resilient, and continuously aligned with both national goals and international standards.

FIGURE 6

AI DASHBOARD CONCEPT MOCKUP



Conclusion

This Monitoring and Evaluation Framework is designed not merely as a tool for oversight, but as a strategic instrument for continuous growth and adaptive governance. It integrates clear, measurable

performance indicators with a dynamic National AI Dashboard, robust oversight from a multidisciplinary Advisory Board, structured feedback loops, specialized task forces focused on critical thematic areas, and periodic independent evaluations. Together, these components create an ecosystem of transparency, accountability, and continuous improvement, ensuring the National AI Roadmap remains a living strategy: ever-evolving, responsive, and deeply informed by stakeholder insights and national aspirations.

By embedding adaptive learning and multi-stakeholder engagement at every level, Thailand commits to an AI journey in which policy and practice are continuously aligned, and each success or setback becomes a stepping stone toward a more resilient, inclusive, and sustainable future. In the spirit of forward-looking governance, this framework reflects our collective determination not only to harness AI for economic transformation but also to safeguard Thailand's natural and cultural heritage, ensuring that true progress is measured by the nation's ability to imagine, adapt, and evolve with purpose.

RISK FACTORS AND CHALLENGES

Implementing a national AI strategy at the scale envisioned by Thailand’s roadmap is inherently complex, encompassing risks across economic, social, technological, and governance domains. Ethnographic interviews with policymakers, industry representatives, community leaders, and academic experts repeatedly highlighted the importance of proactive risk management. By identifying potential pitfalls early and embedding robust mitigation strategies, Thailand can maintain momentum and ensure that AI-driven transformation remains on track. This section examines the most critical risk categories, the specific challenges they present, and the measures embedded in the roadmap to address them (Brynjolfsson & McAfee, 2024a).

[Note: This section should be substantially updated after conducting a risk/stress test in a follow-up workshop.]

Economic and Financial Risks

A major concern raised by both public and private stakeholders is the availability of sufficient resources to drive AI initiatives, particularly during periods of economic uncertainty. In times of fiscal constraint, governments may divert funds from AI projects to more immediate priorities, slowing infrastructure deployment or reducing training programs. Similarly, private investors may hesitate if AI projects do not generate rapid returns (World Bank, 2023d).

Phased Investment Approach: To mitigate this, the roadmap recommends incremental or staged investments. Policymakers can start with pilot projects in critical sectors, such as agriculture or healthcare, and scale funding as tangible results and lessons emerge (International Monetary Fund, 2024).

Public–Private Co-Funding: Encouraging cost-sharing models (e.g., matching grants or venture co-investments) reduces the burden on any single entity. Interviews with startup incubators and large conglomerates revealed a strong interest in joint ventures where risks and rewards are shared (Thailand Development Research Institute, 2023b).

Adaptive Budgeting and Incentives: The roadmap calls for monitoring economic indicators—such as job creation, productivity gains, or new AI patent filings—to assess investment impacts. Underperforming initiatives can have their funds reallocated swiftly. Tax incentives or subsidies may also be introduced to stimulate private capital inflows during economic downturns (United Nations Development Programme, 2024c).

Avoiding Uneven Benefit Distribution

AI’s gains may concentrate in specific industries (e.g., finance, high-technology manufacturing) or regions (primarily Bangkok), potentially exacerbating inequalities (Organisation for Economic Co-operation and Development, 2024d).

Targeted Support for SMEs and Rural Areas: The strategy includes dedicated AI programs for SMEs and rural regions, ensuring productivity gains and job opportunities are more evenly distributed, is a priority emphasized by community organizations (Müller & Winskel, 2024).

Monitoring Economic Disparities: By tracking income levels, regional GDP, and AI adoption metrics across provinces, policymakers can identify lagging areas. Tailored incentives—such as specialized training vouchers or grants—can boost AI uptake in underserved locales (Ministry of Digital Economy and Society, 2023b).

Broad-Based Benefits in Public Tenders: When awarding government contracts for AI solutions (e.g., in infrastructure or e-government), procurement criteria will prioritize proposals that include plans to uplift local communities or SMEs, ensuring wide socio-economic benefits (Zhang, 2024).

By identifying potential pitfalls early and embedding robust mitigation strategies, Thailand can maintain momentum and ensure that AI-driven transformation remains on track.

Overinvestment or Poorly Targeted Investment

Lessons from the ROC illustrate the risks of top-down overinvestment. Between 2023 and 2024, over 500 data center projects were announced, with at least 150 completed in anticipation of an AI boom. Yet by the end of 2024, only about 10% of over 140 registered AI tool companies remained active (Acemoglu & Johnson 2023).

These examples highlight two key lessons: large-scale investments must align with real-world demand, and investment incentives must match industry needs (Thailand Board of Investment, 2024c).

Consequently, Thailand should pursue concentrated but carefully coordinated AI investments. The proposed National AI Dashboard will assist in calibrating funding to proven capacity and priority needs (McKinsey & Company, 2023b).

See Section 18.2 for further discussion.

Social and Workforce Risks

Perhaps the most pressing social concern, frequently raised by labor unions and educational institutions, is that AI-driven automation may displace workers, particularly in routine-intensive roles in manufacturing, agriculture, or services (Thailand National Statistical Office, 2024).

Upskilling and Reskilling Programs: Building on Section 9 of the roadmap, the government plans significant investment in vocational training, online courses, and public-private skill academies. The objective is to help workers transition into emerging AI-related jobs, such as data labeling, equipment maintenance, or process optimization (European Union Agency for Cybersecurity, 2023).

Collaborative Employer Initiatives: Large employers, including automotive and electronics manufacturers, will be incentivized to retrain their workforce rather than resort to layoffs. For example, DEPA may offer partial wage subsidies for employees participating in AI-focused programs (Taleb, 2023a).

Continuous Labor Market Monitoring: A real-time labor market dashboard, powered by AI analytics, will detect early signs of job displacement in specific sectors or regions. Government agencies can then respond proactively with interventions such as targeted job fairs or relocation assistance (KPMG, 2024a).

Cultural and Ethical Concerns

Ethnographic interviews revealed widespread apprehensions around data privacy, facial recognition, and algorithmic bias—particularly in credit scoring and law enforcement (Bank of Thailand, 2024b).

Transparent AI Systems: Public-sector AI deployments must disclose how decisions are made and which data are used, in alignment with ethical AI guidelines discussed in Section 5. This helps reduce fears of “black box” systems (Harvard Business Review Analytics Services, 2024).

Public Awareness Campaigns: Government agencies will run communication drives—through town halls, radio, or social media—to explain AI operations, privacy protections, and grievance channels. This approach was suggested by NGOs to counter misinformation and build public trust.

Ethics Committees and Community Input: High-stakes AI applications (e.g., policing or social welfare) will require review by ethics committees, including civil society representatives, who evaluate potential biases or cultural insensitivity in AI models.

Technological and Cybersecurity Risks

AI solutions must operate reliably even under challenging conditions. Stakeholders, including farmers and healthcare providers, expressed concerns about system failures due to poor data quality, software bugs, or a lack of local context.

Rigorous Testing and Validation: AI systems will undergo pilot phases in controlled environments—regulatory sandboxes for healthcare, test factories for manufacturing, and demonstration farms for agriculture. This approach, endorsed by EECi experts, allows developers to refine models based on real-world feedback.

Continuous Model Updates: The roadmap emphasizes regular model retraining and calibration, especially in dynamic sectors like weather forecasting or disease management. Local R&D, supported by Thai universities, ensures models remain relevant to evolving local conditions.

Quality Data Collection and Curation: Stakeholders emphasized robust data pipelines. In agriculture, extension workers can collect high-quality, region-specific data to feed AI models, reducing risks from incomplete or biased datasets.

Cyber Threats and Data Security

As AI systems become integral to critical infrastructure, cyberattacks pose significant risks. Successful breaches could disrupt essential services or leak sensitive data, undermining public confidence.

Integrated Cybersecurity Framework: AI solutions used by government agencies must meet cybersecurity standards and pass audits. Financial sector stakeholders support this approach, as they already adhere to strict data protection rules.

Incident Response Teams: Specialized units within MDES will coordinate rapid responses to cyber incidents, in partnership with private security firms and academic experts.

Local R&D for National Security: Reducing reliance on foreign AI technologies allows Thailand greater control over source code, encryption standards, and security patches, strengthening national cybersecurity.

Policy and Governance Risks

AI initiatives risk stalling if agencies fail to coordinate or if high-level support declines.

Dedicated Steering Committee and Advisory Board: As detailed in Sections 3 and 11, a high-level body backed by the Prime Minister's Office will oversee policies, budget allocations, and inter-ministerial collaboration, with clear accountability lines and regular reporting cycles.

Cross-Ministerial Task Forces: Sector-specific deployments (e.g., healthcare, agriculture, smart cities) will be managed by specialized task forces, mitigating siloed decision-making.

Incentivizing Agency Participation: Ministries may receive performance-based funding or recognition for successfully implementing AI programs, encouraging alignment with the national strategy.

Regulatory Lag and AI Hype

Technology evolves rapidly, and legal frameworks risk becoming outdated if they are not updated in parallel. There is also a danger that AI hype, amplified by media narratives or overly ambitious claims, may generate unrealistic expectations and subsequent disillusionment.

Adaptive Policy Framework: The roadmap proposes regular reviews and updates of AI regulations, potentially on a 12–18 month cycle. Policymakers would engage academic researchers, industry leaders, and civil society stakeholders to recalibrate regulatory provisions in response to emerging technologies and real-world implementation challenges.

A combination of phased investments, robust workforce upskilling, rigorous technology validation, and adaptive policy frameworks collectively systematically address potential pitfalls.

Realistic Goal-Setting and Transparency: By publishing KPIs and progress reports, the government can manage expectations. Stakeholders from TDRI and NESDC recommended using data-driven simulations to forecast outcomes and avoid overpromising.

Sandboxing Novel AI Services: For innovations such as autonomous delivery drones or AI-based legal services, regulatory sandboxes allow controlled experimentation, balancing innovation with consumer protection.

Mitigation Strategies and Adaptive Planning

From pilot to national rollout, each AI initiative will include a structured risk assessment. Policymakers, technologists, and community representatives will jointly evaluate potential pitfalls—whether financial, social, or technical—and devise contingency plans.

Learning from Pilots: If an AI solution underperforms during a pilot phase, such as a smart city traffic system failing to reduce congestion, lessons learned will guide adjustments before a broader rollout. This iterative approach ensures continuous improvement, cost-effectiveness, and minimized resource waste.

Stakeholder Engagement and Feedback Loops: Regular forums, workshops, and online platforms allow citizens, NGOs, and private firms to voice concerns early. These feedback loops enable the government to pivot quickly if public sentiment or market conditions shift.

Agile Master Planning, Stress Testing, and Simulation Tools

Thailand can pair a virtual “digital twin” of the economy with a lean, test-and-learn methodology to rehearse scenarios before they occur, from macroeconomic shocks to extreme weather, then pivot rapidly when real-world conditions change.

Pilot, Prove, Propel: Begin small, whether in a single factory line or a local farm collective, and expand only once real-world data demonstrates measurable success.

Simulate with a Digital Twin: Policy “what-ifs”—tax adjustments, tariff shocks, or supply-chain disruptions—can be fed into high-speed digital twins, showing projected impacts across sectors on the national dashboard before committing budgets.

Adapt Budgets on the Fly: Funding, timelines, and training programs are linked to live KPIs and real-time alerts, allowing resources to flow to initiatives that perform while unproductive plans are scaled back.

By combining AI-driven stress tests with agile sprints, Thailand transforms its strategy from a static document into a dynamic cycle of resilience, innovation, and growth, always prepared for unforeseen challenges.

Cultivating a Risk-Aware Culture

Ethnographic interviews emphasized that success depends not only on formal policies but also on fostering a mindset characterized by transparency and adaptability:

Interdisciplinary Collaboration: Bringing together data scientists, sociologists, economists, and local community leaders ensures AI projects are evaluated from multiple perspectives. Stakeholders consistently identified diverse expertise as critical to success in complex initiatives.

Communication and Trust-Building: Public trust is essential. Regular project updates, open data portals, and clear accountability mechanisms foster a culture where risks are acknowledged and managed openly rather than hidden.

Ongoing Capacity Building: Training programs for government officials, private sector managers, and civil society representatives on AI governance and risk management enable stakeholders to detect early warning signs and respond effectively.

Conclusion: A Resilient Path Forward

No large-scale transformation is without uncertainties. By acknowledging economic, social, technological, and governance risks from the outset, Thailand's AI roadmap is grounded in preparedness. Phased investments, robust workforce upskilling, rigorous technology validation, and adaptive policy frameworks collectively systematically address potential pitfalls.

Crucially, risk management is recognized not as a one-time exercise but as an ongoing, collaborative process. Through agile master planning, continuous stakeholder engagement, and transparent reporting, Thailand can navigate the complexities of AI adoption while maintaining its overarching vision: an inclusive, innovation-driven, and ethically grounded AI future.

STRATEGIC IMPERATIVES AND KEY RECOMMENDATIONS

Translating Thailand’s national AI strategy from conceptual roadmap to practical reality requires adherence to several strategic imperatives. These imperatives are informed by insights from policymakers, business leaders, researchers, and community stakeholders captured in the Ethnographic Interview Analysis. By following the recommendations outlined below, Thailand can ensure that AI-driven transformation remains agile, inclusive, and aligned with broader national development goals. The key is to adopt an adaptive approach: leveraging data-driven insights, continuous stakeholder engagement, and ethical guardrails to sustain momentum and maintain public trust (United Nations Development Programme, 2024d).

Adopt an Agile Master Planning Approach

The rapid evolution of AI technology demands a planning process that is flexible rather than static, enabling Thailand to respond to emerging trends and pivot when necessary. Ethnographic interviews repeatedly highlighted the pitfalls of rigid, long-term plans that cannot accommodate breakthroughs or course corrections. An “agile masterplan” acknowledges that no single blueprint can perfectly predict the future of AI innovation (World Bank, 2023e).

Iterative Policy Cycles: Policymakers will review and refine the AI strategy at defined intervals (e.g., every 12–18 months). These cycles mirror software development sprints, where lessons from small-scale pilots inform broader deployment. For instance, if a precision agriculture pilot succeeds, it can be scaled swiftly; if it underperforms, lessons learned guide recalibration (Organization for Economic Cooperation and Development, 2024e).

Built-In Feedback Loops: Real-time data on AI adoption, such as telemedicine applications usage, job placement for AI-trained workers, or improvements in manufacturing productivity, will allow authorities to identify effective interventions. A dedicated analytics unit within MDES could serve as the “eyes and ears” of the masterplan, providing dashboards that inform timely adjustments (Ministry of Digital Economy and Society, 2023c).

Adaptive Budgeting and Resource Allocation: Rather than committing large sums upfront for multi-year projects, phased funding allows the government to unlock additional resources when early milestones show promise or redirect funds if initiatives stall. This approach aligns with the risk management principles outlined in Section 12, ensuring that no single project can jeopardize the broader strategy (Gartner, Inc, 2024b).

Simulation and Digital-Twin Stress Testing: Integrate a digital twin of Thailand’s economy and critical infrastructures into the planning process and run dynamic, AI-powered stress tests. By simulating scenarios such as tariff shocks, extreme weather events, supply-chain disruptions, or sudden AI breakthroughs, planners can observe potential ripple effects before committing resources. These simulations reveal hidden vulnerabilities, validate contingency plans, and convert uncertainty into actionable insights (TDRI, 2023).

Practical Implementation Steps

Pilot Phase Implementation: Launch small-scale pilots in key domains, such as AI-driven logistics or rural telehealth, before scaling nationally (World Economic Forum, 2024c).

Cross-Ministry Coordination: A high-level steering committee (see Sections 3 and 11) will monitor pilot outcomes and authorize expansions or pivots (Accenture, 2023b).



Transparent Reporting: Publish quarterly or biannual progress reports, detailing successes, setbacks, and budget use. This transparency fosters accountability and builds trust among citizens and stakeholders (MIT Sloan Management Review, 2024).

Utilize Macro-Economic Simulation Tools

AI initiatives can exert wide-ranging economic impacts, from labor market shifts to national GDP growth. Interviews, particularly with TDRI economists, underscored the importance of rigorous modeling to anticipate how AI investments may affect employment, exports, and income distribution (McKinsey & Company, 2023c).

Scenario Planning and Stress Testing: Simulation tools allow policymakers to explore different “what-if” scenarios. For instance, they can examine how prioritizing AI funding for agriculture affects rural employment compared to emphasizing AI in manufacturing. Running such simulations enables trade-offs to be evaluated and investments to be prioritized based on projected societal returns (Asian Development Bank, 2024).

Early Risk Detection: Models can flag unintended consequences, such as sector-specific labor displacement or unsustainable environmental pressures from energy-intensive AI data centers. Early identification of these red flags allows for targeted mitigation strategies (Bostrom & Dafoe, 2023).

Continuous Calibration: With the availability of real-world data, such as job creation, tax revenues, or patent filings, models can be updated. This iterative calibration refines forecasts and helps the government maintain an agile stance in resource allocation (Brynjolfsson & McAfee, 2024b).

Practical Implementation Steps

Dedicated Modeling Team: Establish a cross-agency analytics group collaborating with academic institutions to maintain and update macro-economic models (Oxford Insights, 2024).

Integration with Policy Cycles: Consult simulation outputs before major funding decisions or policy changes to assess potential outcomes and inform strategy adjustments (Taleb, 2023b).

Public Accessibility of Findings

Summaries of simulation findings, particularly those related to job creation and GDP impacts, should be shared with businesses, NGOs, and civil organizations. Such dissemination would promote inclusive dialog on AI’s economic direction and support informed participation across sectors (Harari, 2024).

Launch High-Level Forums and Ongoing Stakeholder Workshops

A recurring theme in the roadmap consultations was the need for continued collaboration and alignment among stakeholders. Although a national AI summit can help kickstart enthusiasm, sustained engagement is crucial for long-term success (KPMG, 2024b).

National AI Summit or Conference: By convening government leaders, industry executives, researchers, and international experts, Thailand can showcase early achievements, unveil new initiatives, and announce strategic partnerships. The visibility of such an event signals a strong national commitment, encouraging local entrepreneurs, foreign investors, and the broader public to support AI development (Deloitte, 2023).

Regular Thematic Workshops: Rather than relying on one-off gatherings, the roadmap calls for the establishment of institutionalized working groups focused on priority areas such as AI in healthcare, data governance, and workforce development.

The visibility of such an event signals a strong national commitment, encouraging local entrepreneurs, foreign investors, and the broader public to support AI development.

These groups would meet regularly to exchange best practices, monitor progress, and address implementation challenges (PwC, 2024).

Accountability and Knowledge-Sharing: These forums also provide mechanisms for mutual accountability. For example, if a government agency commits to piloting AI in e-governance, or a private firm pledges to train a defined number of engineers, periodic reviews can help ensure that such commitments are fulfilled (IBM Institute for Business Value, 2023).

Practical Implementation Steps

Annual AI Congress: Organize a large-scale national event each year, rotating host locations across regions to promote geographic inclusivity and regional participation (Google AI, 2024).

Sector-Specific Task Forces: Establish smaller, specialized task forces to address domain-specific challenges, such as AI adoption in tourism or environmental management (Thai Ministry of Industry, 2024).

Digital Collaboration Platforms: Develop online collaboration platforms to enable continuous engagement beyond in-person meetings. These platforms can serve as repositories for documents, track action items, and monitor progress in real time (European Commission, 2023d).

Engage the Public and Build Trust in AI

One of the clearest messages from community leaders and civil society representatives was the need to strengthen public understanding of AI. Misconceptions related to job displacement, privacy risks, or the perceived complexity of AI can hinder adoption and generate public resistance (ASEAN Secretariat, 2024b).

Public Outreach Campaigns: Government agencies, in collaboration with NGOs and technology companies, can design multimedia campaigns that illustrate the everyday benefits of AI. Examples may include farmers increasing yields through AI-enabled tools or small businesses expanding through AI-driven e-commerce solutions (Amazon Web Services, 2023).

Local Community Tech Fairs: Organizing traveling exhibitions in rural areas and smaller cities can demystify AI. These events would allow citizens to interact with chatbots, observe simple AI demonstrations, and ask questions directly. Ethnographic interviews suggest that hands-on engagement builds trust more effectively than abstract explanations (Stanford HAI, 2024).

Interactive Feedback Channels: Citizens should have accessible avenues to express concerns or share ideas about AI, whether through social media, community radio programs, or local government offices. Government listening tours, wherein officials visit different provinces to collect public input, were frequently recommended as a way to narrow the gap between policymakers and everyday citizens (International Telecommunication Union, 2023).

Addressing Ethical and Privacy Concerns

Transparent Data Practices: Public agencies should clearly communicate what data are collected, how the data are used, and what safeguards are in place. Such transparency can reduce fears related to surveillance or undisclosed agendas (NVIDIA, 2024).

Culturally Sensitive Communication: In provinces with distinct cultural norms or languages, the use of local translators or cultural mediators can help ensure that AI-related messaging is accessible and culturally resonant. This issue was emphasized by community leaders advocating for inclusive communication strategies.

Citizen Oversight Mechanisms: Communities may establish advisory boards or ethics committees to provide feedback on local AI deployments, such as smart city initiatives or healthcare applications.

Promote Economic Resilience through AI

AI presents an opportunity to broaden Thailand's economic base beyond its traditional strengths in manufacturing and tourism. The roadmap envisions leveraging AI to cultivate new growth areas, such as digital services, creative content, and sustainable technologies, while modernizing established sectors.

Support for Emerging Industries: By targeted grants, incubation programs, and special economic zones for AI startups focused on areas such as climate technology, fintech, and edtech, Thailand can position itself as a

leader in emerging economic frontiers. Stakeholders from the startup ecosystem emphasized the importance of cross-sector collaboration that integrates AI with local cultural and environmental contexts.

Upgrading Manufacturing and Tourism: Existing industries can be strengthened through AI-driven automation, predictive maintenance, and advanced data analytics. During stakeholder consultations, manufacturing executives highlighted the need to shift from low-value to high-value production. AI can also enhance tourism by enabling personalized itineraries and improving crowd management and operational efficiency.

Resilience Against External Shocks: Diversifying AI applications across multiple sectors can reduce Thailand's vulnerability to global economic downturns or disruptions affecting a single industry. This approach reflects the risk management perspective outlined in Section 12, ensuring that if one sector underperforms, others can help sustain overall economic growth.

Long-Term Vision for a Future-Proof Economy

Encouraging AI in Traditional Crafts and Services: Local artisans and small tourism operators can apply AI to expand market reach, improve supply chain, and strengthen customer engagement, thereby bridging tradition with technology.

Green AI Initiatives: Using AI to optimize energy use, manage waste, and reduce pollution supports both environmental sustainability and economic opportunity. This aligns with the sustainability priorities frequently emphasized by environmental experts during interviews.

Innovation Ecosystem Development: By cultivating a continuous pipeline of AI researchers, entrepreneurs, and corporate champions, Thailand can remain adaptable to emerging technologies, such as quantum computing and advanced robotics, well beyond the current wave of AI development.

Build Human Capital at Scale

The most frequently cited challenge in stakeholder interviews was the shortage of skilled AI professionals, including data scientists, machine learning engineers, and AI ethicists. Without robust talent pipelines, even well-sourced AI initiatives risk underperforming.

AI-Infused Curricula in Schools and Universities: The roadmap calls for early exposure to coding and data literacy at the primary and secondary levels. At the tertiary level, universities should expand AI degree offerings and introduce interdisciplinary programs that integrate AI with fields such as agriculture, healthcare, and tourism.

Public-Private Skill Academies and Apprenticeships: Large Thai firms, working in partnership with government agencies, can establish AI training centers. Workers undergoing mid-career transitions, including those displaced by automation, can retrain for AI-related roles. Interviewees from the NESDC emphasized the importance of linking theoretical instruction with hands-on project experience.

Attracting and Retaining Global Talent: To accelerate knowledge transfer, the roadmap recommends streamlined work visa processes for foreign AI experts and returning members of the Thai diaspora. Competitive research grants and prestigious AI research chairs at leading universities can encourage overseas Thai talent to return, while also attracting international researchers to local institutions.

Scaling Training Across Regions and Demographics

Localized Training Hubs: Rural and underserved regions require tailored training programs, potentially delivered through community colleges or vocational institutions, to ensure AI literacy extends beyond major urban centers.

Focused Scholarships and Grants: Government-funded scholarships should target underrepresented groups, such as women, ethnic minorities, and students from low-income backgrounds, to promote equitable access to AI-related careers.

Industry-Academia Collaboration: Promoting corporate sponsorship of AI laboratories or co-designed curricula can strengthen the pipeline of job-ready graduates and reduce the frequently cited mismatch between academic training and industry requirements.

Drive Inclusive Growth and Equal Access

Sections 7 and 11 emphasize that inclusivity is a foundational pillar of Thailand’s AI vision. Building on these principles, the roadmap requires that AI initiatives, particularly those supported by public funding, clearly articulate how they will benefit marginalized populations and remote communities.

Metrics for Inclusivity: Government agencies can monitor the geographic distribution of AI investments (urban versus rural) as well as demographic coverage (gender, age, and income brackets). This data-driven approach helps ensure that AI-related resources are not concentrated in a limited number of cities or dominated by large corporations.

Outreach Quotas and Targets: The government may establish targets, such as allocating a defined percentage of AI training scholarships to rural youth or requiring AI-enabled healthcare programs to reach a minimum number of remote clinics.

Continuous Monitoring and Corrective Action: If disparities emerge, for example, when certain provinces lag significantly behind in AI adoption, the steering committee can recalibrate incentives or introduce targeted interventions to promote more balanced outcomes.

Ultimately, the success of this national AI initiative depends on sustained commitment, transparent processes, and a willingness to adapt at a higher level.

Social Cohesion and Avoiding Digital Divides

Multi-Stakeholder Alliances: Partnerships with NGOs, local cooperatives, and community organizations can help ensure that AI solutions reflect local needs, social contexts, and cultural norms.

Public–Private Partnerships for Connectivity: Many remote regions continue to lack reliable broadband access. Infrastructure development must therefore accompany AI initiatives to prevent a “tech gap” that excludes certain communities from participation.

Localized AI Solutions: AI chatbots, educational platforms, and public service tools should support local languages and dialects. Interviewees from border provinces cautioned that a uniform, one-size-fits-all solution risks excluding non-Thai speakers and minority groups.

Ensure Technological Sovereignty

Although Thailand actively pursues global AI partnerships, as discussed in Section 6, it also seeks a degree of technological self-reliance to protect national interests and preserve cultural specificity.

Homegrown AI Platforms and Tools: Public investment in domestic software developers can encourage the creation of Thai-language AI applications and open-source frameworks. This approach reduces reliance on foreign platforms that may not fully reflect Thailand’s linguistic or cultural context.

Technology Transfer Requirements: In partnerships with multinational AI firms, contractual provisions may require technology transfer, such as training Thai engineers or sharing source code to enable local customization.

Building Domestic R&D Capabilities: Through sustained public funding of AI research institutes, universities, and innovation hubs, Thailand can strengthen domestic intellectual property generation.

Academic stakeholders emphasized the importance of producing original AI research rather than relying primarily on imported solutions.

Securing Data and Infrastructure

Data Sovereignty Policies: Clear regulatory frameworks should ensure that sensitive datasets, like national healthcare records and strategic economic information, remain under Thai jurisdiction.

Resilience Against External Pressures: In an environment of shifting geopolitical dynamics, domestic AI expertise and infrastructure can reduce exposure to external supply chain disruptions or political tensions that may affect access to critical technologies.

Promote Ethical and Responsible AI Use

Sections 5 and 12 outline the ethical and privacy challenges associated with AI deployment. The roadmap acknowledges that as AI expands into sensitive domains, such as finance, law enforcement, and social welfare, new ethical risks will continue to arise.

Regularly Updated Guidelines: An inter-ministerial ethics committee, working alongside civil society representatives, should periodically revise ethical AI guidelines to address emerging risks, including deepfakes and the misuse of generative AI in media.

Enforcement and Accountability: In addition to issuing guidelines, the government will establish monitoring mechanisms to ensure compliance. Organizations that violate ethical standards, such as deploying AI systems that reinforce bias, face penalties or the withdrawal of public funding.

Regional and Global Cooperation: Thailand intends to participate actively in international platforms, including ASEAN AI ethics dialogs and United Nations-affiliated initiatives, to exchange best practices and contribute to global norm-setting. This engagement reinforces Thailand's standing as a responsible AI actor.

Public Trust as a Cornerstone

Independent Oversight Bodies: Appointing ombudspersons or independent commissions to address AI-related grievances provides citizens with formal avenues for redress when AI-driven decisions cause harm or unfair treatment.

Transparent Algorithmic Impact Assessments: Public agencies deploying high-stakes AI systems (e.g., in policing or judicial decision-making) should conduct and publish algorithmic impact assessments to enable informed public scrutiny.

Education on AI Ethics: Training programs for civil servants, business leaders, and AI practitioners should incorporate instruction on bias mitigation, data protection, and ethical decision-making. Embedding these principles at all levels helps ensure that responsible AI practices are institutionalized from the outset.

Accelerate Public Sector Innovation with AI

When government agencies adopt AI solutions effectively, they lead by example by demonstrating feasibility, building confidence, and creating reference models for the private sector. Ethnographic interviews indicate that civil servants often seek more advanced tools to improve service delivery but lack structured guidance and institutional support.

AI Labs in Government Ministries: Each major ministry, such as Health, Education, and Industry, can establish small AI labs to pilot solutions that address internal operational challenges, faster document processing, and policy impacts analysis. These labs can function as centers of excellence, disseminating best practices across agencies.

Upskilling Civil Servants: Beyond technical specialists, frontline staff and managerial personnel require foundational AI literacy to advocate for and sustain initiatives within their departments. Training should include data analytics, process redesign, and change management to ensure AI adoption extends beyond back-office functions.

Open Data for Innovation: Government entities that generate high-value datasets, such as traffic flows, public health statistics, and agricultural data, should be encouraged to release anonymized versions for the public. This enables entrepreneurs and researchers to develop AI-driven solutions, strengthening a broader innovation ecosystem around public services.

Demonstrating Tangible Public Benefits

Faster Service Delivery: AI-enabled chatbots and digital forms can reduce administrative bottlenecks, enabling citizens to renew licenses or access social services more efficiently.

Data-Driven Policymaking: By analyzing real-time data on citizen needs, public health patterns, and infrastructure utilization, policymakers can allocate resources more effectively, narrowing the gap between policy intent and real-world outcomes.

Boosting Public Confidence: Each successful government-led AI initiative, such as reduced hospital waiting times or improved traffic management in Bangkok, can serve as a demonstrative case study, encouraging further adoption across both public and private sectors.

Position Thailand as a Regional AI Leader

The roadmap concludes with a vision that extends beyond national borders. Through strategic partnerships, technology diplomacy, and the promotion of domestic AI innovations, Thailand can position itself as a leading AI hub in Southeast Asia and a recognized contributor on the global stage.

Regular International Conferences: Hosting events such as an annual “AI in ASEAN” summit can attract researchers, investors, and policymakers from across the region. Thai AI startups gain international visibility, while foreign firms may view Thailand as an entry point to the wider ASEAN market.

Collaborative Regional Projects: Joint R&D initiatives, such as an AI center of excellence focused on climate resilience or public health, can bring together neighboring countries. Thailand’s role in coordinating these efforts reinforces its position as a regional technology leader.

Benchmarking and Best Practice Exchange: Thailand should regularly benchmark its AI progress against leading jurisdictions, including Singapore, the ROK, and the EU, and adapt relevant lessons. Active engagement with global AI ethics councils and innovation alliances positions Thailand as both a learner and a contributor.

Cultivating a Global AI Brand

International Marketing and Outreach: Government agencies can collaborate with Thai embassies and trade missions to promote Thai-developed AI solutions internationally, supporting exports and cross-border investment.

Showcasing Cultural Synergies: By embedding Thai cultural values, such as compassion and community orientation, into AI applications, Thailand can differentiate its offerings. Illustrative examples include ethically grounded frameworks inspired by Buddhist principles or community-based AI tools for rural development that resonate with socially conscious global audiences.

Talent Attraction: Over time, a strong international reputation for AI innovation can help attract top-tier researchers, entrepreneurs, and venture capitalists, further accelerating the growth and maturity of Thailand’s AI ecosystem.

Conclusion

Thailand's transition toward an AI-enabled future depends on the successful implementation of these strategic imperatives, ranging from agile master planning and macroeconomic modeling to inclusive engagement, large-scale talent development, and strong ethical governance. Each recommendation is grounded in insights drawn from the Ethnographic Interview Analysis, ensuring that the roadmap reflects local realities and diverse stakeholder perspectives. With these priorities guiding implementation, Thailand is well-positioned not only to adopt AI technologies but also to emerge as a leader in shaping its responsible and impactful use across Southeast Asia and the global community.

THE NEXT BOLD STEPS FOR THAILAND

Thailand now has a rare and timely opportunity to apply AI and its associated technologies in a comprehensive manner, to shape a future in which the country's economic growth, social development, and innovative capacity all reach exceptionally high levels (Organization for Economic Co-operation and Development, 2024f). Ultimately, however, success will require one additional ingredient: boldness.

Accordingly, this final chapter does not focus on goals that are merely reasonable or easily achievable. Instead, it concentrates on stretch goals that are, by their nature, riskier than conventional objectives. While it would be imprudent to allocate all national resources to such ambitions, it is equally necessary to push beyond the comfort zone escape the middle-income trap.

By investing more decisively in advanced AI technologies and by doubling down on the development of AI proficiency among Thailand's population, while governing with foresight and ethical responsibility, the country can ensure that the benefits of AI reach all segments of Thai society. Research by economists Daron Acemoglu, Simon Johnson, and James Robinson, winners of the 2024 Nobel Prize in Economic Sciences, argues that a societally inclusive AI strategy is more likely to sustain national prosperity throughout the 21st century than a societally extractive alternative. In this way, AI can be harnessed to enhance the well-being of all Thai people, unlock the latent potential of rural communities, and preserve the cultural heritage that defines the nation, demonstrating that modernization and tradition can advance together (World Economic Forum, 2023b).

This emphasis on boldness does not imply the adoption of unrealistic stretch goals or a failure to understand the prerequisites for successful AI development and deployment. For example, Sarvam AI was promoted as India's largest AI startup, with a valuation of approximately USD1 billion. However, when it launched its flagship large language model, the rollout attracted only 23 downloads in its first two days. This 24-billion-parameter model was widely viewed as a milestone for a sovereign Indian language AI. By contrast, an open-source large language model developed by two Korean college students accumulated 200,000 downloads over a similar period.

The underlying issue was not a lack of technical capability but insufficient attention to user needs. A comparable challenge was observed in the United States within the Small Business Innovation and Research program funded by the National Science Foundation (NSF). This gap was addressed when the Foundation introduced the Innovation Corps program, which emphasized customer-centric design thinking, an early precursor to the approach later incorporated into the associated AI training program referenced in this Roadmap. The results were substantial: in subsequent cohorts, iCorp trainees from universities launched more than 1,200 businesses and raised approximately USD3 billion in follow-on funding. These examples highlight that if stretch goals for AI are pursued, they must be matched with adequate support structures, funding mechanisms, and practical tools. However, the essential first step remains the willingness to believe that such ambitious outcomes are possible.

By drawing on Thailand's strengths, including its vibrant culture, strategic geographic position, and emerging technology ecosystem, and by pairing these with sustained investment, strong policy frameworks, and multi-stakeholder collaboration, the nation can position AI as a catalyst for prosperity, equity, and global leadership (United Nations ESCAP, 2023).

At the core of this vision lies confidence in the potential of the Thai population to excel once meaningful opportunities are made available. Committing to this belief requires boldness. As Goethe famously observed, "Boldness has genius, power, and magic in it."

FIGURE 7

THAILAND'S BOLD JOURNEY TO AI READINESS

THAILAND'S BOLD JOURNEY TO AI READINESS

BY INVESTING AGGRESSIVELY IN AI TECHNOLOGY AND THE THAI PEOPLE, THE BENEFITS OF AI COULD REACH ALL OF THAI SOCIETY, BRINGING PROSPERITY IN THE 21ST CENTURY. THE NEXT BOLD STEPS TO UNDERTAKE SHOULD INCLUDE:



FORGE A HIGH-IMPACT AI STEERING COMMITTEE

Unite every ministry under one visionary council—smashing silos, supercharging collaboration, and giving every citizen a stake in Thailand's AI destiny.



LAUNCH A PORTFOLIO OF "WIN-FAST" AI PILOTS

Seed projects in proven domains—agriculture, healthcare, tourism—but don't be afraid of moving out of the comfort zone—to build a homegrown *DeepSeek*-inspired moonshot venture.



REVOLUTIONIZE AI EDUCATION & UPSKILLING

Go way beyond 25,000 annual trainees: deploy AI-powered, hyper-scalable e-learning ecosystems to equip millions in a single year—catapulting Thailand to global AI leadership.



IGNITE A NATIONWIDE AI MOVEMENT

Transform "Centers of Excellence" into a living festival—cross-sector innovation nexuses in every province. Brand AI as Thailand's new Songkran: a vibrant, communal celebration of technology, creativity, and national pride

Make every country envy the passion and beauty of a truly Thai AI revolution.



CHAMPION AN AGILE NATIONAL AI MASTER PLAN & AI READINESS DASHBOARD

Swap rigid roadmaps for real-time playbooks. Scan, adapt, and stress test visions at the speed of AI. Then design and deploy a National AI Readiness Dashboard to make sure you stay ahead, every step of the way into the future.



ELEVATE AI GOVERNANCE WITH A SINGULARLY THAI APPROACH TO AI ETHICS

Upgrade the PDPA, mandate independent fairness audits, and inaugurate a public AI Ethics Council—guaranteeing trust, transparency, and Thai values at every algorithmic turn.



SUPERCHARGE RURAL AI HUBS

Blanket underserved provinces with high-speed broadband, telemedicine, AI-driven farming tools, and brainpower—bridging the urban-rural divide overnight.

Balancing Ambition and Authenticity

A recurring theme throughout the Roadmap is the need for balance between ambition and authenticity. Thailand's aspiration to emerge as a leader in AI should not come at the expense of its national identity. Conversely, AI offers an opportunity to amplify the qualities that already distinguish Thailand, including the warmth of its people, the creativity of its entrepreneurs, and the resilience of its communities (Asian Development Bank, 2023e; Boston Consulting Group, 2024b; McKinsey Global Institute, 2023e; Ministry of Digital Economy and Society, 2024; World Bank, 2024f).

But ultimately, success will require one more ingredient: boldness. Therefore, in this final chapter, we will focus not on the reasonable goal but on stretch goals.

Ambition for Global Relevance

By prioritizing high-impact sectors such as manufacturing, agriculture, healthcare, tourism, and financial services, Thailand positions itself to compete more effectively with regional peers, including Singapore and the ROK (PricewaterhouseCoopers, 2023). This ambition is critical for attracting FDI, attracting top-tier AI talent, and building an international reputation for Thai innovation. The strategic objectives outlined in the Roadmap show how each of these industries can integrate AI to enhance productivity and expand into new markets (UNESCO, 2024b).

Authenticity Through Culture and Ethics

AI adoption in Thailand should be grounded in national values. Interviewees frequently highlighted principles rooted in Buddhism and local traditions, including empathy, compassion, and collective well-being (Microsoft & IDC, 2023b). These values can inform the deployment of AI systems, such as ensuring that healthcare technologies reach elderly populations in rural areas or that tourism platforms promote local culture respectfully. By embedding cultural and ethical considerations into AI governance, Thailand can develop an approach that resonates with its citizens and offers a compelling alternative to purely profit-driven models of AI adoption (Google, 2024).

From Governance to Infrastructure

Building an AI-enabled Thailand requires a strong set of foundational elements (Amazon Web Services, 2023; Ericsson, 2024):

Strategic Alignment and Guiding Principles

AI initiatives must align with national development frameworks, including Thailand 4.0 and the 20-Year National Strategy. Stakeholders emphasized that AI should not be pursued in isolation but integrated into broader policy agendas that enhance competitiveness, improve public services delivery, and uplift communities (Gartner, 2023b). Aligning AI initiatives with these existing strategies will help ensure efficient allocation of resources and reinforce AI's role in supporting, rather than diverting from, Thailand's long-term development objectives (IBM Institute for Business Value, 2024).

Robust Governance and Stakeholder Ecosystems

Multiple government agencies currently manage different components of the AI adoption process. A recurring recommendation from interview participants was the establishment of a National AI Steering Committee or Advisory Board to set clear national objectives, harmonize policies, and drive effective cross-ministerial coordination. Specialized task forces focused on data governance, AI ethics, and sector-specific implementation would then report to this central body (Accenture, 2023c). Additionally, by involving diverse segments of Thai society in policy consultations and pilot initiatives, Thailand can develop AI strategies that reflect local contexts and strengthen broad-based trust in technological systems (Stanford University Human-Centered AI, 2024).

Human Capital and Education

The successful deployment of AI depends on a workforce with the skills to design, manage, and apply these technologies effectively. Findings across all projects consistently highlight the need for large-scale upskilling across demographic and professional groups, including students, mid-career professionals, business leaders, workers, and government officials.

Formal education pathways can introduce AI literacy as early as primary school, while universities and technical institutes focus on advanced competencies such as machine learning, data science, and AI systems engineering. In parallel, vocational programs, online learning platforms, and short-term workshops can enable working adults to adapt to AI-driven changes in the labor market (National Statistical Office Thailand, 2024).

By complementing these initiatives with standardized AI certification frameworks and tax incentives for employer-sponsored training, Thailand can accelerate the development of a workforce that is both AI-aware and AI-capable (Ministry of Industry Thailand, 2024).

Digital Infrastructure

Reliable, high-speed digital connectivity forms the backbone of effective AI deployment. Interviewees from rural regions frequently emphasized that inconsistent Internet access constrains the adoption of telemedicine, e-learning, and advanced agricultural technologies. The phase rollout of 5G networks, beginning in industrial zones and extending to underserved and remote areas, would enable data-intensive AI applications such as predictive maintenance in manufacturing and real-time traffic management in urban centers (National Science and Technology Development Agency, 2024b). Equally critical are investments in cloud computing infrastructure and local data centers capable of handling the computational demands of AI models, while addressing data sovereignty and privacy requirements. By strengthening cybersecurity frameworks, encryption protocols, and system redundancy through strong backup mechanisms, Thailand can ensure that its digital infrastructure remains secure, resilient, and trusted (Thailand Board of Investment, 2024d).

AI Research and Innovation

To achieve long-term competitiveness, Thailand must move beyond the passive import of AI technologies. Establishing world-class AI research centers, particularly through partnerships with universities and global firms, would support the development of domestic innovation capacity. These centers could specialize in strategically important domains, including healthcare diagnostics, natural language processing tailored to Thai languages and dialects, and climate and environmental modeling. By promoting experimentation, intellectual property generation, and the creation of spin-off startups, Thailand can build a sustainable foundation for AI leadership, rather than relying on short-term gains from externally developed solutions.

Turning Vision into Action: Key Sectors

Certain economic sectors present immediate, high-impact opportunities for AI deployment. These sectors can function as practical testing grounds where AI applications demonstrate value, generate tangible economic returns, and strengthen public confidence in emerging technologies.

Manufacturing and Industry

By integrating AI into production processes through applications such as robotics, predictive maintenance, logistics optimization, and quality control, Thailand can strengthen its position within global manufacturing supply chains. Policy incentives for SMEs should include tax relief and training subsidies to encourage firms of all sizes to modernize operations and improve productivity.

A progressively more technologically capable industrial base is likely to attract additional investment and contribute to the diversification of Thailand's export portfolio.

Precision farming, AI-enabled pest control, and smart irrigation can substantially increase agricultural yields while reducing environmental strain.

The coming years will be a time of great challenges. Thailand's economic growth rate has already been stalled for a decade, and significant efforts are required to boost GDP growth.

Agriculture

AI can also optimize agricultural supply chains by connecting farmers more directly with consumers and distributors. As rural communities experience higher incomes and improved resilience to

climate-related shocks, AI shifts from an abstract concept to a practical tool for empowerment and economic stability.

Tourism

AI-driven chatbots, multilingual concierge services, and personalized itineraries can help Thailand differentiate itself within an increasingly competitive global tourism market. Predictive analytics can also support local governments in managing visitor flows, safeguarding cultural heritage sites, and mitigating the risks of overtourism. The synergy between AI innovation and Thailand's tradition of hospitality has the potential to elevate the nation's brand as a world-class destination.

Healthcare

Interviews with hospital administrators and healthcare professionals revealed a strong interest in expanding telemedicine, AI-assisted diagnostics, and predictive analytics for epidemic preparedness and management. These applications not only enhance patient outcomes but also reduce healthcare costs and expand access for rural and underserved populations. As Thailand continues to grow its medical tourism sector, AI-driven quality assurance systems and personalized treatment recommendations can further distinguish Thai hospitals in the global healthcare market. A critical priority in this context is the development of improved translation, lip-syncing, and voice-cloning technologies to support international patient engagement and global marketing initiatives.

Smart Cities

AI offers significant potential for addressing urban challenges such as traffic congestion, air pollution, and inefficient resource use. By equipping local governments with real-time data dashboards and decision-support systems, AI can contribute to more livable, sustainable, and responsive cities. Citizens benefit directly through reduced commute times, improved waste management, and enhanced public safety. Successful pilots in major metropolitan areas could serve as models for similar initiatives in smaller municipalities nationwide.

Financial Services

The financial sector represents a strong candidate for AI adoption, with applications ranging from automated credit scoring for microloans to AI-based fraud detection systems. These innovations can expand financial inclusion for the unbanked and underbanked, particularly in rural regions, while strengthening overall economic resilience. To sustain public trust as AI-driven financial services expand, clear regulatory frameworks, transparent data governance practices, and strong consumer protection mechanisms will be essential.

AI as an Industry

To capture the full economic potential of AI, Thailand must transition from being primarily a consumer of imported AI solutions to becoming a developer and exporter of domestically produced technologies. The global AI tools market is already valued in the trillions of dollars, and by investing strategically in R&D, nurturing startup ecosystems, and building world-class data centers and semiconductor fabrication facilities, Thailand can position itself to capture high-value technology exports and generate well-paid, knowledge-intensive employment. Public-private research laboratories, venture financing incentives, and targeted tax benefits can further enable local firms to achieve breakthroughs in areas like natural language processing, computer vision, and edge AI hardware. Even a modest share of the global AI market would deliver substantial gains in GDP, enhance productivity across every sector, and anchor Thailand's reputation as a regional innovation leader.

Inclusive, Equitable, and Ethical AI

All stakeholders involved in this Roadmap emphasized that AI deployment must be inclusive and equitable. Rural communities, SMEs, older adults, and vulnerable populations face heightened risks of exclusion during periods of rapid technological change. Addressing these risks requires targeted policy interventions, including the following:

Digital Inclusion Initiatives: Dedicated funding for rural broadband expansion, community-based AI hubs, and localized AI applications in Thai dialects ensures that no region or population group is overlooked.

SME Empowerment: Microgrants, mentorship programs, and simplified AI tools enable small businesses adopt AI without the financial and technical barriers that larger firms are better positioned to absorb.

Workforce Reskilling: As automation reshapes job roles, reskilling initiatives can support displaced workers in transitioning to occupations that emphasize human creativity, emotional intelligence, and AI supervision.

Ethical Frameworks and Transparency: Requirements for fairness audits, explainable AI in high-stakes decision-making, and public oversight mechanisms help protect citizens' rights and reinforce public trust.

By embedding these safeguards into national AI strategies, Thailand can ensure that technological progress benefits the many rather than the few, with gains distributed across regions, income groups, and demographic segments.

Public–Private Partnerships: Fueling a Shared Future

AI development cannot be a purely top-down government initiative. Private-sector innovation, academic research, and civil society participation are all essential components of a resilient AI ecosystem. Well-designed public–private partnerships can

Accelerate AI Adoption: Large firms can invest in advanced AI infrastructure, while smaller enterprises gain access through shared platforms or cost-sharing arrangements.

Drive Innovation: Startups frequently generate the most disruptive AI solutions. With effective incubators, accelerators, and grant programs, these ventures can catalyze transformation across entire industries.

Scale Up Training: Universities and private training providers can collaborate with government agencies to deliver AI literacy programs, certification pathways, and continuing education initiatives, ensuring that upskilling efforts reach the full breadth of the workforce.

Expand Research Collaboration: Joint AI laboratories and co-funded research initiatives between industry and academia promote applied innovation. By aligning public and private investment, breakthroughs can be translated into practical solutions, whether improving hospital operations or enhancing agricultural productivity.

From Blueprint to Reality: Execution and Next Steps

The journey toward national AI proficiency will require sustained commitment and coordinated action across all segments of government and society. Decision-makers must champion this transformation by allocating resources and removing institutional barriers; industry and academia must lead innovation and workforce development; and the public must be engaged as active participants and beneficiaries of change. Interviews, workshops, and collaborative activities conducted for this Roadmap have already established a strong foundation of consensus and momentum. The priority now shifts decisively from vision-setting to execution.

Every stakeholder, from national ministries to local communities, has a critical role in translating these strategic objectives into tangible, on-the-ground outcomes.

The next steps for the Government of Thailand should include the following seven bold actions:

- **Forge a High-Impact AI Steering Committee:** Bring together all relevant ministers, including industry, education, health, and agriculture, into a unified national council. Breaking down bureaucratic silos, encouraging cross-agency collaboration, and crowdsourcing citizen input will ensure that Thailand's AI agenda is not merely top-down, but genuinely nationwide.

- **Champion an Agile National AI Master Plan:** Replace static five-year plans with a dynamic monitoring framework that tracks technological developments, policy shifts, and startup activity in near real time. Rapid test-and-tweak cycles, supported by AI design sprints, will allow Thailand to respond proactively to emerging opportunities rather than react belatedly.
- **Launch a Portfolio of “Win-Fast” AI Pilots:** Initiate low-risk, high-impact pilots in areas such as precision agriculture, telehealth diagnostics, and intelligent tourism services to deliver early, visible successes. In parallel, support at least one ambitious, high-risk initiative modeled on frontier AI efforts, to incubate Thailand’s next globally competitive generative AI enterprise.
- **Elevate AI Governance with a Distinctly Thai Approach to Ethics:** Strengthen enforcement of the Personal Data Protection Act through clearer penalties for breaches, require independent third-party algorithm audits, and establish a citizen-led AI Ethics Council that publishes transparent trust and accountability indicators. This approach moves beyond symbolic compliance to ensure that Thai values actively shape AI deployment.
- **Revolutionize AI Education and Upskilling:** Expand AI learning opportunities from thousands to millions of learners through scalable tools such as AI-powered microlearning platforms, peer-based learning cohorts, and adaptive virtual laboratories. Targeted nano-certifications in rural Thai, regional dialects, and sector-specific skills can make AI literacy as commonplace as digital banking.
- **Supercharge Rural AI Hubs:** Extend high-speed broadband coverage nationwide while integrating remote telemedicine service, smart irrigation systems, and modular innovation laboratories. Training local “AI facilitators” to lead community-based projects, from agricultural analytics to local-language chatbots, can deliver visible improvements in months rather than years.
- **Ignite a Nationwide AI Movement:** Transform existing Centers of Excellence into inclusive, rotating AI engagement platforms that bring together students, farmers, artists, entrepreneurs, and executives. Interactive showcases, co-creation events, and public demonstrations can help embed AI into everyday culture and ensure board-based ownership of the national AI journey.

Conclusion: Securing Thailand’s AI Future

The coming decade will present Thailand with significant economic and structural challenges. Economic growth has remained subdued for an extended period, and concerted efforts will be required to restore momentum and raise GDP growth.

The implementation window for these initiatives, from 2025 to 2030, is unlikely to coincide with a period of global stability. Instead, Thailand will be operating in an environment characterized by rapid technological change, demographic aging, a stagnating workforce, and intensifying regional competition. Under these conditions, incremental reforms will be insufficient. Bold and forward-looking leadership will be required to navigate uncertainty and seize emerging opportunities.

Implementing a comprehensive national program for AI and related technological advances offers a powerful pathway for progress amid these challenges.

The approach outlined in this report provides a structured yet flexible framework to help Thailand prepare for and respond to a rapidly evolving global landscape. The program is both ambitious and achievable. It is ambitious in its aim to position Thailand as a leader in the global AI-enabled economy, and achievable because it is grounded in the nation’s existing strengths and a pragmatic assessment of institutional capacity, human capital, and policy readiness.



APPENDICES

APPENDIX A: SUMMARY OF METHODOLOGY FOR THE ETHNOGRAPHIC INTERVIEWING PROCESS

To develop a grounded understanding of the complex realities shaping Thailand's readiness for industrial AI integration, this study adopted a comprehensive, multi-faceted research design. Rather than relying exclusively on quantitative surveys, the methodology prioritizes qualitative depth through ethnographic interviewing, complemented by structured participant feedback from the initial AI Strategy Workshop and AI Mastermind Training sessions. This intentional integration of ethnographic inquiry with interactive stakeholder engagement produced an authentic, strong, and richly contextualized portrait of Thailand's industrial AI landscape, aligned closely with the nation's strategic AI ambitions.

Ethnographic Interviews

A total of 23 in-depth ethnographic interviews were conducted, each designed to surface underlying beliefs, motivations, and structural barriers that are often overlooked by quantitative approaches. Ethnographic interviewing was selected for its capacity to promote open, trust-based dialog, enabling participants to articulate implicit cultural norms, latent constraints, and critical nuances influencing AI adoption.

The interviews were carried out by a team of seven experienced researchers, including four with doctoral qualifications in management systems, AI innovation, and design ethnography. This interdisciplinary composition helped cultivate an environment of credibility, openness, and analytical rigor throughout the interview process. Interview participants were drawn from key stakeholder groups, including government policymakers, private-sector leaders, SMEs, academic researchers, and independent AI experts. This purposive sampling strategy ensured broad and representative perspectives across the major segments of Thai society involved in industrial AI development.

Participant Selection and Stakeholder Representation

Stakeholders were selected to reflect balanced representation across sectors critical to Thailand's industrial and technological strategy:

Government Agencies: Senior officials from the Ministry of Industry, the Digital Economy Promotion Agency (DEPA), and related regulatory bodies provided strategic policy perspectives, highlighting systemic constraints, governance challenges, and national AI priorities.

Private Sector Leaders: Executives from multinational corporations, emerging AI startups, and SMEs across manufacturing, healthcare, agriculture, tourism, and financial services shared insights into workforce readiness, financial limitations, and practical barriers to AI adoption.

Academic Institutions: Researchers, educators, and academic administrators contributed perspectives on the disconnect between theoretical AI research and applied industrial needs, identifying critical gaps in workforce preparation and applied research translation.

AI Experts and Consultants: Independent AI professionals and consultants offered global perspectives on best practices, ethical considerations, emerging technological trends, and sector-specific AI integration strategies, anchoring the analysis in both international context and local relevance.

Initial AI Strategy Workshop and AI Mastermind Training Feedback

To complement the ethnographic interviews, structured participant feedback was collected during the initial AI Strategy Workshop and AI Mastermind Training sessions conducted in February 2025. Participants included senior industry leaders, policymakers, SME representatives, and academics, selected based on their direct involvement in Thailand's AI strategy formulation and industrial productivity initiatives.

Feedback was gathered through multiple structured mechanisms to ensure depth, reliability, and methodological rigor:

Structured Feedback Forms: Participants completed post-session evaluation instruments designed to capture immediate reactions, identify perceived knowledge gaps, surface barriers and opportunities, and assess the practical relevance of the strategies and training modules presented.

Interactive Breakout Groups and Facilitated Discussions: Moderated breakout sessions enabled focused discussion of priority themes. These sessions were audio-recorded, transcribed, and systematically analyzed, allowing for the capture of collective perspectives, sectoral differences, and areas of convergence.

Facilitators Observational Notes: Facilitators documented real-time observations, informal exchanges, and emergent insights throughout the sessions, capturing subtleties and contextual dynamics that might not surface through formal feedback instruments alone.

Analytical Procedures and Thematic Synthesis

All qualitative data generated from ethnographic interviews and workshop activities were analyzed using a rigorous thematic analysis framework. Interview transcripts, feedback forms, observational notes, and discussion records were systematically coded in alignment with the five pillars of Thailand's National AI Strategy: Infrastructure, AI Literacy, Governance, Innovation, and Public-Private Adoption.

An iterative coding process was employed to identify recurring themes, sector-specific insights, points of convergence, and critical divergences across stakeholder groups. Data from interviews and workshops were triangulated to validate findings and strengthen analytical robustness, thereby enhancing the credibility and reliability of the synthesized insights. This triangulation ensured coherence between empirical findings and national strategic priorities, supporting clear alignment with the Ministry of Industry objectives and broader policy goals.

Structured Thematic Coding: All qualitative materials, including interview transcripts, workshop feedback forms, breakout session notes, and observational records, were systematically organized into clearly defined thematic categories corresponding to Thailand's five strategic pillars. This process enabled precise identification of recurring challenges, emerging opportunities, and strategic imperatives across sectors.

Pattern Identification and Validation: Following thematic classification, recurrent patterns and salient sector-specific insights were cross-checked across data sources and stakeholder groups. Explicit triangulation techniques were applied to corroborate findings, ensuring analytical consistency and methodological rigor.

Strategic Alignment: Insights derived from the analysis were explicitly mapped against the objectives of Thailand's National AI Strategy. Each major finding and associated recommendation was directly linked to strategic priorities, ensuring relevance, clarity, and practical applicability for the Ministry of Industry and affiliated stakeholders.

Limitations and Methodological Reflections

Despite the rigor of the research design, several methodological limitations were explicitly acknowledged and proactively addressed:

Scope of Interviews and Representation: While comprehensive in intent, the total number of interviews (25) may not fully capture every nuance of Thailand's diverse and expansive industrial ecosystem. This limitation was mitigated through purposive participant selection, ensuring broad sectoral representation and coverage across critical thematic areas relevant to industrial AI readiness.

Cultural Response Biases: Cultural dynamics, including tendencies toward optimism, deference, or restrained critique, may have influenced participant responses. To address this, the ethnographic approach emphasized trust-building, confidentiality, and open-ended dialog to encourage candid expression. Moreover, all project facilitators completed an ethnographic de-biasing workshop to heighten awareness of cultural framing and response patterns.

Researcher Interpretive Bias: As with all qualitative research, interpretive subjectivity presents an inherent risk. This was mitigated through thematic coding, multi-researcher triangulation, and cross-validation across multiple data sources, including interviews, workshops, and structured feedback instruments. Findings were further grounded through explicit reference to stakeholder quotations and documented empirical evidence.

Through this comprehensive and carefully structured methodological approach, the study presents findings that credibly reflect stakeholder realities, aspirations, and constraints. The resulting insights are explicitly designed to inform practical, actionable AI integration strategies within the scope of Thailand's Ministry of Industry and the nation's broader strategic objectives.

APPENDIX B: SUMMARY OF METHODOLOGY FOR THE STRATEGY WORKSHOP AND ROADMAP

To develop a comprehensive and pragmatic strategy roadmap for integrating AI into Thailand's industrial sector, a multi-layered methodological approach was employed, drawing upon established strategic frameworks and participatory design principles. The methodology was intentionally structured to balance qualitative depth with analytical rigor, leveraging ethnographic interviewing, structured brainstorming, business model canvases, and advanced thematic analysis. This integrated approach ensured that the resulting strategy roadmap is both theoretically grounded and operationally actionable, promoting stakeholder alignment and sustained buy-in while remaining closely aligned with Thailand's National AI Strategy.

Foundations of the Methodological Approach: Integrative and Contextual Design

The methodology extended beyond a purely mechanical data collection exercise and was designed as a deliberate, context-sensitive process that integrated multiple complementary frameworks into a coherent strategic output. The core methodological components include:

Design Thinking: Emphasized human-centered problem-solving, incorporating diverse stakeholder perspectives to ensure relevance, usability, and contextual applicability.

Business Model Canvas (Osterwalder & Pigneur): Provided a structured mechanism for organizing insights and translating qualitative data into actionable strategic components and implementation pathways.

Ethnographic Interviewing (Geertz): Captured deep cultural, organizational, and contextual insights to ensure that strategic recommendations aligned with social norms and industrial realities. This approach incorporated an in-house technique grounded in appreciative inquiry.

Participatory Action Research: Positioned stakeholders as active contributors rather than passive respondents, promoting shared ownership of the strategic vision and increasing implementation feasibility.

Triangulated Data Analysis: Applied to systematically cross-validate findings across data sources, enhancing analytical robustness, credibility, and internal consistency.

Methodological Process: A Multi-Stage Approach

Stage 1: Stakeholder Engagement and Qualitative Data Collection

The process commenced with structured ethnographic interviewing and stakeholder engagement, deliberately designed to capture nuanced, context-specific insights often overlooked by purely quantitative methods. This phase included the following:

23 In-Depth Ethnographic Interviews: Conducted with key stakeholders across government agencies (e.g., Ministry of Industry and DEPA), private sector leaders, academic institutions, and AI experts. The objective was to surface latent barriers and socio-cultural factors influencing AI adoption.

Structured Interview Protocols: Developed to elicit comprehensive and reflective responses while minimizing social desirability bias, with emphasis on motivations, constraints, and future visions for AI integration.

Example from Ethnographic Insights:

Government representatives consistently highlighted misalignment between policy frameworks and operational readiness, while private sector leaders emphasized limited inter-industry collaboration as a primary bottleneck. These insights directly informed the roadmap's emphasis on structured multi-stakeholder collaboration frameworks.

Stage 2: Collaborative Ideation through Design Sprints and Brainstorming

To translate qualitative insights into structured strategic components, a series of collaborative design sprints and brainstorming workshops was conducted. This stage marked the transition from exploratory data collection to organized ideation and strategy formulation.

Methodologies Applied:

Design Sprints (Knapp et al.): Enabled rapid problem definition, ideation, and prioritization within time-bound workshops.

Sticky Note Brainstorming (Affinity Mapping): Captured spontaneous insights and organized them into coherent thematic clusters.

Interactive Group Discussions: Facilitated convergence of diverse perspectives, supporting innovation while surfacing pain points.

Example from Brainstorming Data Analysis:

AI Governance-related inputs highlighted regulatory gaps and ethical concerns, which were synthesized into recommendations for National AI Standards and Compliance Frameworks. Similarly, training-related inputs underscored workforce upskilling challenges, leading to proposals for AI literacy programs and certification pathways.

Stage 3: Synthesis through Business Model Canvas and Thematic Coding

Following data generation, brainstorming outputs were systematically translated into structured strategic constructs using Business Model Canvas and thematic analysis. This stage served as the analytical backbone of the roadmap.

Business Model Canvas Application:

Pain Points and Challenges: Identified during brainstorming and mapped onto canvases to structure the problem space.

Opportunities and Solutions: Derived from insights and translated into actionable initiatives, such as Trusted AI Standards and AI Literacy programs.

Strategic Partnerships and Implementation Frameworks: Addressed through stakeholder collaboration models and co-innovation hubs.

Example from Business Model Canvas Insights:

Within the National Innovation Dashboard canvas, challenges such as data overload and fragmented information systems informed the proposal for a National Data Exchange Platform to enable streamlined information sharing and cross-sector collaboration.

Stage 4: Thematic Analysis and Strategic Mapping

Building on the structured canvases and ideation outputs, data were subjected to rigorous thematic analysis aligned with Thailand's National AI Strategy. Thematic coding followed the methodology articulated by Braun and Clarke:

Data Familiarization: Systematic review of transcripts and workshop materials to ensure deep contextual understanding.

Initial Coding: Identification of recurring themes, issues, and constraints.

Theme Identification: Aggregation of related codes into higher-order themes, including AI Governance, Workforce Readiness, Innovation Ecosystems, and Public–Private Collaboration.

Pattern Validation: Cross-referencing qualitative themes with quantitative indicators and stakeholder inputs to enhance reliability.

Stage 5: Strategic Roadmap Construction

The final stage synthesized thematic insights into a cohesive strategic roadmap using established Strategic Roadmapping techniques (Phaal et al.), integrating vision-setting, strategy formulation, and implementation planning. Core components included:

Vision and Objectives: Anchored in stakeholder aspirations and national policy priorities.

Strategic Pillars: Derived from thematic analysis and validated through stakeholder consultation.

Implementation Roadmap: Detailing actionable steps, timelines, and responsible entities.

Monitoring and Evaluation: Embedding mechanisms for progress tracking and iterative refinement.

Conclusion: Integrating Insights for Strategic Coherence

The strategy roadmap represents the culmination of a comprehensive and carefully structured methodological process designed to harness the collective intelligence of Thailand's AI ecosystem. By integrating ethnographic interviewing, collaborative ideation, business model canvassing, and thematic analysis, the process ensured that the roadmap is strategically sound, culturally grounded, and practically implementable.

A critical strength of this approach lies in the systematic cross-referencing of workshop-based strategy outputs with ethnographic interview data. This triangulation ensured that strategic recommendations were firmly rooted in lived experiences, institutional realities, and sector-specific constraints. Ethnographic interviews captured nuanced perspectives from government agencies, private sector leaders, AI experts, and educational institutions, which were then rigorously compared with thematic outputs from workshops to enhance analytical depth and validity.

For example, the Trusted AI Standards brainstorming exercise identified enforcement and compliance gaps that were corroborated by ethnographic accounts highlighting concerns around ethical oversight. Similarly, the Transforming Industry canvas emphasized the need for accessible AI tools for SMEs, echoing interview findings related to resource and capability constraints among smaller enterprises.

Through this methodological integration, the roadmap reflects a shared and cohesive vision for Thailand's AI future. By aligning structured analysis with stakeholder experience, it positions AI as a transformative lever for economic growth, social inclusion, and sustained technological leadership.

APPENDIX C: TRANSLATING TO THE TRAINING CURRICULUM

For Thailand’s industrial sector, AI represents a critical catalyst for productivity growth, innovation capacity, and long-term economic resilience. Accordingly, the Ministry of Industry, in collaboration with the Thailand Productivity Institute (FTPI), has prioritized AI adoption as a core component of national industrial strategies, aligning these efforts with broader economic objectives and global technological trends.

At the policy level, Thailand’s National AI Strategy and Action Plan (2022–2027) articulates ambitious targets across infrastructure development, regulatory advancement, and workforce capability building. However, persistent implementation challenges remain, most notably the acute shortage of AI professionals. Thailand currently produces approximately 200 AI engineers per year, far below the estimated national demand of 30,000 (Amity Solutions, 2024). This gap underscores the urgency of effective, scalable, and accessible training programs capable of rapidly building applied AI capacity.

A significant step toward addressing these challenges was the recent AI Mastermind workshop, which generated crucial participant and employer feedback that directly informed subsequent curriculum refinement.

Following the implementation of a five-day, in-person “train-the-trainer” workshop, feedback consistently called for more concise and interactive training formats. While participants commended the depth and comprehensiveness of the content, many highlighted the difficulty of committing to five consecutive days of in-person training. Parallel employer interviews conducted by FTPI revealed a strong reluctance among organizations to release key staff for a full week, citing operational disruption and productivity losses. Employers instead expressed a preference for limiting in-person commitments to two or three days, supplemented by weekly webinars and structured homework assignments (Training report-INTERIM, 2025). Taken together, these findings point to a central theme: flexibility, applied learning, and organizational feasibility are critical determinants of training effectiveness for both employees and employers.

In response, the revised curriculum shifts from a single five-day, in-person format to a two-day intensive workshop followed by four to six weekly webinars.

This redesigned structure alleviates scheduling constraints while leveraging established learning-science principles, particularly spaced repetition, to reinforce skills acquisition through iterative practice, assignments, and peer interaction. The approach also aligns with FTPI’s mandate to deliver innovative and high-impact training models that support Thailand’s AI-enabled industrial transformation.

Stakeholder Engagement and Employer Feedback

Capturing Voices from the First Workshop

During the initial workshop, representatives from the Ministry of Industry, FTPI, private sector organizations, and academic institutions convened to examine AI’s role in Thai manufacturing, logistics, and related industries. Participants expressed strong appreciation for coverage of topics such as large language models (LLMs), ethical AI governance, and hands-on demonstrations of AI tools.

Key insights emerging from these discussions included:

1. Time Constraints and Employer Concerns
 - Employers emphasized the importance of minimizing staff absence, ideally limiting in-person training to two days.
 - Participants noted the need to balance training participation with ongoing operational and client responsibilities, which constrain availability for extended workshops.

2. Retention and Spacing

- Participants requested intervals between sessions to practical application of newly acquired concepts.
- Spaced learning over multiple weeks was identified as particularly effective for reinforcing AI techniques and improving long-term retention (DEPA, 2024).

3. Deeper Hands-On Projects and Homework

- Attendees expressed strong interest in developing real-world AI prototypes but stressed the need for sufficient time between sessions to experiment, iterate, and share progress.

4. Local Context and Language

- Stakeholders encouraged the incorporation of Thai-language modules and localized case studies, particularly tailored to the needs of SMEs.

Employer Interviews Conducted by FTPI

Independent employer interviews conducted by FTPI reinforced the workshop feedback and provided additional insight into organizational constraints shaping training preferences:

Operational Continuity: Industries such as manufacturing and logistics face significant challenges when supervisors or technical staff are absent for an entire week.

Cost Efficiency: For many SMEs, the combined costs of travel, accommodation, and potential overtime for remaining staff pose a substantial burden.

Focused Learning: Employers demonstrated greater willingness to release employees for two or three highly concentrated training days, particularly when followed by remote webinars. This blended approach was viewed as an effective way to sustain learning without disrupting core operations.

These findings directly informed the decision to restructure the curriculum to maximize learning impact while remaining responsive to workplace realities.

Justification for a Two-Day Workshop Plus Weekly Webinars Model

1. Addressing Employer Concerns

The transition to a shorter in-person format directly reflects employer preferences for training designs that minimize operational disruption. FTPI employer interviews indicate a strong preference for two-day workshops to reduce downtime and maintain productivity (FTPI Interviews, 2025). This condensed format also mitigates participant fatigue associated with extended, theory-heavy sessions.

2. Enhancing Retention Through Spacing Learning

Pedagogical research consistently supports spaced learning as an effective approach for mastering complex skills. By separating intensive in-person instruction from weekly virtual sessions, participants are afforded time to apply, reflect on, and refine AI competencies (DEPA, 2023). This structure also addresses concerns regarding cognitive overload observed during the initial AI Mastermind training (Training report-INTERIM, 2025).

3. Real-World Application with Accountability

Participants repeatedly emphasized the value of extended homework assignments that enable the implementation of AI solutions within their own organizations. The revised model establishes a structured cycle of application and feedback:

- **Action:** Participants begin deploying AI tools immediately following the two-day workshop.
- **Feedback:** Weekly webinars provide guided troubleshooting, peer learning, and instructor support.

By dedicating each webinar to a specific theme, such as AI data governance or advanced prompt engineering, participants experience continuous relevance and motivation to complete the program.

4. Accessibility and National Outreach

FTPI's mandate includes engaging stakeholders from across Thailand, including SMEs located in regional and rural industrial zones. A shortened in-person requirement combined with online follow-up significantly broadens access for participants who would otherwise be unable to attend training in Bangkok or major cities (Bangkok Post, 2024). This model directly supports national objectives related to inclusive digital upskilling and equitable AI adoption.

5. Aligning with the APO Productivity Specialist Certification

The two-phase structure ensures that participants can fulfill all competency requirements under the APO Productivity Specialist Certification in AI. Core skills are developed during in-person sessions, while ongoing virtual engagements enable continuous assessment, project-based learning, and progressive mastery of advanced competencies.

Revised Curriculum and Schedule Overview

The updated curriculum is organized into two integrated phases:

1. Phase 1 (In-Person): Two-Day Workshop
2. Phase 2 (Virtual): Four to Six Weekly Webinars

Both phases directly reflect participant and employer feedback, ensuring a balanced approach that emphasizes practical application, pedagogical effectiveness, and scheduling flexibility.

Phase 1: Two-Day Hands-On Workshop

Location: Bangkok

Facilitators: Moses Ma, Dr. Carol Grojean, and local industry experts

Day 1: AI Foundations and Prompt Engineering

Morning (9:00 AM to 12:30 PM)

- Welcome and overview
- Introduction to the AI Mastermind Program and Thailand's AI strategy
- Emphasis on the workshop–webinar hybrid approach
- Employer-driven constraints

- A brief discussion outlining the rationale for the revised format, focusing on minimizing days away from work
- AI's role in industrial productivity
- Real-world impacts illustrated through case studies in manufacturing, logistics, and SMEs

Afternoon (1:30 PM to 4:00 PM)

- Prompt engineering essentials
- Fundamentals of large language models (LLMs)
- Key prompt design parameters, including temperature and maximum tokens
- Hands-on exercises
- Creating custom prompts for sector-specific tasks, such as inventory management
- Small-group activities with real-time AI feedback

Day 2: AI Productivity Canvas and Building Your Own AI Tools

Morning (9:00 AM to 12:30 PM)

- AI productivity canvas
- A step-by-step framework tailored by FTPI for industrial AI deployment.
- Breakout groups
- Participants brainstorm real AI projects applicable to their respective workplaces
- Case studies from Thai SMEs
- Local success stories and lessons learned

Afternoon (1:30 PM to 4:30 PM)

- No-code AI development
- Overview of user-friendly AI platforms, including GPT Builder, Claude AI, and Perplexity AI
- Rapid prototype demonstrations
- Introduction to AI agentic
- Project presentations and next steps
- Group-wise presentations of preliminary AI solutions
- Explanation of upcoming webinars and homework assignments

At the conclusion of Day 2, participants receive a “Starter Homework Packet” outlining tasks to be completed before the first webinar. These tasks may include refining an AI project roadmap or configuring an online environment for prompt experimentation.

Phase 2: Weekly Webinar Series (Four to Six Weeks)

Schedule: One 90-minute session per week

Goal: Reinforce hands-on learning, deliver advanced modules, and support real-world application

Webinar #1: Advanced Prompt Engineering and LLM Theory

- Deepen understanding of LLM customization techniques, including LoRA, and fine-tuning.
- Review and troubleshoot challenges encountered following the in-person workshop.
- Homework: Develop a refined prompt library for a selected industrial use case.

Webinar #2: AI Agents and Workflow Automation

- Demonstrate how AI agents can automate multi-step business processes.
- Introduce applied scenarios in manufacturing and logistics, such as quality inspection.
- Homework: Deploy a simple AI agent to automate at least one real-world workflow within the participant's organization.

Webinar #3: AI Resource Planning (ARP) and Innovation Portfolio

- Introduce ARP as a strategic planning tool for aligning AI initiatives with resource allocation.
- Develop or update an AI innovation portfolio linking project costs, impact, and risk.
- Homework: Produce a risk-reward analysis for proposed AI projects.

Webinar #4: Design Thinking

- Integrate design thinking principles with user-centric approaches to improve product market fit.
- Examine the Innovation Corps use case from the United States National Science Foundation, highlighting the effectiveness of lean canvas and design thinking methodologies.
- Homework: Conduct a short design-thinking session within the participant's organization, incorporating AI feedback loops.

Webinar #5: Scaling AI in Industry

- Explore best practices for scaling AI solutions across multiple factories or departments.
- Review Thai industrial case studies with a focus on return on investment and continuous improvement.
- Homework: Draft a scale-up plan for an existing AI pilot project.

Webinar #6: Leadership, Ethical AI, and Future Trends

- Examine emerging AI developments, including multimodal models and advanced robotics.
- Guide AI leadership approaches and the establishment of AI Centers of Excellence.

- Discuss ethical AI deployment, including data privacy, regulatory compliance, and worker protections.
- Homework: Finalize all assignments and prepare for the certification assessment.

Path to APO Productivity Specialist Certification

Upon completion of the two-day workshop, attendance at a minimum of four weekly webinars, and submission of all assigned homework, participants become eligible to sit for the APO Productivity Specialist in AI examination. The assessment evaluates the following:

- Technical Proficiency: Mastery of AI fundamentals, prompt engineering, and no-code AI tools.
- Strategic Frameworks: Ability to apply the AI Productivity Canvas and ARP models.
- Ethical and Regulatory Awareness: Demonstrated understanding of compliance, data governance, and human-centric design.
- Practical Implementation: Evidence of real-world outcomes, assessed through homework projects and a final AI pilot presentation.

This hybrid model, combining shortened in-person training with structured webinar follow-up, provides participants with sufficient time for applied practice, organizational support, and iterative learning, culminating in advanced and practical AI capabilities.

Next Steps

1. Finalize Workshop Logistics
 - Secure a Bangkok venue and confirmed dates, tentatively scheduled for May, emphasizing the two-day commitment.
 - Distribute orientation materials to help participants maximize in-person learning.
2. Develop Comprehensive Webinar Content
 - Align exercises in each webinar closely with participants' real-world projects.
 - Ensure that all exercises incorporate Thailand-based use cases.
3. Implement Feedback Mechanisms
 - Collect real-time feedback following each webinar to refine content and address emerging skill gaps.
4. Promote Employer Buy-In
 - Emphasize reduced time away from work, limited to two workshop days, alongside sustained follow-up support.
 - Highlight early success stories from pilot participants.
5. Build an AI Practitioner Community
 - Establish an online forum or Slack channel to enable participants to exchange solutions, troubleshoot challenges, and share progress on AI pilot initiatives.

Conclusion

This revised curriculum, structured around a two-day in-person workshop followed by four to six weekly webinars, directly addresses the concerns raised by both participants and employers. It aligns with operational realities within Thai companies while maintaining the depth and rigor required for the APO Productivity Specialist in AI certification. Grounded in global best practices and informed by local stakeholder feedback, this hybrid approach is designed to accelerate AI adoption across Thailand's industrial ecosystem.

By combining focused face-to-face instruction with sustained virtual mentorship, FTPI and the Ministry of Industry are positioned to cultivate an AI-capable workforce, drive sustainable productivity gains, and strengthen Thailand's leadership in the digital economy.

APPENDIX D: CITATIONS AND REFERENCES

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APPENDIX E: GLOSSARY OF AI TERMINOLOGY

Agentics – The art of wiring many small AI “agents” together so they cooperate, negotiate, and get complex work done with minimal human hand-holding.

Alignment – Making sure an AI’s goals and limits match human values so it does what we want and nothing we don’t.

Anthropomorphism – When we imagine an AI has human feelings or a personality. It’s really just software responding to data.

Bias – Skewed training data can nudge an AI toward wrong or unfair answers. Good data care and testing help keep this in check.

Chain-of-Thought Prompting – Asking the model to “show its work” step-by-step so the final answer is clearer and often more accurate.

Context Window – The chunk of text the model can look at once—its short-term “memory.” Bigger windows mean it can follow a longer conversation.

Deep Research – Using AI to trawl vast papers, patents, and data lakes quickly, then surface the best nuggets for human experts to verify.

Embeddings – Compact number strings that capture the meaning of text, images, or sounds so AIs can compare them efficiently.

Emergent Behavior – Surprise skills that show up only when a model is very large, like writing code or poetry, it was never explicitly taught.

Few-Shot Learning – Teaching a model a new task with just a handful of examples instead of thousands.

Fine-Tuning – Giving a pre-trained model extra training on your own data so it speaks your domain’s language.

Generative AI – Tools that create new text, images, or video by learning patterns in huge datasets and remixing them in fresh ways.

Guardrails – Hard rules or filters—like “no personal data”—that block the model from straying into risky territory.

Hallucination – Confident-sounding but wrong answers that pop out when the model fills gaps with made-up facts.

Large Language Model (LLM) – A giant neural network trained on Internet-scale text so it can predict the next word—and therefore chat, draft, and analyze.

Natural Language Processing (NLP) – The branch of AI that lets computers read, write, and understand human language.

Neural Network – A layered math model inspired by brain neurons; it spots patterns in data and learns from them.

Parameters – The billions of tiny numerical “dials” an LLM tweaks during training to improve its predictions.

P(doom) – The probability that AI will eventually cause an existential catastrophe that will endanger the human race.

Prompt – The instruction or question you feed an AI. Well-crafted prompts act like steering wheels for better results.

Reasoning – The model’s ability to follow logical steps, connect dots, and reach a sound conclusion rather than just parroting text.

Reinforcement Learning – Training by trial and error: the model tries something, gets a reward or penalty, and adjusts for next time.

Retrieval-Augmented Generation (RAG) – A technique where the model grabs fresh facts from a trusted database before writing, cutting down on hallucinations.

Safety – Practices that keep AI from causing harm—technical testing, red-teaming, policy checks, and transparency.

Token – The bite-size chunks (roughly $\frac{3}{4}$ of a word in English) that the model actually reads and writes.

Transformer Model – A neural-net design that can look at all words in a sentence at once, making it great at spotting context.

Zero-Shot Learning – When a model performs a task it never saw during training, guided only by the prompt’s description. refining the learning process. Models learn by making decisions, observing the outcomes of those decisions, and adjusting their strategies accordingly.

APPENDIX F: PROJECT METHODOLOGY AND NOTE REGARDING AI USAGE

Integration of Retrieval-Augmented Generation (RAG) and Deep Research Methodologies

This National AI Roadmap for the Sustainable Productivity of Industries in Thailand employed a multi-method approach to enhance the depth, validity, and comprehensiveness of the findings.

The project began with proven qualitative methods, including ethnographic interviews, detailed stakeholder discussions, collaborative workshops, and intensive face-to-face training sessions. All of these methods were instrumental in defining the proper scale and scope of the roadmap and its recommendations.

Ideas and concepts were surfaced, developed, evaluated, and refined through intensive dialogs and working sessions conducted over four months. (See Appendix I for a selection of notable interviewee comments).

To add depth and nuance, AI-driven methodologies were applied, specifically Retrieval-Augmented Generation (RAG) combined with Deep Research. This approach is recognized as an academic standard for AI research augmentation across advanced fields.

The integration of human insights with AI analysis constitutes a Hybrid Analytical Framework (HAF), ensuring that findings are contextually relevant, empirically grounded, and suitable for evidence-based policymaking.

While concerns exist about AI replacing human effort, such fears are misplaced. For example, the 2024 Nobel Prize in Chemistry recognized the achievements of a human + AI research team, demonstrating the power of collaboration rather than substitution.

Furthermore, the US Federal Trade Commission has highlighted that claims about AI content detection accuracy are often misleading due to vendor bias.

Conflict of interests

Retrieval-Augmented Generation (RAG) Methodology

RAG bridges qualitative insights from interviews with broader empirical evidence drawn from large textual databases. Unlike traditional generative

AI, RAG integrates an external retrieval mechanism that queries specialized repositories, academic literature, industry reports, and domain-specific knowledge bases. This ensures relevance, contextual accuracy, and real-time responsiveness.

Methodological Process:

1. Data Corpus Preparation:

A structured repository was compiled, including sector-specific reports, global AI case studies, policy guidelines, academic papers, and interview transcripts. Sources were curated to align with the five strategic objectives of the roadmap: Industrial Transformation, Public Service Enhancement, Sustainable Development, Inclusive Growth, and Regional Innovation Leadership.

2. Query Formulation and Data Retrieval:

Stakeholder-derived research questions were converted into structured and unstructured queries compatible with RAG models. Queries were iteratively refined to ensure precision and contextual relevance.

3. Response Generation and Contextualization:

The AI produced synthesized responses from retrieved documents, highlighting trends, correlating insights, validating anecdotal findings against empirical evidence, and aggregating sources with proper attribution.

4. Validation and Cross-Referencing:

AI-generated responses were cross-referenced with original interview data to confirm alignment, coherence, and contextual appropriateness. Any discrepancies were noted, and follow-up queries were used to resolve conflicts.

Rationale for Use:

The integration of RAG was particularly valuable for triangulating qualitative findings with quantitative data, thereby enhancing both the credibility and comprehensiveness of the analysis. By leveraging RAG, the scope of insights extended beyond the limitations of traditional field interviews, ensuring a more inclusive dataset.

Deep Research Methodology

OpenAI Deep Research was applied to uncover latent patterns, emerging trends, and contextual discrepancies within a diverse and large dataset comprising reference documents from global sources. This methodology emphasizes semantic analysis, cross-referencing, and meta-analytical synthesis, allowing connections to be drawn across disparate data points, with all sources properly attributed.

Methodological Process:

1. Data Aggregation:

Primary sources (ethnographic interviews and workshop findings) were combined with secondary sources (open-access databases, research publications, government reports, and public sentiment datasets). Data were categorized according to thematic relevance to the strategic pillars of the National AI Roadmap.

2. Semantic Analysis and Pattern Recognition:

Advanced Natural Language Processing (NLP) algorithms analyzed the aggregated dataset to detect recurring themes, emerging trends, and underlying correlations. Special focus was given to identifying synergies between stakeholder insights and global patterns in AI adoption.

3. Cross-Referencing and Triangulation:

Extracted themes were systematically cross-referenced with RAG findings to ensure consistency and coherence. Where discrepancies were identified, targeted queries refined the dataset.

4. Contextualization and Synthesis:

Insights from semantic analysis were synthesized into actionable recommendations aligned with the strategic objectives of the roadmap. The process was iterative, with continuous refinement based on stakeholder feedback and emerging data.

Rationale for Use:

Deep Research addresses the limitations of traditional methodologies in handling large-scale data. Its systematic correlation of qualitative and quantitative insights provides a robust evidentiary foundation for the roadmap's policy recommendations.

Methodological Integration through the Hybrid Analytical Framework (HAF)

The Hybrid Analytical Framework (HAF) integrates RAG and Deep Research to overcome the limitations of conventional AI policy methodologies. Its key advantages include:

1. Improved Validity:

Triangulation of qualitative findings with AI-driven quantitative analysis ensures that recommendations are both contextually accurate and empirically robust.

2. Dynamic Responsiveness:

Real-time query and update capabilities allow the strategy to adapt continuously to technological and socio-economic changes.

3. Enhanced Inclusivity:

Voices captured through ethnographic interviews, including those of marginalized or underrepresented groups, are validated and contextualized within broader empirical datasets.

4. Policy Coherence:

Integration of RAG and Deep Research strengthens the coherence of recommendations by providing a comprehensive evidentiary basis encompassing both qualitative and quantitative dimensions.

Conclusion

As experts supporting the APO and FTPI in developing the AI Productivity Specialist training and curriculum, the application of RAG and HAF has proven effective in significantly expanding the range of reference materials accessible to the project team. Applied rigorously to test, validate, and, where necessary, invalidate concepts and proposals emerging from stakeholder dialogs, these methodologies enhanced both the scope and the depth of the findings.

By leveraging AI to increase effectiveness and productivity, this project demonstrates the practical value of AI as a productivity-enhancement tool, fulfilling the intended purpose of the National AI Roadmap. The use of RAG and HAF exemplifies how AI can serve as a powerful instrument with the potential to deliver substantial benefits to the people of Thailand.

APPENDIX G: DESIGNING A NEXT-GENERATION AI READINESS DASHBOARD USING AI

Building a National AI Readiness Dashboard: A Guide on Designing Next Generation Biomimetic Governance

Every nation entering the intelligent era faces a paradox: AI can make governance smarter only if governance itself becomes adaptive, self-healing, and life-like. This requires a shift

from mechanical management to biomimetic design, building systems that learn, evolve, and regenerate in the way living organisms do.

This dashboard cannot be built using outdated thinking or siloed ministries. It is essentially a national nervous system that continuously senses, interprets, and responds to the health of a nation's digital metabolism, its skills, data integrity, innovation rate, equity, and resilience.

This appendix outlines how a country can design such a biomimetic system, using AI not only as the subject of measurement but as the instrument of measurement itself, collecting data, detecting drift, and even guiding regenerative policy in real time.

This model builds upon FutureLab's proprietary and patent-pending technology, which treats AI governance as a public health function, a living immune system that protects societies from ethical drift and systemic imbalance while accelerating innovation and inclusion.

The Purpose Measuring Life, Not Machines

Traditional governance measures economic outputs, GDP, inflation, and unemployment, but AI readiness is not a matter of quantitative volume; it is a matter of qualitative vitality. It measures whether the social organism has the nervous, vascular, and immune systems required to adapt to exponential change.

A National AI Readiness Dashboard, therefore, serves as the nation's metabolic monitor, performing five continuous functions:

- Sensing: Capturing real-time data across 100 KPIs covering governance, skills, ethics, sustainability, and innovation.
- Diagnosing: Detecting "diseases" of drift bias, inequality, data poverty, or unsafe automation.
- Healing: Deploying targeted, AI-guided interventions (training, incentives, regulations).
- Learning: Adapting its models as new data reveals emerging patterns.
- Communicating: Sharing open, comprehensible metrics that build public trust. In essence, it measures the digital health of a system.

The Architecture of Governance as a Living System

A biomimetic AI readiness system mirrors the structure of a living body: sensors (data), organs (analytics), brain (AI agents), and immune response (policy feedback).

Layer 1: Sensing and Data Collection (The Sensory Network)

AI-driven data pipelines continuously collect, clean, and integrate information from national sources, such as labor statistics, patents, R&D funding, education data, corporate disclosures, and public sentiment. Autonomous agents perform:

- Semantic ingestion of unstructured documents via NLP and OCR.

- Entity linking across ministries through graph databases.
- Data quality scoring via anomaly detection and pattern similarity models.
- The goal is to create a real-time data nervous system where every subtle signal, economic, social, or ethical, is measurable and traceable.

Layer 2: KPI Computation (The Organs of Measurement)

Our model proposes 100 KPIs that act as a physiological marker of vital signs of national AI health. Examples:

- AI Literacy Rate: The cognitive health of the workforce.
- Data Interoperability Score: The circulatory health of information flows.
- Model Explainability Coverage: The transparency of thought.
- AI Carbon Intensity (kg CO₂e): The metabolic cost of computation. AI models process these KPIs using:
 - Automated feature extraction to generate dynamic indicators.
 - Causal inference to reveal dependencies (e.g., literacy improvement lowers bias incidents).
 - Continuous calibration so indicators evolve as technology and behavior change. This layer provides the nation's vital statistics.

Layer 3: Intelligence and Trend Analysis (The Cognitive Cortex)

Here, the system begins to think. Analytical AI agents detect subtle shifts, correlations, and risks invisible to static dashboards:

- Time-series forecasting to predict readiness trends.
- Anomaly detection for sudden ethical, social, or economic deviations.
- Scenario simulation testing how policy changes (like tax credits or AI education mandates) ripple through the ecosystem.
- Cohort clustering groups regions, sectors, or demographics to expose localized strengths and weaknesses.

This layer transforms data into situational awareness, the biomimetic equivalent of perception.

Layer 4: Reflex and Healing (The Immune Response)

When the system detects a “pathogen” (e.g., rising job displacement, carbon overshoot, or bias drift), policy agents trigger an automatic response:

- Deploy training incentives via AI-powered education platforms like GIGA. learn.
- Adjust funding ratios toward sustainability or inclusivity programs.
- Alert ministries with policy recommendations ranked by predicted effectiveness.

These feedback loops are modeled on the human immune system rapid, distributed, and self-correcting. They embody the core of FutureLab's next-generation governance models that diagnose and heal in real time.

Layer 5: Transparency and Public Interface (The Skin)

To function democratically, a biomimetic dashboard must show its face to the world:

- Open dashboards publish KPIs in plain language.
- Narrative generators (LLMs) explain trends in conversational summaries.
- Citizen feedback agents gather experiential data to complement quantitative inputs.
- Trust indicators visualize ethical compliance and inclusion improvements.

This layer represents civic consciousness, the place where data becomes dialog and governance becomes participatory.

AI Throughout the Lifecycle

AI must be infused through every stage, not as decoration but as the operating logic.

Phase	AI Role	Biological Analogy
Data Collection	NLP, computer vision	Sensory neurons
Integration	Knowledge graphs	Connective tissue
Analysis	Predictive + causal models	Brain cortex
Response	Reinforcement learning	Reflex arcs
Explanation	XAI models	Language centers
Adaptation	Continual learning	Neuroplasticity

In this model, AI gradually learns how to govern itself, albeit under human oversight, continuously improving the national learning loop.

Integration with FutureLab’s Proposed Global Framework

Ideally, this national dashboard would not stand alone; it would serve as a national node in a global network modeled on public health. Each country would report anonymized KPI data to a global early-warning system and, in return, receive comparative analytics, ethical alerts, and policy templates from the collective. Potentially, each nation could participate in a regenerative finance layer that funds targeted improvements in readiness and equity.

For example, if the dashboard detects declining AI literacy or rising bias drift, it could automatically trigger resource flows from the collective funding inclusion datasets, retraining programs, or safe model audits.

In this way, the nation’s dashboard acts as both a patient monitor and a healing node within a planetary network for ethical intelligence.

Institutional Design: Making the Living System Work

Optimal Governance Structure: This model requires the establishment of a National AI Readiness Observatory under the Prime Minister’s Office to coordinate data, ethics, and education ministries. It would rely on a three-tier structure:

- Data Secretariat: Runs the technical AI pipelines and maintains data integrity.
- Ethics and Alignment Council: Ensures KPIs respect human values and rights.
- Citizen Commons Forum: Provides participatory oversight and civic legitimacy.

Required Legal Framework:

- Federated data trusts enable participation without surveillance.
- The AI Transparency Act mandates periodic publication of KPI summaries.
- National “Ethical Computing Standards” enforce energy and fairness disclosures.
- Infrastructure: Hybrid cloud with sovereign layers, interoperable APIs, open data pipelines, and secure agent sandboxes for experimentation.
- Capacity Building: Universities and vocational schools integrate dashboard literacy into curricula, training digital epidemiologists for governance.

Why Biomimetic, and Not Bureaucratic

A biomimetic AI readiness dashboard does not attempt to control complexity; it learns from it. It evolves like an ecosystem, balancing feedback loops and allowing positive emergence.

Traditional bureaucracies react after crises, with lots of finger-pointing. Biomimetic systems adapt before collapse.

Biomimetic systems view governance as metabolism: sensing stress, releasing hormones (policy actions), and restoring equilibrium before systemic damage occurs.

This philosophy is central to FutureLab’s approach that the best way to govern technology is not through static rules but through dynamic balance, the same principle life itself uses to sustain order amid chaos.

The Ethical Dimension Measuring Wisdom, Not Just Readiness

Our proposed 100 KPIs do more than track progress; they form a moral barometer. Metrics like Bias Deviation, Public Trust in AI, and AI Carbon Footprint ensure that a nation’s intelligence growth does not outpace its conscience.

FutureLab’s model proposes that wisdom is the ultimate performance metric: not how fast a nation adopts AI, but how gracefully it integrates intelligence for the public good.

The biomimetic dashboard, with its continuous sensing and feedback, becomes a technological conscience, an instrument that helps the nation know itself as a living system.

Conclusion: The Nation as an Intelligent Organism

A well-designed National AI Readiness Dashboard is not a spreadsheet; it is a living mirror of the nation’s cognitive health. By applying biomimetic design and FutureLab’s Solomonic public-health model of AI governance, a country can evolve from reactive policymaking to self-regulating and self-optimizing intelligence. It must sense when education needs a booster, when ethics require antibodies, and when innovation metabolism is overheating. It must learn how to convert metrics into meaning, meaning into wisdom, and wisdom into action.

When a nation’s governance learns to behave like life, adaptive, transparent, and regenerative, it ceases merely to survive the AI revolution. It begins to co-evolve with it.

Biomimetic KPIs

A biomimetic AI readiness dashboard would include many metrics, but the exact composition depends on the state of the nation it is guiding. This is not something like a prescription that a doctor can provide, especially without a careful diagnosis. Ideally, the dashboard should be co-designed by internal and

external experts to offer a diversity of experience and perspectives. Nevertheless, it is instructive to provide a starting point. Here are the first 40 metrics that all countries should consider including:

1. Global Surveillance and Early Warning

- Syndromic Signal Count: Anomalous spikes in harm/failure reports.
- Bias Drift Alerts: Weekly detected shifts by domain.
- Safety Incident Rate (per 1M calls): Normalized across models.

2. Exposure and Vulnerability Mapping

- Population Exposure (%): People regularly interacting with AI.
- High-Risk Sector Coverage (%): Health, finance, elections, etc.
- Child/Youth Exposure (%): Estimated minors' contact with AI.
- Rural/Remote Exposure Gap (%): Urban vs rural access delta.
- Compute Poverty Rate (%): Nations below basic compute threshold.
- Election Cycle Risk Count (#): Active elections under AI influence risk.

3. Inclusive Access and Equity (Coverage)

- Affordability Index: Cost per 1k tokens vs median income.
- Localization Coverage (%): UI, docs, support in local languages.
- Women & Girls AI Access (%): Gender equity in access.
- Indigenous Access Programs (#): Targeted inclusion initiatives.
- Low-Bandwidth Mode Adoption (%): Users served sub-5 Mbps.

4. Literacy, Immunization, and Harm Reduction

- AI Literacy Rate (%): Baseline knowledge test pass rate.

5. Model Safety, Quality, and “Variant” Intelligence

- Global Safety Benchmark Score: standardized eval composite.
- Adversarial Robustness Index: Jailbreak & prompt-attack resilience.
- Bias Parity Score: Parity across protected classes.
- Explainability Coverage (%): Models with interpretable outputs.

6. Data Health and Supply Integrity

- Data Lineage Completeness (%): Traceable provenance.

- Contamination Rate (%): Copyrighted/ unsafe content share.
- Federated Participation (# orgs): Privacy-preserving training.
- Data Trusts & Commons (#): Shared assets governed ethically.

7. Intervention Readiness and Response

- Alert Escalation SLA Compliance (%): WHO-style tiered responses met.
- National AI EOC Activation Time (hrs): Emergency ops center.
- Counter-Misinfo Surge Capacity (# teams): Rapid response units.
- Policy “Circuit Breaker” Usage (#): Throttle/suspend switches triggered.
- Compute Credit Stockpile (PF-days): Reserve to pivot to safer models.

8. Ecosystem Equity and Governance

- Global Participation Breadth (# countries): Active contributors.
- Open-Standards Adoption (%): Safety schemas, audit formats.
- Youth Council Representation (#): Formal youth voices.

9. Sustainability and Resilience

- Energy per Inference (J): Efficiency benchmark.
- Carbon Intensity (gCO₂e/1k tokens): Standardized footprint.
- Green Compute Share (%): Renewables-backed workloads.
- Water Use Intensity (L/MWh): Responsible cooling.

10. Outcomes and Trust Benchmarks

- Public Trust in AI (%): Recurring global survey.
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