

## **Racing toward the future: artificial intelligence in Southeast Asia**

# Executive summary

Artificial intelligence (AI) will have a profound impact on industries, societies, and governments in the 21st century—enabling technology adoption, digital transformations, and new customer experiences. The need to embrace AI is immediate, which has been readily apparent amid the COVID-19 pandemic as AI is playing a crucial role in areas such as cluster identification, contact tracing, symptom identification, and drug development.

For Southeast Asia, AI poses both an opportunity and a challenge. It will create the platform to advance key sectors such as manufacturing, retail, financial services, and healthcare. However, local AI talent and capabilities are still limited, especially outside Singapore—creating a potential gap in the development of solutions for specific socioeconomic issues across the highly diverse Southeast Asian countries, consumers, and industries.

To better understand the state of AI readiness in Southeast Asia, Kearney and EDBI surveyed more than 110 AI users, providers, and investors; interviewed representatives of more than 25 companies and government agencies across Singapore, Malaysia, Indonesia, Thailand, Vietnam, and the Philippines; and examined the expected economic impact of AI across multiple use cases and industries. Our study sheds light on the immense value at stake: if applied and executed well, **AI could add \$1 trillion to the region's GDP by 2030.**

Given its potential impact, AI is often treated as a panacea, leading early adopters to dive in without a clear business case. Our study reveals the importance of a focused AI implementation: 80 percent of the potential value comes from fewer than 20 percent of the use cases, primarily in sales, marketing, and supply chain management. In Southeast Asia, revenue management is the starting point for AI investments, achieving two to three times more attention than cost management, as exemplified in use cases such as next product to buy (NPTB) and personalized offerings. In addition to a focused implementation, the key to maximizing the value of AI is fully engaging stakeholders to ensure that the AI solutions address the business priorities and deliver a near-term impact.

The benefits of AI are clear, yet the adoption rate says otherwise: more than 80 percent of the region is still in early stages of adoption. Our study reveals five challenges and opportunities:

**1. An overemphasized concern for the AI talent gap.**

This can be mitigated by democratizing AI. For many use cases, leading AI solution providers are offering easy-to-deploy AI models. Upskilling the workforce with the relevant business understanding is also becoming more important than acquiring external talent who have technical AI knowledge.

**2. A fragmented and nascent AI ecosystem.** This requires more systematic development, especially by creating a conducive test and development environment that brings AI users and providers together and stimulates the development of local use cases and datasets.

**3. An evolving data governance and infrastructure.**

This will require a deliberate effort to put the necessary governance structure in place and balance the infrastructure investments that are needed to support both near-term business priorities and longer term, large-scale data requirements.

**4. New regulations that require closer engagement between users and regulators.** Regulators need a deeper understanding of the evolving industry and consumers' needs along with a balanced risk-based, forward-looking approach to AI.

**5. Resistance to AI.** Many users push back against AI adoption because of its perceived impact on job opportunities and the requirements for developing short-term and long-term capabilities. Countries can address these challenges by making systemic changes in the education system.

Resolving these issues will require concerted actions from all stakeholders: governments, businesses, technology providers, investors, and academia alike. National AI strategies and skill-building programs are a good start, but they won't be enough. AI users and providers will need to focus more on the business impact, and investors can play an active role in disseminating AI across their portfolio companies. Businesses will also need to ensure they are well-organized to drive AI adoption, including clear business ownership, agile ways of working, aggregation of feature sets to scale use cases, and linking AI models to automated workflows.

Although the ecosystem in Southeast Asia is still in nascent stages, applying AI has become easier for many businesses, with fewer concerns about the internal talent gap. It is now time to unleash the full power of AI and start the race toward the future.

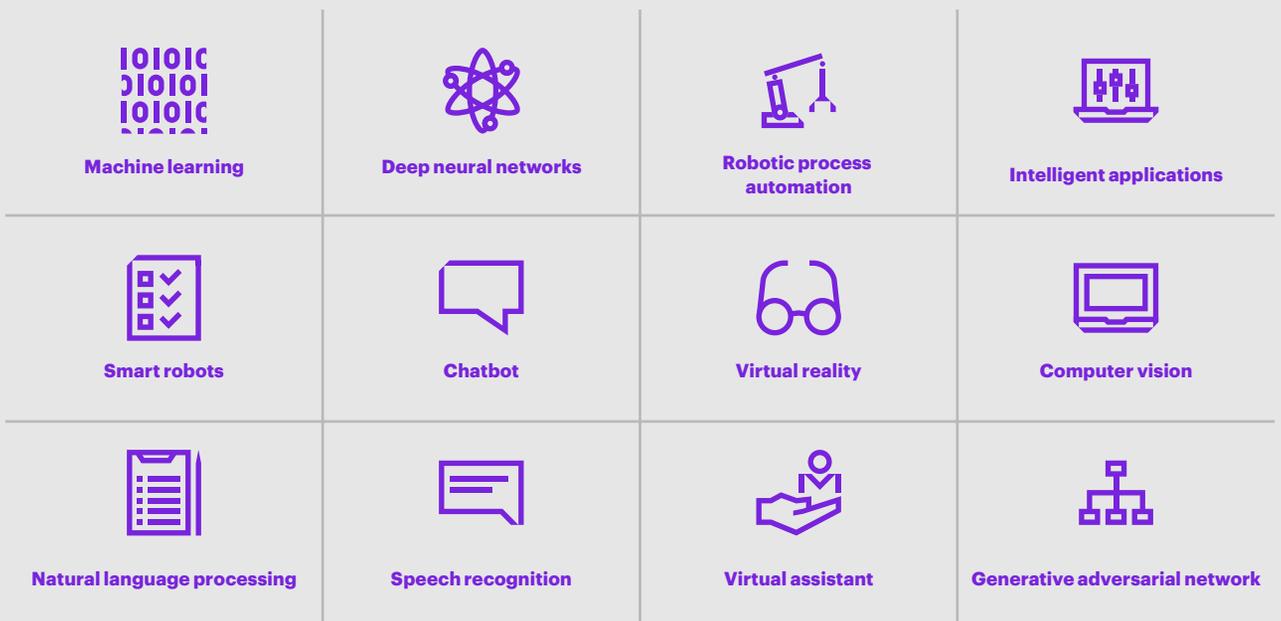
# AI is integral to Southeast Asia's future, but it is still in an early stage

## AI covers a broad set of intelligent applications

AI is the discipline of making analytical machines intelligent, enabling an organization to function appropriately and with foresight. AI can be embedded in a broad range of applications, many of which we considered in our study (see figure 1).

One familiar application is the AI-enabled customer service chatbot. AI also extends to newer human augmentation technologies that enable automating business processes to onboard new employees, provide financial advice, or act as a personal assistant. And, of course, AI will include applications that strive to emulate human behavior in complex, unpredictable environments, such as autonomous driving.

Figure 1  
**A range of AI applications were considered in our research**



Source: Kearney analysis

# AI adoption is still in nascent stages in Southeast Asia

The advent of Industry 4.0 has spotlighted the need to accelerate technology adoption, especially AI, to futureproof economies. However, our study shows that Southeast Asia is still in the early stages of AI adoption (see figure 2).

The embrace of new technologies typically follows an S-curve, beginning with innovators and early adopters. When adoption hits an inflection point, it triggers exponential growth as the technology’s potential value becomes clearer. Our study indicates that AI adoption in Southeast Asia is still in the early part of the curve, with 30 percent of respondents developing their AI strategies or just starting to invest (see appendix on page 22). About 50 percent of companies are at least piloting some AI initiatives. Only 15 percent are in advanced stages of AI implementation, typically those in more service-oriented sectors. When it comes to investment, 83 percent are devoting less than 0.5 percent of their revenues to embedding AI solutions into their operations.

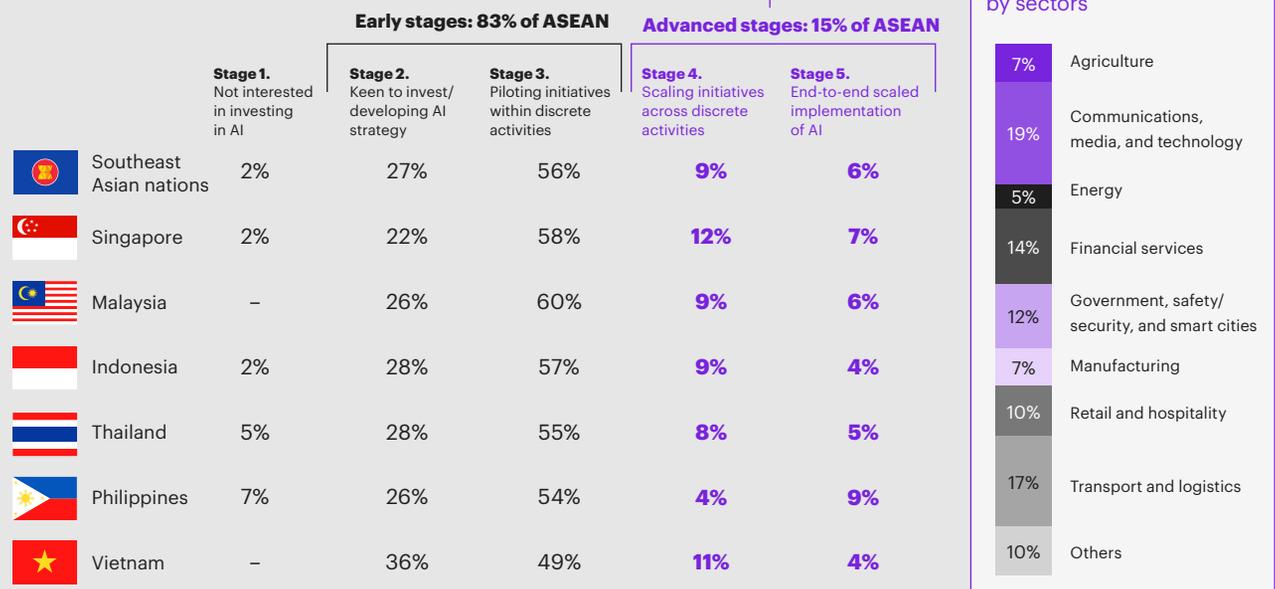
Although investments in AI solution providers have grown steadily, the region is lagging more advanced countries by two to three years (see figure 3 on page 5). The region received AI investments of only \$2 per capita between 2015 and 2019—an amount that is dwarfed by the per capita investments of \$155 and \$21 respectively for the United States and China. Singapore is the region’s standout with \$68 per capita investment.

Even though AI investments are concentrated in Singapore, nine of the top 10 deals were for Singapore-based start-ups with businesses and use cases across the region. For example, Biofourmis, a health analytics platform that analyzes physiology data from clinical-grade wearables, operates in Singapore and Indonesia. Similarly, Tookitaki, an intelligent decision-support system for compliance programs in the financial services sector, operates across the six larger Southeast Asian countries.

The region is also gaining AI research attention from international companies. American software firm Salesforce opened its first overseas AI research center in Singapore last year, joining the ranks of YITU Technology, Alibaba, Dyson, and DataRobot.

Figure 2  
**More than 80 percent of the region is in the early stages of AI adoption**

Stages of AI (by % of respondents, region, or country)

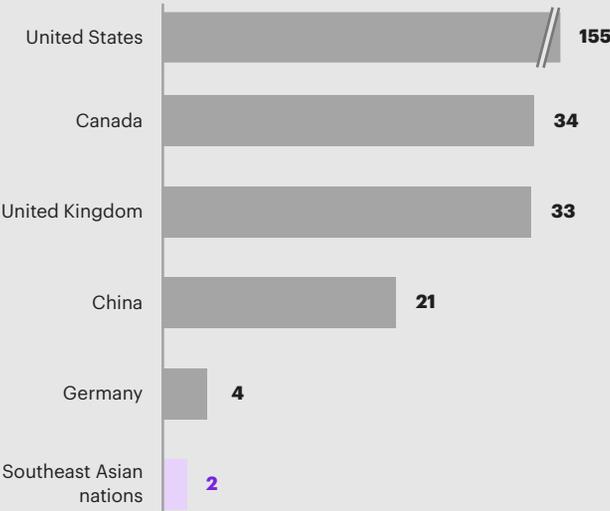


Note: Percentages may not resolve because of rounding.  
 Source: Kearney–EDBI artificial intelligence study

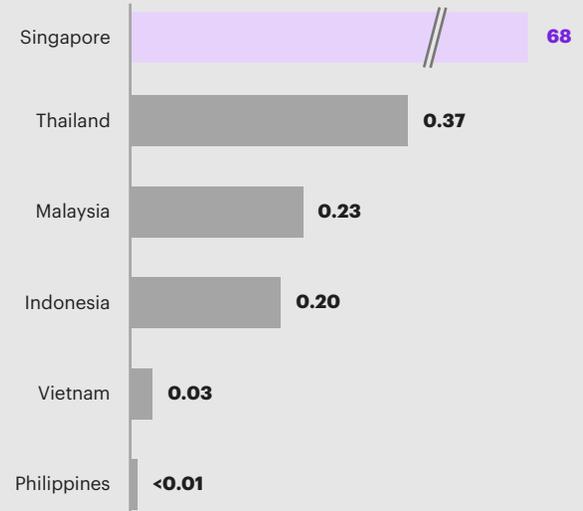
Figure 3

### Investments in AI solutions companies in Southeast Asia lag more advanced countries, with Singapore being the exception

AI investments across the world  
(\$ per capita, 2019)



AI investments across Southeast Asia  
(\$ per capita, 2019)



Note: Philippines figure reflects investments in 2018 due to data availability.  
Sources: Pitchbook; Kearney analysis

## AI has the potential to add \$1 trillion to the region's GDP

More than 70 percent of our survey respondents see AI as crucial to Southeast Asia's future and point out that AI adoption needs to be accelerated.

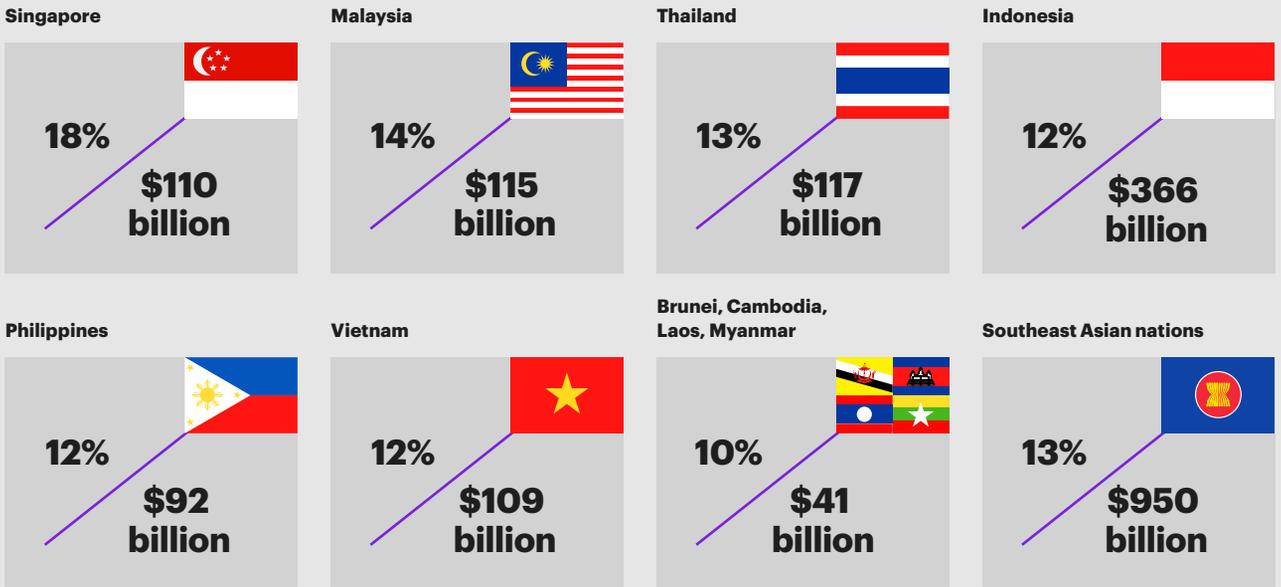
Our study reveals that AI can have a strong overall impact: a 10 to 18 percent GDP uplift across Southeast Asia by 2030, equivalent to nearly \$1 trillion (see figure 4 on page 6). The impact variance seen across countries is the result of the different sectorial make-ups and the relative maturity of each country's AI infrastructure and adoption readiness. For instance, Singapore's GDP is predominantly made up of service sectors and has a highly digitized, automated, and efficient economy that is well-positioned to capture the full potential of AI. For example, AI will deliver a bigger economic impact in Singapore than it will in Cambodia, which is more focused on primary sectors and is still at an early stage of AI adoption.

Regional governments have started to recognize how important AI is to their economies. Singapore launched its National AI Strategy in 2019, and Malaysia and Indonesia are expected to follow suit this year. Malaysia already announced a \$1 billion project to build its first AI park—a partnership between a local company, G3 Global, and China's SenseTime and China Harbour Engineering.

Figure 4

**AI is expected to provide a 10 to 18 percent uplift in GDP across Southeast Asia by 2030**

Economic impact of AI in 2030 (% of 2030 GDP)



Source: Kearney analysis

Given the value at stake, now is the time for all governments and companies to turn their attention to compelling AI strategies. As AI continues to evolve, it will transform Southeast Asia's top five sectors (see figure 5 on page 7).

**“Southeast Asia’s AI economy is growing rapidly, with governments and companies investing more in machine learning to find new ways of improving their resilience and productivity. With the rising wave of middle-class affluence coupled with rapid digital adoption, AI should yield good financial returns while creating disruptive capabilities to transform industries and stimulate economic growth with the next big breakthrough. As a long-term value-adding**

**global investor, EDBI is committed to investing in AI and related technologies for wide-ranging applications from smart city solutions, Industry 4.0, urban sustainability, healthcare, and nurturing talents in these emerging fields.”**

**Chu Swee Yeok,  
CEO and president, EDBI**

Figure 5

**Southeast Asia’s top five sectors will benefit from AI growth**

Sector	Description	Use case examples
<b>Manufacturing</b>	<p>Manufacturing comprises 22 percent of the Southeast Asian economy. Industry 4.0 technologies are expected to expand manufacturing value added (MVA) by 35 to 45 percent over the next 10 years. AI is vital to capturing this MVA potential across the entire value chain, from product engineering and supply chain management to logistics and circular management.</p>	<p>A leading Japanese automotive OEM aims to improve operational efficiency by 30 percent in 2021 through new AI solutions—for example, by using machine learning and computer vision to optimize maintenance and quality inspection.</p>
<b>Retail and hospitality</b>	<p>Retail and hospitality is growing at a rapid pace and makes up 16 percent of the region’s economy and 4 percent of its employment. Advances in machine learning and big data can drive 20 to 25 percent in topline growth, delivered by AI use cases such as NPTB, intelligent pricing, and supply chain effectiveness. With a mobile-centric population, retail in Southeast Asia is poised for a rapid disruption from AI and workforce displacement.</p>	<p>CapitaLand, one of Asia's largest real estate companies, introduced an AI model for its service apartment business that recommends both rates and minimum duration of stay based on historic trends, competitor rates, and events in the city. This model resulted in a significant revenue uplift.</p>
<b>Agriculture</b>	<p>Agriculture remains crucial to the region and contributes 11 percent of GDP. Southeast Asia is home to some of the world’s largest agricultural exporters, but with low productivity and crop wastage that can be as high as 20 to 30 percent. AI stands to disrupt this sector: up to 90 percent of crop diseases, better pesticide demand, and fertilization requirements can all be predicted using a combination of drone and image recognition algorithms.</p>	<p>A leading private equity player in the agriculture space invested in a company that uses AI in hydroponics to insert the optimal combination of 18 different nutrients in water for accelerated and sustained plant growth.</p>
<b>Government, safety/security, and smart cities</b>	<p>The public sector, contributing 12 percent to the region’s economic activity, is facing significant pressures. Infrastructure is being pushed to its breaking point, and the urban population is projected to increase from the current 280 million to 370 million in 2030. With limited land and legacy infrastructure, AI has the potential to help ease the burden through resource optimization, smarter cities, traffic congestion relief, and improved citizen well-being and education.</p>	<p>LTA Singapore deploys sensors to gather traffic information and make traffic light systems smarter by analyzing real-time information for traffic optimization.</p>
<b>Healthcare</b>	<p>Healthcare spend in Southeast Asia will more than double over the next 10 years to nearly \$1 trillion. AI is vital not only for disease prevention and recovery, but also to democratizing healthcare in less developed countries, addressing doctor shortages, and tackling the threat and management of infectious diseases such as COVID-19.</p>	<p>Doctor Raksa is a telemedicine service in Thailand that offers consultation with certified doctors through a secure chat, audio, or video consultation platform and uses AI to assist physicians in performing preliminary diagnoses. When the COVID-19 outbreak took hold, adoption of services grew nearly sixfold.</p>

Source: Kearney analysis

# The benefits of AI can be transformative, but it requires a razor-sharp focus

## AI is not a panacea, and the focus needs to be on specific use cases

Given its high-impact potential, AI can be viewed as a panacea for many business problems. As a result, some early adopters are applying AI solutions without carefully considering either the specific problem they are trying to solve or its local context.

Consider the example of a large Southeast Asian telecom group that implemented an AI-powered know-your-customer procedure for its mobile wallet business only to discover it resulted in low auto-approval rates. They later realized that the solution they were using was built using primarily American and European datasets, which did not apply well to the Southeast Asian context. After several iterations with localized datasets, they saw a huge improvement in performance.

Most importantly, AI solutions need to be focused on specific use cases that solve business problems and deliver economic value in the near term, such as contact center intelligence, personalization, forecasting, and intelligent document management. Our study indicates that 80 percent of AI's potential value comes from less than 20 percent of use cases. Many companies are implementing AI without clearly identifying high-impact use cases or getting business stakeholders on board. In fact, full involvement of business owners at each step of the use case deployment is crucial to maximizing the value of AI.

At the aggregate level, use cases in sales and marketing as well as in supply chain management deliver the biggest impact. For example, many consumer packaged goods companies forecast inaccuracies because of high demand volatility from stock-keeping unit proliferation. To address this, one major company in Southeast Asia used machine learning-based predictive analytics and pattern recognition to augment its statistical model with various external data such as point of service, price, promotions, and social media posts. This improved forecast accuracy by 4 to 20 percent and lowered inventory safety stock by more than 12 percent.

Demonstrating a near-term impact is also vital to creating the organizational conviction and commitment needed to scale up and deploy AI more widely across the entire business value chain.

**“It is important to have each country invest in capacity to develop their own algorithms and AI models, as opposed to importing global AI models and implementing them locally. This will help eliminate systemic bias and solve local problems more holistically.”**

**Naveen Menon,  
President (ASEAN), Cisco Systems**

## Revenue management is the starting point for Southeast Asia

Our study reveals that Southeast Asia has an overwhelming focus on using AI to manage revenues. In fact, revenue management is getting two to three times more attention than cost management across all sectors (see figure 6 on page 10). This contrasts with other regions such as Europe, where around 70 percent of companies focus on using AI for productivity and efficiency. This seems to be because of both the nascent stage of AI adoption in Southeast Asia and the region's fewer opportunities to optimize labor costs. Consequently, AI-led topline solutions tend to attract more attention.

Going forward, we expect to see the region's AI priorities shift toward optimizing the cost base as organizations familiarize themselves with AI and become more aware of its potential to enhance other value chain areas. Not surprisingly, this will also lead to greater use case differentiation by industry. For example, the agriculture and retail industries will focus more on supply chain, operations, and procurement, while energy and public-sector organizations will pay more attention to backend optimization in HR and IT. AI adoption in manufacturing is in a nascent stage, but this might reflect Southeast Asia's high number of small to medium-size enterprises (SMEs), which make up 95 percent of all manufacturing companies. SMEs tend to be less able to adopt more advanced solutions.

Even within the same function, AI investments are distributed unevenly. In operations, for example, the region's manufacturing firms are keen on using AI for robotics and automation. However, AI-enabled predictive maintenance can make a bigger impact. This reinforces the need for both a more exhaustive business-focused cost-benefit analysis of all current and new use cases and a comprehensive implementation road map.

## AI can impact the entire value chain

Although there are specific industries and use cases that can benefit, AI has the potential to deliver a substantial impact across the entire value chain. Based on the use cases we examined, AI is likely to have the most impact in two areas: supply chain management and sales and marketing. More than 70 percent of all incremental AI value in Southeast Asia could be attributed to these two areas (see figure 7 on page 11).

However, within each function, some use cases have more potential than others. AI adopters have reported significant benefits from implementing AI across the value chain (see figure 8 on page 12). Leaders in Southeast Asia have seen a significant upside from sales and marketing use cases, in particular from predictive upselling and cross-selling, customer life-cycle management, and the right product recommendations.

In sales and marketing, NPTB and individualized offerings are huge drivers of value. Replacing basic recommendation engines, which cannot scale, with personalized recommendations powered by machine learning can greatly improve digital engagements, conversions, and revenues. Machine learning can help create and deliver high-quality recommendations that respond to specific needs, preferences, and behaviors of customers. When successfully implemented, AI can increase revenues by 21 to 30 percent (see Case study on page 13: Tokopedia and Appier).

Figure 6

**AI investments in Southeast Asia are focused on revenue management but will shift toward optimizing costs**

Focus of AI investments across the value chain

Scaled scores: relative to sectors

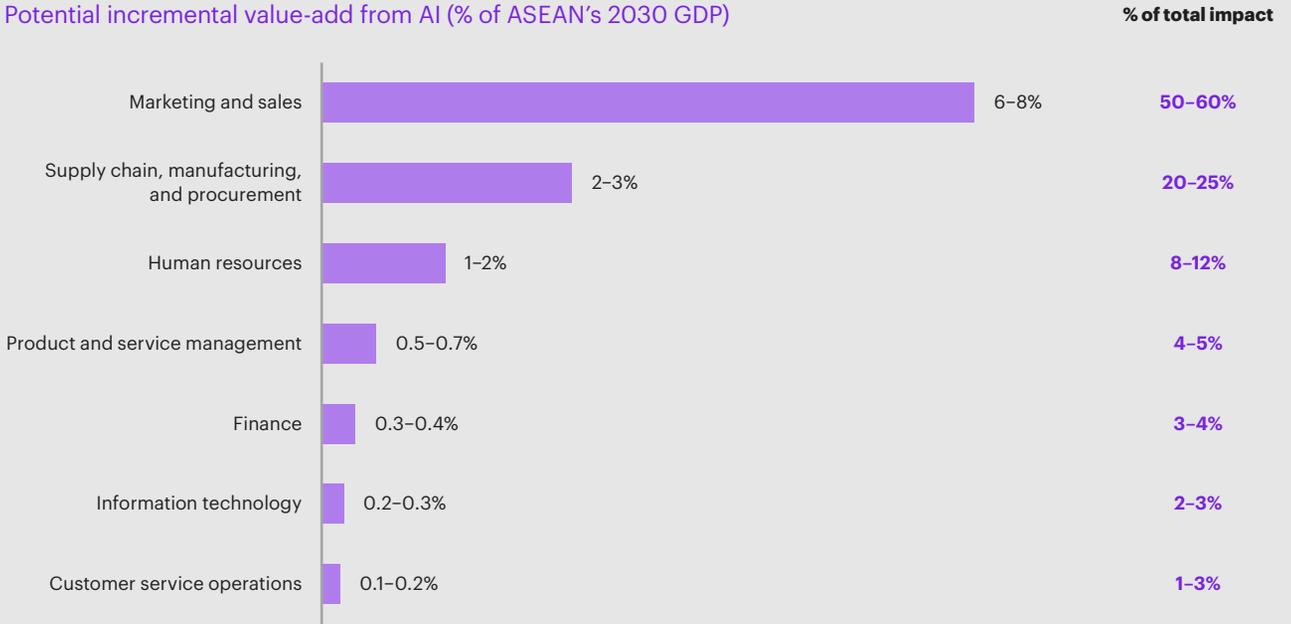


**Focus:** Very high [Dark Purple] Very low [Light Purple]  
**Increase:** Very large [Dark Grey+] Very small/zero [Light Grey+]  
**Decrease:** Very large [Dark Grey-] Very small [Light Grey-]

Note: Scores have been scaled at a sector level.  
 Source: Kearney–EDBI artificial intelligence study

Figure 7

**AI is likely to have the greatest impact in marketing and sales and supply chain management**



Source: Kearney analysis

One of the highest-impact use cases for supply chain management is inventory optimization (see Case study on page 13: Singapore Airlines). By implementing machine learning, businesses can more accurately forecast customer demand for sales and capacity planning, which can also help reduce waste. Machine learning-based forecasting, which combines historical data with a continual influx of new information, is a significant improvement over simple spreadsheets, which rely solely on historical data. AI-based inventory optimization solutions can lead to a 21 to 30 percent reduction in stock-outs.

Beyond these two areas, we also see substantial pockets of value in other functions. In HR, for example, AI can help organizations increase productivity in recruitment, engage employees, and reduce employee attrition (see Case study on page 13: Pulsifi). AI can also be used to improve customer experiences (see Case study on page 13: Parcel Platform).

Given the value at stake, the cost of focusing on the wrong AI use cases can be significant. Forward-thinking organizations reassess their AI efforts and prioritize the high-impact use cases that directly address their specific problems.

Figure 8

**AI adopters have reported significant improvements in performance across the value chain**

High-impact use cases across the value chain

Selected examples from AI leaders (results may vary across industries)

	High-impact use cases		
<b>Marketing and sales</b>	Predictive purchase intent identification >30% increase in lead conversion	Next product to buy/ individualized offerings 21% to 30% increase in revenue	Churn reduction 21% to 30% decrease in customer churn
<b>Supply chain, manufacturing, and procurement</b>	Predictive maintenance >30% reduction in maintenance cost	Yield, throughput, and line optimization >30% increase in productivity	Inventory and parts optimization 21% to 30% decrease in stock-outs
<b>Human resources</b>	Candidate sourcing and matching 11% to 20% increase in hiring productivity	Adaptive learning 11% to 20% increase in employee engagement	Employee retention 11% to 20% decrease in employee attrition
<b>Product and service management</b>	Product feature optimization 21% to 30% decrease in lead time	AI-assisted product development 6% to 10% decrease in new product development time	Predictive defect detection 6% to 10% increase in first pass yield
<b>Finance</b>	Credit risk modelling >30% improvement in risk model performance	Audit and compliance 21% to 30% reduction in noncompliance-associated costs	Fraud and anomaly detection 11% to 20% decrease in cases of fraudulent transactions
<b>Information technology</b>	IT operations monitoring 11% to 20% reduction in IT downtime	Predictive ticket management 11% to 20% improved IT productivity	Resource optimization 11% to 20% increased utilization of bandwidth and storage
<b>Customer service operations</b>	Call center customer/agent profiling and routing >30% increase in first call resolution	Predictive service intervention 21% to 30% decrease in customer service ticket	Self-serve incident management 21% to 30% reduction in customer service cost

Source: Kearney–EDBI artificial intelligence study

## Case studies

### Tokopedia and Appier

Tokopedia, one of Indonesia's largest online marketplaces, wanted to increase both the volume and quality of transactions using advanced programmatic solutions. Leveraging Appier's range of AI platforms, the company was able to automatically adjust to evolving customer behaviors and tailor product recommendations to each user's unique cross-screen and purchase journey. After implementation, Tokopedia increased the total number of transactions by 202 percent. Transactions per customer rose up to 27 percent, and revenue jumped 179 percent month over month.

### Singapore Airlines

Singapore Airlines implemented a recommendation engine on its website to drive e-commerce performance as well as customer engagement. Customer data is fed into a deep-learning AI model to analyze and predict customers' flight purchase behaviors. To optimize sales and inventory of extra legroom seats, Singapore Airlines has also developed a propensity score based on each customer's likelihood to purchase such seats.

### Pulsifi

In recruitment, most organizations rely on resumes, which show academic and work experience but not essential innate skills. Traits such as grit, motivation to learn, and teamwork are challenging for companies to assess, even in interviews. HR start-up Pulsifi has been using AI to help organizations solve this problem. For its management trainee program, which receives thousands of applications every year, a leading global consumer goods group integrated Pulsifi into its application process to better understand candidates' behaviors, motivations, and leadership qualities, bringing the shortlist down by more than 90 percent. Using Pulsifi, the company was able to shortlist top candidates with 97 percent accuracy—up from 50 percent.

### Parcel Platform

Parcel Perform, an e-commerce logistics start-up based in Singapore, was looking for a solution to provide e-commerce customers with a predicted delivery date, something that less than 5 percent of regional logistics carriers do. The company used AI and machine learning because logistical processes may vary due to reasons beyond the company's control, such as the COVID-19 pandemic. Partnering with AWS's Amazon Machine Learning Solutions Lab, the company went through the parcel data feed and implemented the model over six months. The date of arrival prediction engine initially achieved 91 percent accuracy with an average range of 1.21 days after using machine learning. Through successive iterations, the company reached 96 percent accuracy with an average range of 1.03 days.



# The challenges to AI adoption are well-founded, but the walls are crumbling

## Five issues are hindering AI adoption in Southeast Asia

The benefits from AI use cases are clear. The current adoption rate, however, says otherwise. We have identified five issues that are prevalent across all sectors (see figure 9 on page 15).

### 1. Overemphasized concerns for a talent gap

Respondents and interviewees report a mismatch between skills and AI requirements. More than 85 percent highlight difficulties in finding and attracting technical talent that can work on AI-related activities, especially as they are competing with technology companies, especially hyperscalers and start-ups. Interviews also reveal that technical talent often lacks the domain understanding to apply AI to crucial business problems. However, we believe this talent gap is overemphasized: the actual technical skill requirements for developing and implementing AI solutions have become less complex, given the increasing availability of easy-to-deploy AI models from leading AI solution providers.

### 2. Fragmented and nascent AI ecosystem

More than three-quarters of respondents (76 percent) see the AI ecosystem in Southeast Asia as immature and fragmented—particularly outside Singapore—making it difficult for most companies to find and work with suitable AI providers. This impacts both companies' willingness to experiment with use cases and AI providers' ability to develop new applications.

### 3. Evolving data governance and infrastructure

More than 50 percent of respondents feel that companies' data quality, infrastructure, and governance are inadequate. Disjointed data collection, lack of quality standards, and antiquated data infrastructure cause challenges in harmonizing and extracting data, creating potential security concerns. This fundamentally slows down the adoption of AI.

### 4. New regulations that impact AI development

Regulatory constraints—including privacy protection, data-sharing restrictions, on-premise storage requirements, and mandated AI model transparency—are an understandable yet significant bottleneck to AI adoption, especially in Indonesia. Three-quarters of respondents believe that more harmonized regulations across Southeast Asia will accelerate AI investments, addressing in-country AI adoption and facilitating cross-border data flows for the region's interconnected businesses and value chains.

### 5. User resistance to AI

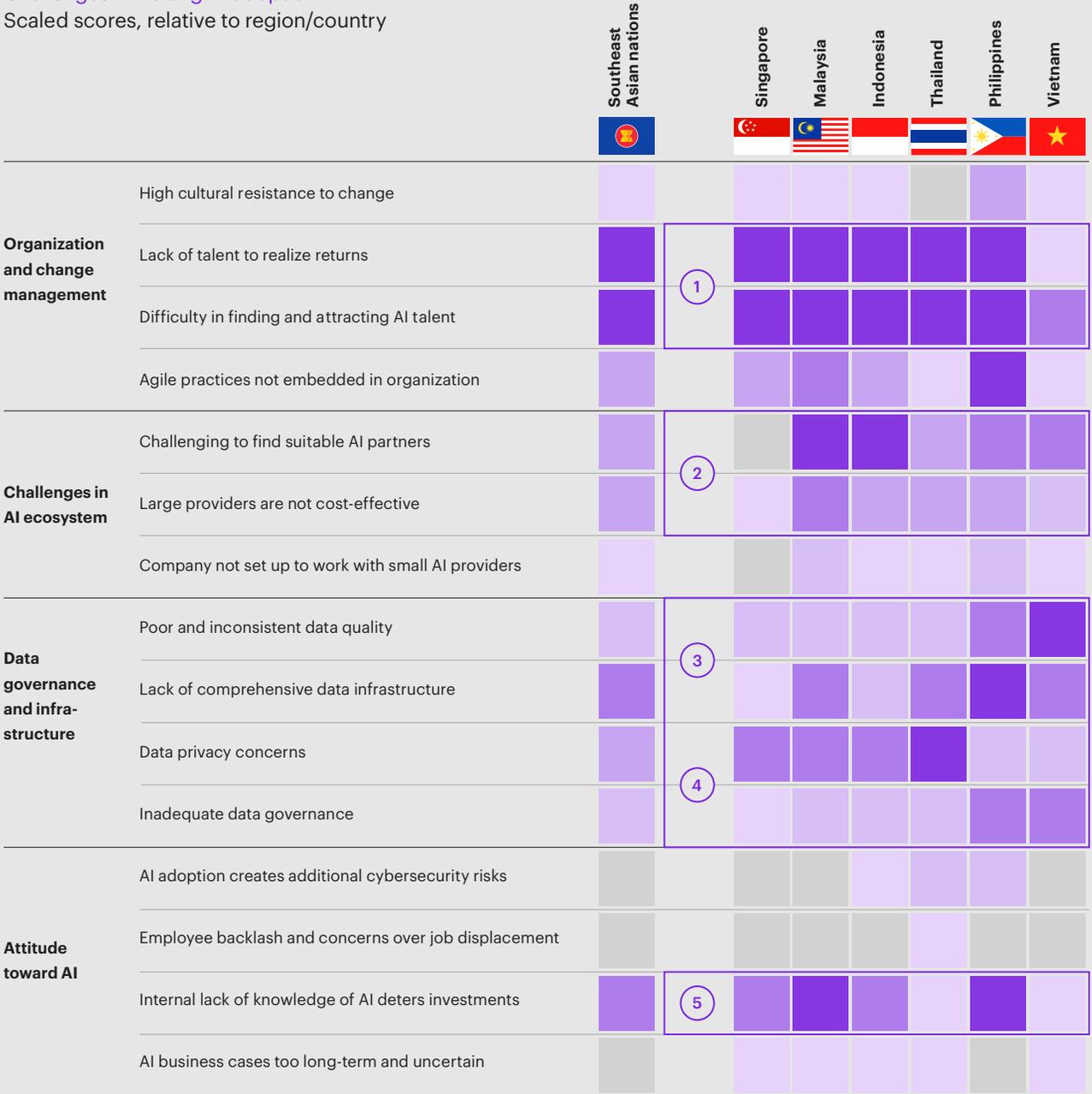
AI will impact jobs, and the pace of change can be worrisome for some. In fact, our interviews exposed two opposing scenarios: either a gradual replacement in line with previous technology adoptions or a catalytic displacement driven by an unprecedented, wide-ranging impact of AI on most industries. Regardless of the scenario, 33 percent of respondents are concerned about employee backlash from job displacement.

Figure 9

**The survey identified a number of challenges to AI adoption**

Challenges inhibiting AI adoption

Scaled scores, relative to region/country



**Key issues**

- ① Overstated concerns for talent gap
- ② Fragmented and immature AI ecosystem
- ③ Weak data governance and infrastructure
- ④ Regulations stifling AI development
- ⑤ Organizational resistance to workforce transition

**Extent of challenge**

Very high Very low

Note: Scores have been scaled at a country/region level. For example, the range of scores for Singapore is divided into five equal segments and ranked from very high to very low.

Sources: Gartner, Kearney–EDBI artificial intelligence study

# A comprehensive improvement agenda will help capture AI's full potential

Resolving these issues will require concerted actions at both the organizational and national level. Inspiration can be found in how some companies and governments are already addressing them.

## 1. Democratize AI to resolve the talent gap

The AI talent gap is often overestimated. While it is true that data scientists are in short supply, many AI solution providers have ready-made, easy-to-deploy models that do not require deep expertise or depend on external talent. With appropriate training, many science, technology, engineering, and mathematics (STEM) graduates will be able to transition to AI-related jobs such as data preparation, data visualization, and data management. Upskilling the workforce as well as acquiring external talent for select roles can also address the talent gap.

For example, the national initiative AI Singapore has an apprenticeship program designed to facilitate reskilling and outplacement into appropriate AI-related jobs. The program grooms talent with a nine-month classroom-based program, followed by on-the-job training with an industry partner to create a real-world AI use case. In addition, there are a number of publicly available training courses that allow anyone to easily acquire AI-related knowledge and improve their AI literacy.

Many interviewees pointed to a lack of business or domain knowledge as a bigger challenge than technical skills. AI leaders focus on continuously co-creating new use cases with immersion sessions that combine business and technical staff. For example, DBS Bank collaborated with AWS DeepRacer League to educate 3,000 staff about AI and machine learning. By raising awareness about AI and combining business understanding with technical know-how, the company was able to identify and develop more new AI use cases.

Rather than focusing on searching and competing for deep technical AI talent, companies would do well to invest in upskilling their existing talent who are interested in AI because their understanding of the business issues is invaluable.

Finally, technology partners play a significant role in helping companies deploy AI solutions faster and more effectively, reducing the need for specialized talent across domains. Leading providers have established relationships with systems integrators, software vendors, and software-as-a-service providers offering a wide range of tools, features, and models.

As a result, the perceived and often overemphasized talent gap is emerging as less of an obstacle to AI adoption in many businesses.

## 2. Systematically stimulate AI ecosystem and testbed development

The immaturity and fragmentation of Southeast Asia's AI vendor ecosystem make it difficult for many companies to identify providers that have the relevant AI models and business understanding. Furthermore, many potential AI users are inexperienced and looking for solutions that have proven to be successful before. This leads to a chicken-and-egg situation, particularly in parts of the value chain where use cases are nascent or specific to local business problems. Finally, large enterprises are predisposed to working with large vendors and are often not set up to work with smaller providers because of their procurement protocols. Larger enterprises can address these challenges with their in-house teams and infrastructures, but most SMEs cannot afford to do this. Cloud providers help lowering infrastructure costs, yet operational issues still require investing in local use cases.

Here, government-supported testbeds (test and development setups) can play a crucial role in stimulating local use cases, generating rich and context-specific datasets for iterative testing of models, and giving SMEs access to the AI ecosystem without immediate or major financial commitments. Testbeds also demonstrate the intricacies of AI's impact on society by enabling data-driven decision-making.

Building a testbed is difficult because it needs to support the development of real, scalable solutions and not merely serve as a technology showcase. By studying successful testbeds such as Dublin Smart Docklands, Masdar City, Britain's National Health Service, Manufacturing Quality Management in China, and Water Security in the United States, we discovered five common factors:

- a. **Real commitment.** Dedicated test areas, financial contributions, and regulatory exemptions
- b. **Results-orientation.** Not just a showcase, but focused on actual business outcomes
- c. **Multi-stakeholder.** Active and coordinated involvement from government, companies, start-ups, academia, and society

- d. **Scalable approach.** Progressively expanding from sandboxes to broader, public environments
- e. **Trial of real ecosystem changes.** Intended to test and revise existing rules, regulations, and methods while continuing to ensure safety and security

A good example of such a comprehensive testbed is Singapore's autonomous vehicle testing (see Case study: autonomous vehicle testing in Singapore).

For factors such as regulations and quality, relevant data are especially crucial to AI testbeds and will be discussed further below.

## Case study

### Autonomous vehicle testing in Singapore

Autonomous vehicles have the potential to radically transform mobility and investments. Singapore is conducting an autonomous vehicle trial, run by the prime minister's office with the involvement of ST Engineering, Nanyang Technology University, traffic police, and JTC Corporation (a planning agency).

A dedicated initial test circuit helped simulate the road environment for autonomous vehicles. After successful results, the testbed was extended to western Singapore, covering more than 1,000 km of public roads, which is allowing the initiative to conduct tests in a wider range of traffic scenarios and road conditions.

The primary objective of this testbed is to ensure public safety before rolling out autonomous vehicles on a broader scale. Hence, guardrails such as having an onboard safety driver, prominent signs, and third-party liability insurance are being tested. This approach not only reassures the public, but also allows the regulator to learn about the technology and its risks so it can develop effective long-term regulation.

### 3. Change the approach to data in the near term

Given that about 80 percent of AI activity is spent on basic data processing, having an adequate data structure and governance will accelerate the ability to adopt AI.

Data collection is often complex and time consuming. Companies should focus on collecting only the data that business stakeholders need (see Case study: AWS Registry of Open Data and Amazon SageMaker Ground Truth). Data infrastructure projects should no longer be managed in a traditional IT way—as multiyear “fixing of building blocks.” Instead, companies should follow a two-speed approach of balancing business requirements with systematic infrastructure building and legacy overhaul. Other important factors such as security, legal, and regulatory requirements should be addressed proactively.

### 4. Proactively engage regulators to address AI adoption

Our interviews reveal a number of regulatory areas that need to be addressed. Regulators need to be updated on the latest AI developments so they can revise regulations accordingly. Understandably, they are concerned about privacy protection, security, and data sharing, but they need to take a forward-looking approach to support the development of new AI solutions.

AI governance efforts should take a risk-based approach to addressing the responsible use of AI, taking into account the nature and context of the AI deployment. A one-size-fits-all approach risks underregulating highly impactful use cases, which creates potential for real harm, and overregulating the inconsequential, which hinders innovation and adoption of technology that can benefit people’s lives. This also reaffirms the fundamental importance of testbeds, not only for developing innovative solutions, but also for regulators to understand and test new regulatory boundaries.

## Case studies

### **AWS Registry of Open Data and Amazon SageMaker Ground Truth**

The AWS Registry of Open Data makes it easier to find data that is publicly available from AWS resources. The registry is a data-sharing platform: anyone can analyze the platform’s data and build services on top of it. Sharing data in the cloud lets users spend time on data analysis rather than on data acquisition and dealing with regulations.

AstraZeneca uses Amazon SageMaker Ground Truth, a machine learning-powered, human-in-the-loop data-labeling and annotation service. The service automates some of the most tedious aspects of data labeling in research and development, reducing the time spent cataloging samples by at least 50 percent.

### **Federated learning**

AI start-up Us2 AI uses AI to automate the interpretation of echocardiograms—a tedious manual and error-prone process that used to only be performed by highly specialized professionals. Us2 AI has also established a federated learning platform where AI models can be enhanced via multiple iterations at different sites. This enables large volumes of diverse data across hospitals to be used while complying with local governance of the clinical data.

Some countries, such as Singapore and Malaysia, have started to develop national AI strategies to balance ecosystem developments and regulatory approaches while relying on the private sector for input and risk understanding. Given that 23 percent of trade is inter-ASEAN, AI regulations should be aligned and harmonized across the region, similar to the approaches being pursued for cybersecurity and cross-border data flows. The European Union's General Data Protection Rule, which is standardized across its 28 member countries, takes such an approach by giving citizens control of their personal data while simplifying the regulatory environment for businesses.

In addition to aligning on AI regulations, countries should commit to enabling the cross-border flow of data. Data localization or residency requirements hinder the development and use of AI, especially where data scientists need to have access to significant computing power that may be hosted in another country or require access to a large variety of datasets from multiple jurisdictions.

Depending on the circumstances, a business may decide to keep its data in one location, in which case federated learning can help (see Case study on page 18: federated learning). With federated learning, AI models are trained with decentralized data: the AI model is downloaded and trained locally, and then updates are consolidated to improve the shared model.

## 5. Build a future-ready workforce

Although AI can have a catalytic effect on the workforce, we believe its impact will be more gradual. For the most part, AI will replace tasks, not jobs, augmenting human actions so that people can be more productive and make better, more data-driven decisions and will give rise to other “builder” jobs such as data scientists and translators, which are in scarce supply in ASEAN. Tomorrow's workforce must be prepared to harness the power of AI in their daily activities.

Policymakers and business leaders both have a role to play in ensuring that employees remain relevant. Reskilling and upskilling programs are essential to help employees prepare to work with AI. Government-backed initiatives such as the United Kingdom's National Retraining Scheme help prepare people for the future of work by strengthening their technical skills via both online and in-person training. Businesses can also tap online providers such as Udemy or Coursera to educate their employees on the fundamentals of AI.

Although reskilling and upskilling are important, what's even more important is bringing about long-term changes in the education system. Unleashing AI will require a broad spectrum of talent that can research, build, train, maintain, and monitor the technology. This will entail systemic changes aimed at expanding and strengthening the STEM education system.

Across the region, governments have been encouraging STEM studies in a bid to bridge the talent gap. In Malaysia, the Ministry of Education's STEM4All initiative aims to fuel students' interest, expand access to STEM subjects, and evolve STEM to STREAM (science, technology, reading, arts, and mathematics). In Vietnam, demand-oriented technical and vocational education and training programs provide an alternative to college. STREAM programs designed for formal skills development in areas such as programming will result in a strong technology base. One challenge is local languages, particularly in areas such as conversational AI. Most platforms and code bases are still English-centric, limiting their usefulness for otherwise well-educated technical workforces in Thailand and Vietnam.

While governments are well aware of the talent gap, most efforts continue to be focused on reskilling. Addressing the issue will require a more comprehensive effort to change countries' education systems.

# Every stakeholder has a role to play in unlocking the benefits of AI

To resolve the issues, national AI strategies and skill-building programs are a good start, but the momentum should continue. Both AI users and solution providers need to be more focused on the business impact. Investors can also play a more active role in disseminating AI across their portfolio companies, and academia should focus research on industry applications.

## 1. Governments

- **Develop a national AI agenda that prioritizes the adoption of AI in key sectors.** Governments can lead the charge in AI adoption to ensure the efficient allocation of resources and extract maximum value while creating a strong ecosystem to deploy AI across the wider economy.
- **Promote long-term changes in education to build a future-ready workforce.** To address the talent gaps and reskill low-skilled workers who may be at higher risk of displacement, future-proofing the workforce is essential through an adaptive education system and enabling a systematic shift to activities that add more value.
- **Expand the use of testbeds to stimulate AI development while minimizing risks.** Testbeds are the most effective ways to address the uncertain implications of AI, foster innovation, and facilitate adoption. Governments should work closely with regulators, users, and solution providers to ensure these testbeds are effective for piloting business-driven use cases and to help make them pervasive across businesses, sectors, and society.

## 2. Business users of AI

- **Prioritize AI initiatives and focus on the near-term business impact.** Businesses need to prioritize use cases that solve operational issues and have the potential for a tangible, near-term impact. This is the only effective way to both foster quick business buy-in and build momentum for deploying AI at scale.
- **Streamline and establish new ways of working.** Adopting and scaling AI requires organizational changes, including agile operating models, aggregation of feature sets to scale use cases, automated closed-loop test beds, and linkage of AI-models to other automated workflows.
- **Fix data infrastructure and governance issues.** A more radical approach is recommended for this; businesses cannot wait for a step-by-step overhaul of legacy systems. Improving data needs to start with a focus on use cases that deliver near-term value.
- **Adopt a business- and employee-centric approach to AI.** AI should not be sparking a search only for data scientists. Rather, it is about building, reskilling, and augmenting the relevant AI skills in the existing workforce to help them solve crucial business problems. This approach also ensures that employees remain relevant and do not resist the adoption of AI.

### 3. Technology and AI providers

- **Adopt a business model-centric approach to AI.** Solution providers need to focus on value propositions with a clear near-term business impact instead of developing potentially breakthrough technologies with uncertain paths to monetization.
- **Reassess delivery models.** Solution providers need to work closely with the business and IT side of their customers to achieve the expected impact. An effective mix of on-site and off-site presence is essential, and solution providers will need to work with the right local partners to effectively deliver and build a local AI setup in the region.

### 4. Investors

- **Broaden investment areas.** There are huge pockets of value yet to be captured across various use cases, sectors, and regions. Investors can benefit from widening their investment landscape.
- **Play an AI activist role across the portfolio.** Investors can add more value by opening their AI networks to portfolio companies, thereby improving their understanding of AI. For example, global investors could stimulate AI development in Southeast Asia by connecting their portfolio companies with AI hubs in China, India, or the United States.

### 5. Academia

- **Align research interests with industry and societal needs.** To achieve widespread AI adoption, business and research interests must be closely aligned. Academia should not limit research to current applications; there needs to be a focus on addressing the current and upcoming societal and market needs.
- **Adopt an industry-focused curriculum.** Students should be educated and equipped with the right knowledge and skills that are aligned with industry needs. It's not about developing data scientists and AI experts; it's about developing talent who can use their technical skills to address business problems and opportunities.

Across all of these stakeholder actions, one theme prevails: focus on the business impact. The value of AI is not in the technology itself but in how it can solve business problems and deliver value in the near term.

Given that AI adoption in Southeast Asia is still nascent, focused and concerted action can unlock the potential of AI and capture the projected \$1 trillion boost to the region's GDP by 2030. All stakeholders—governments, businesses, AI solution providers, investors, and academia—will need to work in tandem with a common focus on driving the business and social impact.

## Methodology

Our model is based on a bottom-up approach that models the potential economic impact at a use-case level and then aggregates the impact up to the economy level. The economic-level aggregation of use-case impact is moderated and adjusted based on industry- and country-specific adoption factors such as digital maturity, network readiness, and economic productivity.

The value impact model has four components:

- i. **Gross value add.** We measured the contribution of key economic sectors based on two primary drivers of value add: sector sales and sector input. Data from the Economist Intelligence Unit, IHS Markit, and World Bank was used to establish the baseline GDP in 2030 at \$7.5 trillion (before the full potential of AI is realized).
- ii. **Impact from AI.** We sized the impact on value-add at an industry sector level through two categories of AI use cases: revenue enhancements and cost efficiencies. These estimates are informed by survey responses from more than 110 business executives in the region as well as lessons learned from more than 50 industry use cases. Industry-specific adoption rates for each use case are factored in based on current levels of industry focus. We estimated the incremental full economic impact from AI to be \$1.2 trillion.
- iii. **Other effects from AI.** We applied additional adjustment factors to account for other positive effects from the implementation of AI, such as additional investments that companies make to support AI implementation, investors' investments in AI providers, and induced consumption due to the economic value that AI could generate.
- iv. **Country-specific adjustments.** Our model accounts for cross-country variances in digital adoption, network readiness, and economic productivity to simulate the realistic adoption of AI through an S-curve model. Data from World Bank and the World Economic Forum were used as inputs into the S-curve model. As with most technologies, the adoption of AI is likely to follow an S-curve pattern with a slow start followed by accelerated adoption as the technology matures. Applying this moderating factor to our results on the full impact potential of AI, we estimate the final gross economic impact of AI to be around \$1 trillion.

This approach assumes that most of the economic value that AI generates in Southeast Asia will remain in the region and that leakage to other regions will be small, given that AI benefits are realized mostly in the local economies and most AI implementation will be carried out locally.

Finally, our approach assumes that the productivity benefits of AI can be fully realized at the national economy level, where labor can shift from activities impacted by AI toward growth sectors and new jobs created by AI.

---

# Contacts

**Soon Ghee Chua**, partner, Singapore, [soon.ghee.chua@kearney.com](mailto:soon.ghee.chua@kearney.com)

**Nikolai Dobberstein**, partner, Kuala Lumpur, [nikolai.dobberstein@kearney.com](mailto:nikolai.dobberstein@kearney.com)

**Kaushik Sriram**, partner, Singapore, [kaushik.sriram@kearney.com](mailto:kaushik.sriram@kearney.com)

---

# Acknowledgements

This paper is a joint effort by EDBI and Kearney to shed light on the adoption and impact of AI on Southeast Asia. The perspectives in this paper were developed by EDBI's network and Kearney's analysis and expertise in AI. We would like to thank the following individuals for their contribution to the report: Chua Soon Ghee, Nikolai Dobberstein, Kaushik Sriram, Muhammed Fahmi, Hong Shao Kai, and Tan Yong Zhi.

We would also like to express our appreciation to the industry experts who generously shared their insights with us through in-depth interviews. In addition, a special thank you goes to all who participated in our executive survey, which provided the basis for this paper.

For more information, please get in touch with us:

## Kearney

As a global consulting partnership in more than 40 countries, our people make us who we are. We're individuals who take as much joy from those we work with as the work itself. Driven to be the difference between a big idea and making it happen, we help our clients break through.

**[kearney.com](https://www.kearney.com)**

## EDBI

Investing since 1991, EDBI is a Singapore-based global investor in select high-growth technology sectors, including information and communication technology, emerging technology, healthcare, and other strategic industries. As a value-creating investor, EDBI helps companies achieve their ambitious goals by leveraging our broad network, resources, and expertise. With our growth capital, EDBI supports companies seeking to expand in Asia and globally through Singapore.

**[edbi.com](https://www.edbi.com)**  
**[infoHQ@edbi.com](mailto:infoHQ@edbi.com)**

For more information, permission to reprint or translate this work, and all other correspondence, please email [insight@kearney.com](mailto:insight@kearney.com). A.T. Kearney Korea LLC is a separate and independent legal entity operating under the Kearney name in Korea. A.T. Kearney operates in India as A.T. Kearney Limited (Branch Office), a branch office of A.T. Kearney Limited, a company organized under the laws of England and Wales. © 2020, A.T. Kearney, Inc. All rights reserved.

AR