Strategic Deployment of Artificial Intelligence to Enhance the Competitiveness of Thai Enterprises

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Abstract

This article proposes strategic approaches for deploying artificial intelligence (AI) to enhance the competitiveness of Thai enterprises, grounded in the principle of AI Added Value—the targeted application of domain-specific AI to generate measurable value creation. The study presents an analytical framework and implementation roadmap across four high-potential industries in Thailand: tourism, healthcare, agriculture, and manufacturing.

National-level value enhancement through AI can be realized when five critical enablers are systematically addressed: (1) trustworthy data and AI governance aligned with legal and regulatory frameworks; (2) accelerated and continuous workforce upskilling; (3) accessible and scalable computational infrastructure; (4) financial mechanisms that support large-scale deployment; and (5) comprehensive risk management covering cybersecurity, ethical considerations, and supply chain resilience.

The article concludes with a set of policy recommendations aimed at accelerating AI scaling, outlining short-term (1–2 years) and medium-term (3–5 years) measures. These recommendations are accompanied by measurable key performance indicators (KPIs) spanning economic outcomes, systemic capability development, and risk mitigation dimensions.

Introduction and the Thai AI Market Context

Thailand's big data and artificial intelligence (AI) market has been expanding on both the supply and demand sides. The Big Data Institute (BDI) estimated that the market value in 2025 reached THB 41,858 million, representing an 18% increase from the previous year [1]. This trend carries two important implications. First, Thailand possesses a sufficiently large domestic market to serve as a foundation for the development of AI-driven products and services by local enterprises. Second, market expansion does not necessarily translate into productivity gains if the majority of organizations remain at the pilot stage or adopt AI in fragmented and non-systematic ways.

From a policy perspective, the National AI Action Plan (2022–2027) outlines five strategic pillars and fifteen programs covering the entire AI ecosystem—from infrastructure development and human capital enhancement to the promotion of real-world AI deployment [2]. In 2024 alone, a total of 592 AI-related projects received government support, amounting to a combined budget of THB 1,043.04 million [3].

Despite this progress, practical value creation through AI continues to be constrained by three critical bottlenecks: (1) data availability and system interoperability; (2) workforce capacity and digital skills; and (3) trust and AI governance. A joint survey conducted by the Electronic Transactions Development Agency (ETDA) and the National Science and Technology Development Agency (NSTDA) found that only 17.8% of organizations have fully implemented AI solutions, while 73.3% report plans to adopt AI. This gap highlights substantial scaling opportunities that depend on resolving systemic constraints [4].

To provide a quantitative overview, this article uses the BDI baseline market value to estimate future market expansion under growth assumptions consistent with reported trends and global AI market trajectories. These figures are presented solely for policy comparison purposes and should not be interpreted as official forecasts [1].

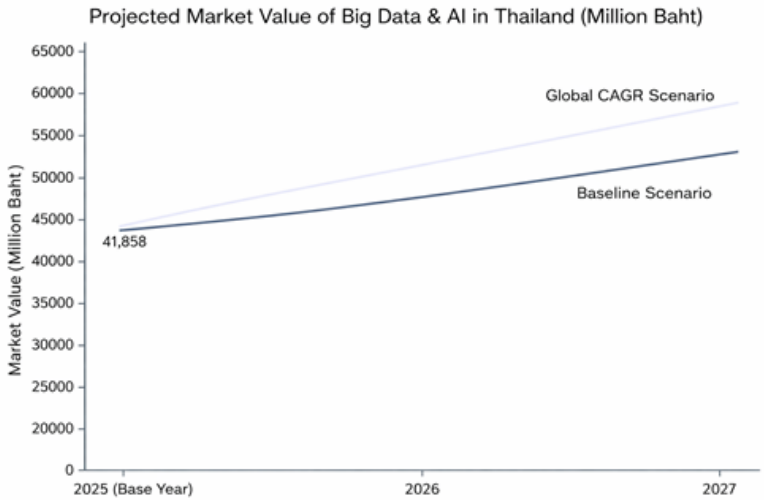

Figure 1 Projected Market Value of Big Data and AI in Thailand Based on BDI Growth Assumptions (Baseline) and Global Market Trends (Global CAGR)

Strategic Deployment of Domain-Specific AI in Four High-Potential Industries

The strategic approach across industries follows a consistent framework. It begins with the identification of high-value use cases that deliver clear and measurable impact. These use cases are then developed into operational systems that can be effectively integrated into organizational workflows. Subsequently, successful implementations are scaled through digital platforms and strategic partnerships within the broader business ecosystem.

This phased approach enables organizations to achieve tangible short-term outcomes before committing substantial resources to broader deployment in subsequent stages. By prioritizing demonstrable value creation, firms can reduce implementation risk while building internal capabilities necessary for sustainable AI-driven transformation.

Tourism Sector

The Bank of Thailand estimated tourism revenue in 2024 at approximately THB 1.4 trillion, with projections indicating continued growth to THB 1.5 trillion and THB 1.7 trillion in 2025 and 2026, respectively [5]. This upward trend suggests that value creation in the tourism sector depends not merely on increasing the number of visitors, but more importantly on enhancing revenue per trip and optimizing service capacity. Both dimensions represent areas where artificial intelligence can generate direct and measurable impact.

High-value AI use cases in this sector include:

(1) **Revenue management and demand forecasting,** utilizing seasonal demand analytics to optimize pricing strategies and allocate rooms or services more efficiently

(2) **Personalized services for high-value customer segments,** leveraging behavioral data to increase conversion rates and per-trip expenditure

(3) **Generative AI service assistants,** developing multilingual intelligent assistants to reduce response time and enhance communication quality with tourists

(4) **Data analytics for quality tourism strategies,** designing targeted visitor acquisition strategies in collaboration with tourism platforms. The Asian Development Bank (ADB) identifies digitalization and AI as critical drivers for advancing quality tourism in the region [6].

Key challenges include fragmented data across accommodation providers, activity operators, and transportation services; the absence of standardized mechanisms for secure data exchange; and limited digital skills and investment capacity among small and medium-sized enterprises (SMEs) [7].

In the short term (1–2 years), priority initiatives should focus on AI-driven revenue optimization and the development of intelligent customer service centers. In the medium term (3–5 years), efforts should shift toward establishing regional tourism data-sharing systems to enhance capacity management and collectively improve service quality through collaboration among government agencies, private sector operators, and digital platforms [6].

Healthcare Sector

The healthcare system faces increasing pressure from workforce shortages and rising operational costs. The World Health Organization (WHO) reported that Thailand's health expenditure accounted for 5.16% of GDP in 2021 [8]. The Organisation for Economic Co-operation and Development (OECD) emphasizes that AI adoption in healthcare must adhere to principles of trustworthiness, safety, and systematic risk management [9].

Low-risk, high-readiness AI use cases in this sector include:

(1) **Generative AI and automation for administrative workflows,** such as summarizing medical records, processing insurance claims documentation, and managing patient appointments;

(2) **AI-assisted medical imaging triage,** which requires rigorous validation and physician oversight in accordance with OECD guidelines [9] and Artificial Intelligence–Generated Content (AIGC) governance principles [10]

(3) **Hospital operational AI,** including predictive analytics for bed occupancy rates and inventory management of medical supplies

(4) **Population health analytics,** enabling proactive disease prevention planning and more efficient resource allocation.

Key barriers include:

(1) patient privacy and data protection concerns;

(2) the lack of interoperable data standards across healthcare systems;

(3) the assignment of liability in cases of AI-related clinical errors; and

(4) risks associated with inaccurate outputs generated by Generative AI, which require structured oversight consistent with AIGC governance frameworks [10].

In the short term (1–2 years), strategic priorities should focus on administrative automation and operational analytics, alongside the establishment of an internal AI governance committee to oversee risk, compliance, and ethical standards [11]. In the medium term (3–5 years), efforts should concentrate on enhancing cross-system data interoperability and deploying validated AI-assisted medical imaging models, supported by continuous performance monitoring in alignment with the principles of trustworthy AI [9].

Agricultural Sector

The agricultural sector accounted for 8.58% of Thailand's GDP in 2023 [12] and represents a domain where AI can generate tangible and measurable impact. Prominent high-value AI use cases include:

(1) **Plant disease diagnosis via LINE application.** The National Electronics and Computer Technology Center (NECTEC) has developed an AI-based system that enables farmers to capture plant images and receive diagnostic results within 3–5 seconds. The system currently supports key economic crops such as rice, strawberries, and cassava [13, 14].

(2) **Precision agriculture powered by AI,** which has demonstrated the potential to increase yields by approximately 15–20% while reducing overall investment costs by 25–30%, depending on geographic conditions and crop type [15].

(3) **Quality analytics and supply chain traceability,** integrating data from farm plots to end consumers in order to enhance quality standards, strengthen compliance, and improve export competitiveness.

(4) **Risk assessment for agricultural credit and insurance,** leveraging yield and weather data to enable financial institutions to design more accurate and tailored financial products for farmers.

Key constraints include the predominance of smallholder farming structures with limited access to advanced technologies; the lack of standardized field-level data; and model performance drift caused by seasonal variability and environmental changes, which necessitate continuous monitoring and model recalibration.

In the short term (1–2 years), strategic priorities should focus on scaling low-cost, accessible AI-based plant disease diagnostic services. In the medium term (3–5 years), efforts should concentrate on expanding precision agriculture through cooperatives and large-scale farming clusters, alongside the development of integrated product traceability platforms to elevate export standards and global competitiveness.

Manufacturing Sector

The manufacturing sector constitutes a core pillar of Thailand's economy, accounting for approximately 24.32% of gross domestic product (GDP) in 2024 [16]. Despite its significance, most enterprises remain at the stage of case-by-case technology adoption and must accelerate their transition toward systemic AI integration in order to sustain and enhance long-term competitiveness.

High-value AI use cases in this sector include:

(1) **Predictive maintenance.** McKinsey reports that AI-enabled predictive maintenance can reduce production downtime by 30–50% and extend machine lifespan by 20–40% [17].

(2) **Computer vision–based quality inspection,** which reduces defects and rework while addressing shortages of specialized skilled labor.

(3) **Intelligent energy management systems,** lowering energy costs per unit of output and enhancing process stability.

(4) **No-code or low-code AI platforms for industrial users,** such as NECTEC's Nomad-ML platform, which is designed for accessibility without programming expertise and has been piloted across multiple industries, including metal components, frozen food processing, and medical applications [18].

Key constraints include legacy machinery systems with limited data interoperability; cybersecurity risks in industrial control systems; and high upfront investment costs related to equipment upgrades and process redesign.

In the short term (1–2 years), strategic efforts should prioritize pilot implementations within critical production lines to demonstrate measurable performance gains. In the medium term (3–5 years), expansion should focus on deploying edge intelligence systems, integrating manufacturing control systems with enterprise information systems, and implementing AI-driven supply chain analytics to enhance resilience against market volatility.

Enabling Factors for Scaling AI Adoption

Data and AI Governance

A foundational prerequisite for large-scale AI deployment is the establishment of trust through transparency and auditability. The Artificial Intelligence–Generated Content (AIGC) governance framework proposes three core components: AI governance structure, AI strategy, and AI operational management. These elements should be operationalized through systematic instruments such as model cards, data lineage tracking, audit logs, and pre-deployment risk assessments—particularly in the case of Generative AI systems [11]. Effective governance mechanisms not only mitigate legal and ethical risks but also strengthen institutional confidence in AI-driven decision-making.

Workforce Development and Upskilling

The World Bank indicates that generative AI adoption in Thailand remains relatively limited, with skill shortages and motivational barriers particularly pronounced among small and medium-sized enterprises (SMEs) [7]. To address this gap, private organizations should establish structured AI career pathways, including roles such as AI product managers, data stewards, model engineers, and model risk specialists. Performance evaluation systems should be redesigned to incentivize measurable productivity gains enabled by AI rather than merely counting the number of AI-related initiatives.

Computational Infrastructure

Access to scalable cloud computing services and high-performance graphical processing units (GPUs) is a critical determinant of both the speed and cost-efficiency of AI development. Investments by major global technology providers—such as Google's data center expansion in Thailand—signal positive momentum for the domestic AI ecosystem [19]. However, the World Trade Organization (WTO) cautions that continued concentration of AI resources may widen wealth disparities between developed and developing economies if not addressed through inclusive infrastructure policies [20].

Financial Support Mechanisms

Public-sector support includes dedicated AI project funding [3], enhanced tax deductions for research and development (e.g., double tax deductibility), and investment incentives from the Board of Investment (BOI) targeting digital and AI technologies. Meanwhile, the private sector should leverage strategic investment mechanisms, including venture capital participation in technology startups, acting as early adopters to pilot innovations in real-world environments, and engaging in public–private co-investment models for AI applications that generate broad economic spillovers.

Policy Recommendations

To accelerate the transition of artificial intelligence from experimental initiatives to economically impactful deployment, this article proposes five policy measures, prioritized from immediate actions to structural reforms. These recommendations aim to directly address the systemic bottlenecks that constrain value creation within Thai enterprises.

1. **Facilitate efficient data circulation across the four priority industries** by

establishing standardized data frameworks and secure data-sharing mechanisms. This may include the development of data trusts and regulatory sandboxes for innovation, guided by the AIGC governance framework as the principal reference model.

2. **Shift policy orientation from "supporting experimentation" to "supporting scaling."** Public funding and incentive schemes should be tied to measurable outcome-based indicators and demonstrable real-world implementation within organizations.

3. **Strengthen tax incentives and investment privileges that directly promote AI-driven value creation,** such as enhanced R&D tax deductions (e.g., double deductibility) and Board of Investment (BOI) incentives targeting digital and AI technologies, particularly to accelerate adoption among small and medium-sized enterprises (SMEs).

4. **Expand access to computational infrastructure,** ensuring that Thai businesses can obtain scalable cloud computing services and high-performance processing capacity at competitive and affordable costs.

5. **Establish minimum AI governance standards in high-risk sectors,** including healthcare, finance, and critical national infrastructure. The AIGC framework should serve as a foundational reference to ensure transparency, accountability, and risk mitigation in AI deployment.

Practical Guidelines for Private-Sector Value Creation through AI

The implementation roadmap for private enterprises seeking to generate value from AI adoption consists of the following sequential steps:

1. **Identify value creation opportunities** Organizations should prioritize business processes where AI can significantly increase revenue or reduce unit costs. Clear and measurable success indicators must be defined at the outset to ensure outcome-oriented deployment.

2. **Assess data readiness** Enterprises should conduct a comprehensive audit of available data assets, evaluating data quality, completeness, consistency, and access rights. This assessment provides the foundation for selecting feasible and scalable AI use cases.

3. **Establish governance mechanisms prior to deployment** An internal AI governance committee should be formed to oversee compliance, ethics, and risk management. Human-in-the-loop decision processes must be defined, and audit trail systems should be implemented in accordance with AIGC governance guidelines to ensure transparency and accountability.

4. **Conduct measurable pilot implementations** Initial deployment should focus on evidence-based use cases with rapid and demonstrable impact, such as predictive maintenance, intelligent chatbots, and automated document processing. Pilot projects must incorporate performance tracking mechanisms to quantify return on investment (ROI).

5. **Scale systematically** Organizations should develop standardized implementation blueprints covering data management, model deployment, monitoring, and performance evaluation. This structured approach enables rapid replication across business units and sup-

ports sustainable AI capability development.

Conclusion

Artificial intelligence holds substantial potential to enhance the competitiveness of Thai businesses. However, translating this potential into tangible economic value requires more than experimental adoption of emerging technologies. This article emphasizes focusing on "high-value creation points" and systematically scaling implementation across four key industries: tourism, healthcare, agriculture, and manufacturing.

Although Thailand's AI market continues to expand—reaching an estimated value of THB 41,858 million in 2025—only 17.8% of organizations have implemented AI in practice. The primary barriers are not a lack of interest, but systemic bottlenecks related to data readiness, workforce capabilities, and AI governance.

Addressing these constraints requires coordinated action across five critical dimensions: (1) establishing trustworthy AI governance, (2) continuous workforce development, (3) access to computational infrastructure, (4) financial mechanisms that incentivize scaling rather than experimentation, and (5) robust management of cybersecurity and ethical risks.

From a policy perspective, the key shift must be from "supporting experimentation" to "supporting scaling," linking public measures to measurable outcomes and demonstrable implementation. For the private sector, the strategic priority should be to begin with high-impact, quick-win use cases, embed governance mechanisms from the outset, and institutionalize AI as a permanent organizational capability rather than a stand-alone pilot initiative. Only through such structural transformation can Thai enterprises achieve sustainable competitiveness in the global economy.

Author Biography

Dr.Chanwit Boonchuay serves as President of the Artificial Intelligence Entrepreneur Association of Thailand (AIEAT) and Chief Executive Officer of Synapse (Thailand) Co., Ltd. He holds a Ph.D. in Power System Management from the Asian Institute of Technology (AIT). He has previously served as a visiting researcher at the University of Tennessee, United States, and the University of Hong Kong.

Dr.Chanwit Boonchuay contributes to national-level policy development as a member of specialized committees driving Thailand's National Artificial Intelligence Strategy. He actively collaborates with both public and private sectors to advance the country's AI ecosystem and strengthen its innovation capacity.

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