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From Cloud to Edge

The value of distributed AI in Vietnam

Commissioned by Qualcomm Technologies, Inc.

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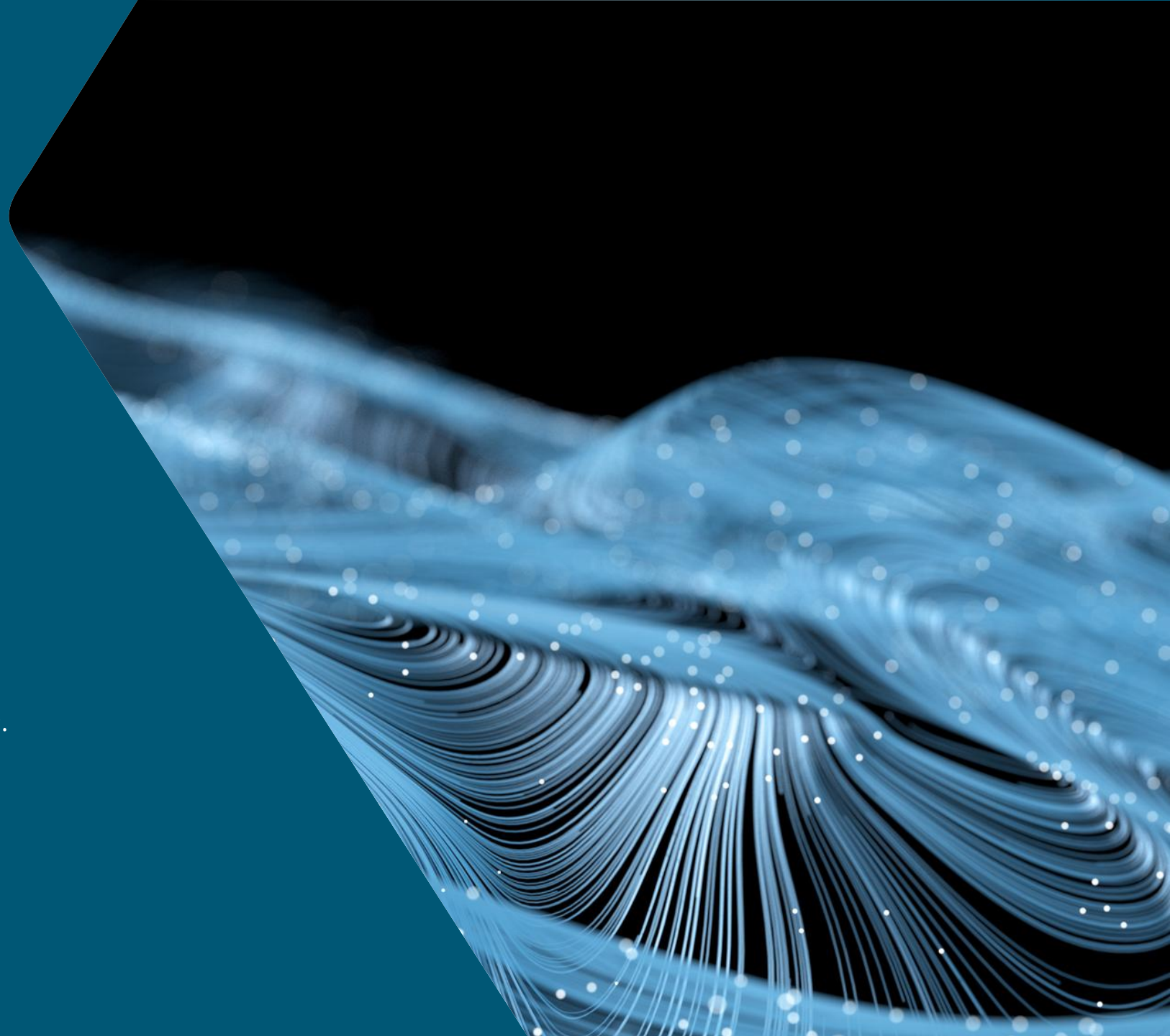

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All calculations were done in USD and are based on the latest available data as of time of analysis in 2026.

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Access Partnership's Economics Strategy team is a leading economic and strategy consulting practice with deep experience across a number of topics in the digital economy and the future of skills, sustainability, and economic development.

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Executive summary and key highlights

Vietnam is already deploying distributed and physical AI, with an explicit target to become a **top 4-ASEAN AI powerhouse by 2030**. Splitting workloads across cloud, edge and device through distributed AI is the pivotal step to reach that target at that speed and scale, with distributed AI applications potentially unlocking up to **US$30B** in annual economic value by **2035** for the country. Capturing it takes **~US$5.2B** of incremental investment over 2026-2035 plus a strategy that institutionalizes Vietnam's strengths and pairs homegrown momentum with regional leadership at **APEC 2027**.

Vietnam can unlock up to US$30B with distributed AI...

>$13B
of economic value in 2035 from **Autonomous manufacturing and robotics**

Equivalent to 1.7% of 2035 manufacturing GDP, lifting a sector worth ~25% of GDP and ~US$400B in exports

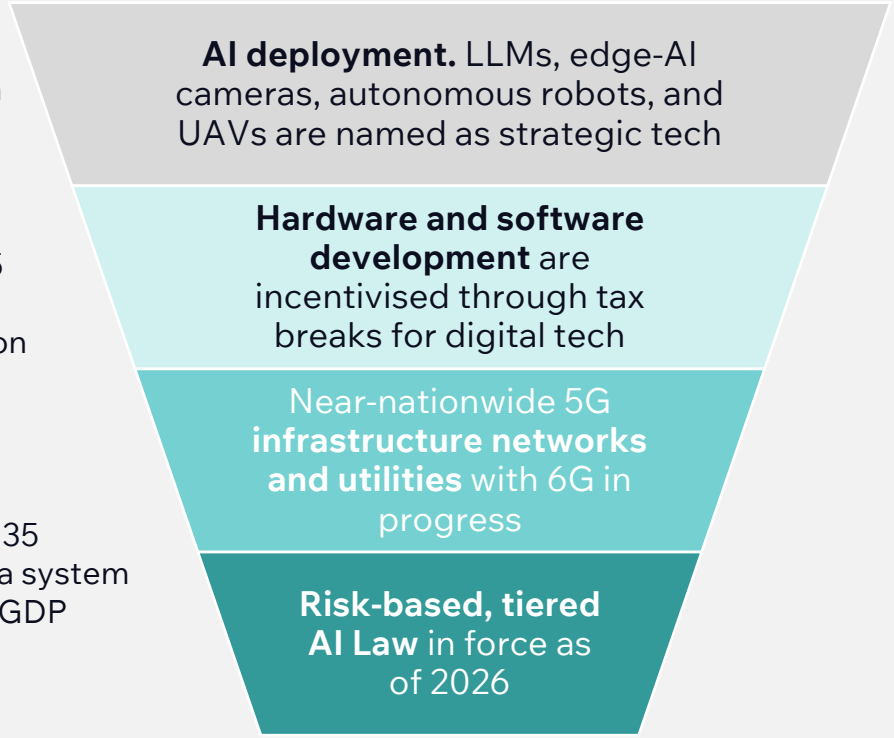
>$11B
of economic value in 2035 from **Smart city management**

Equivalent to 5.2% of 2035 utility & infrastructure upkeep, projected based on historical spend

>$6.1B
of economic value in 2035 from **AI-enhanced healthcare**

Equivalent to 4.2% of 2035 health spending across a system that is as large as 4% of GDP

...backed by advantages already built across the AI stack



Targeted policies will be key to further unlock it

1. Leverage regional platforms to champion AI standards and interoperability
2. Establish clear data portability guidelines for vendor diversity as key norms for AI application development
3. Front-load investment in 5G and 6G connectivity for OEMs in an era of agentic and physical AI
4. Embed distributed and edge AI, with concrete benchmarks, across Vietnam's core tech policy instruments

Chapter 1

Vietnam’s AI and technology landscape: An imperative for distributed AI

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AI adoption has become a strategic anchor to Vietnam's economic strategy, and how AI processing is deployed will be a key factor of success

Vietnam's AI and technology ambitions...

Vietnam is aiming for top-tier AI leadership by 2030

The National Strategy on AI (2021–2030) calls for Viet Nam to be a top 4 ASEAN and top 50 global AI power by 2030. This means in just 4 years, Vietnam needs to deploy AI at scale through either targeted infrastructure investments or development.

Vietnam's strategic technologies are ripe for AI integration

While Decision 21/2026/QD-TTg already prioritizes LLMs and specialized AI, other strategic tech (robotics, smart manufacturing, biosensors) would also benefit from AI integration from its advanced data processing and analytical capabilities.

Economy-wide AI adoption is a core part of the country's strategy

Ensuring that all types of businesses and workers use AI will be necessary to promoting productivity and economic growth. Already 74% of businesses in Vietnam are using AI– representing a 39% year-on-year increase between 2023 and 2024.

...must face key considerations

- Critical targets mean AI deployment must scale up while overcoming energy constraints
- Strategic applications that are time or data-sensitive can only leverage always-on or on-device AI processing
- As wider adoption of AI progresses, managing data compliance and costs for a wide variety of use cases will be key

Vietnam is already focused on distributed AI which will address speed, scale, and security constraints that cloud alone cannot resolve

Vietnam's prioritization of edge, distributed AI applications will be key to its AI deployment strategy. With inference capacity constrained through 2030, the economic return will depend on which use cases Vietnam deploys first.

Distributed AI sidesteps energy bottlenecks in mass deployment of AI	On-device processing reduces energy demand from resource-intensive data centres – directly aligned with Resolution 70's energy security mandate and Vietnam's grid capacity constraints.
Always-on AI enables a wider range of physical AI applications that require near-instant processing	Distributed AI ensures resilience for physical AI (drones, robotics) in disaster response, healthcare, and other time-sensitive or hazardous conditions.
Mitigating risks of mass AI adoption will be possible through on-premise, on-device deployment	On-device AI processing keeps sensitive data in-country, supporting Vietnam's digital sovereignty goals, and reduces bandwidth costs and network congestion.

Cloud-based AI alone will also not be sustainable to deploy AI at scale – given the following AI inference trends

30x Given ongoing trends, demand for AI inference compute in Vietnam could multiply **30 times** by 2030…

6x Meeting this demand is equivalent to multiplying projected data center capacity in Vietnam **6 times**…

85% … and based on current data center investment trajectories, Vietnam could have an **85% gap** in AI inferencing capacity in 2030

Chapter 2

Impact of distributed AI on Vietnam's economy and society

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Specific distributed AI use cases can unlock transformative applications across Viet Nam's priority sectors, boosting productivity and competitiveness

Distributed AI use cases and solutions that are significant to Vietnam *(and scope of potential market)*

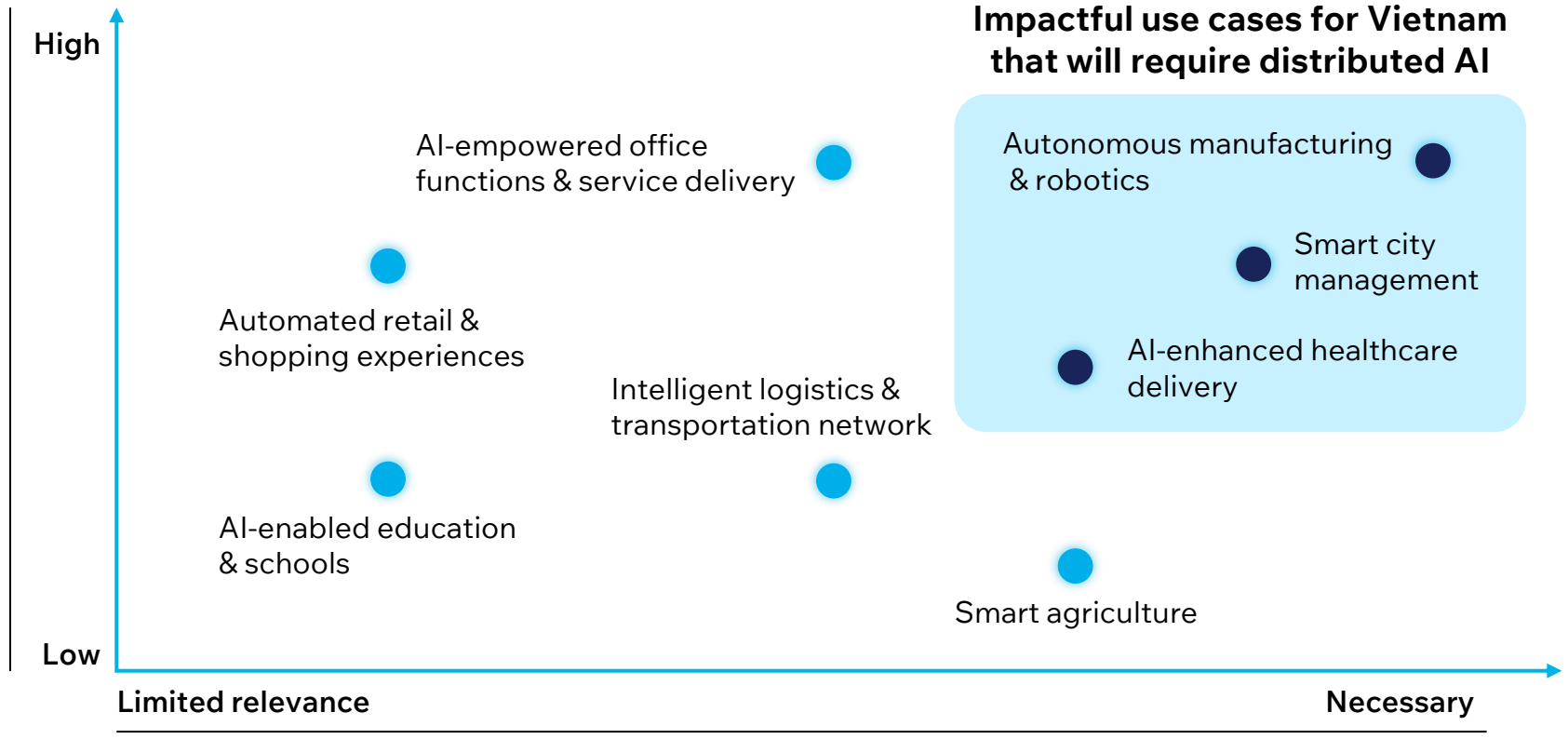
Smart city management • Traffic monitoring & crowd analytics • Drone-based safety surveillance & critical missions • Flood & environmental monitoring • Smart city command centres	**Autonomous manufacturing & robotics** • Computer vision for quality inspection • Autonomous production robots and AI-powered production line management • Humanoid robots for assembly and material handling	**AI-empowered office functions & service delivery** • On-premise LLM for enterprises with security requirements • Voice bots for front-office engagements • AI co-pilots for internal processes	**Intelligent logistics & transportation network** • Fleet management & telematics • Automated driver monitoring • Drone & robot-enabled asset tracking • Cold-chain monitoring & fine-tuning • Warehouse management & stock automation
AI-enhanced healthcare delivery • AI-enabled patient tracking (cameras and wearables) • AI-powered assistant and robots for doctors, nurses • Portable medical devices with AI-assisted diagnostics • Humanoid robots for patient care and clinical support	**AI-enabled education & schools** • Smart classrooms and student progress tracking systems • On-device student tutoring • Speech-based AI for feedback & guidance • AI-enabled proctoring	**Automated retail & shopping experiences** • Smart checkout and point-of-sale systems • Computer vision-enabled shelf monitoring • AI-powered customer analytics & tracking • Voice-based assistance	**Smart agriculture** • Drone-based crop management • IoT-enabled precision irrigation & watering • Sensor-based soil & nutrient optimization

Distributed AI is expected to play a significant role in unlocking value through manufacturing, smart city, and healthcare applications in Vietnam

Impact on economy

This dimension analyzes the scale of a use case's impact using public data, such as:

- Impact on the socio-economic challenge
- Market size
- Breadth of impact
- Quality of current infrastructure
- Governmental priority



Prevalence of distributed AI

This dimension relies on assessments of the scale of distributed AI deployment due to factors such as real-time or near-instant processing, reliance on sensitive data, level of personalization needed, or ability to leverage lightweight AI models

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Vietnam's factories, cities, and healthcare institutions are set to derive up to US$30B worth of economic value from distributed AI applications

Impact of **three use-cases** – driven by automating work to promote industrial productivity, smarter cities from intelligent monitoring and grid management, and more efficient healthcare systems

	>$13B **Autonomous manufacturing & robotics**	>$11B **Smart city management**	>$6.1B **AI-enhanced healthcare delivery**
Equivalent to:	**1.7%** of the manufacturing sector's contribution to GDP in 2035	**5.2%** of utility and infrastructure maintenance costs in 2035	**4.2%** of estimated total healthcare spending in 2035
Examples:	Applications such as Industrial robotic arms, construction robots, humanoid robots for hazardous tasks, XR smart glasses for hands-free guidance, autonomous cleaning and inspection robots, and predictive maintenance	Applications such as intelligent traffic systems, sensor-based traffic lights, automated safety and surveillance systems, and smart power grid management for energy distribution	Applications such as AI-enabled medical image recognition, generative AI-assisted medical research and screening, and preemptive intervention through AI-enabled monitoring
Impact created by:	• Lower downtime • Higher labor productivity • Fewer safety incidents	• Reduction in traffic congestion • Reduction in crime rates • Energy efficiency in power grids	• Healthcare delivery efficiencies • Reduction in hospitalizations • Reduction in workforce sick days

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Note: Economic Value refers to the increased revenue or cost savings that businesses generate from increased market reach or increased productivity. It is not directly attributable to GDP.
Source: Access Partnership analysis

Chapter 3

Paving the way for distributed AI leadership with governmental support

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Regulatory and policy development in Vietnam has been keeping pace with technological progress, but infrastructure has room to go

Multiple initiatives that can support distributed AI deployment are already underway

	Vietnam's policy foundations	The distributed AI stack	Principles to advance distributed AI
AI deployment	**Vertical AI and physical AI deployment now are part of the national ambitions.** Edge-AI cameras, autonomous mobile robots, and UAVs have been designated as priority strategic technology products under Decision 21/2026/QD-TTg	On-device & physical AI devices Industrial AI deployment	**Facilitating global interoperability** to reduce trade friction, promote interchangeability, and secure market access for AI innovation and products
Hardware & software	**Dedicated government backing,** with the Law on Digital Technology Industry offering corporate and personal income tax exemption for digital technology projects. LLMs have also been prioritized as a strategic technology product by the government	Data & Models (*Software*) Compute processing & chips (*Hardware*)	**Promoting competition and vendor diversity** by opening the ecosystem to multinational investment so applications stay vendor-agnostic and cost-competitive
Infra-structure & utilities	**Moving toward 6G deployment and expanding power capacity.** Vietnam is near completion in deploying 5G across the nation, with local telcos already being part of global 6G technology developments and research (Viettel: 6G licensing targeted by 2028)	Network connectivity Power infrastructure	**Tying infrastructure investment to outcomes** to ensure demand for AI-ready networks grows alongside supply, reducing investment uncertainty
Regulation	**Responsible agile governance** – The AI Law (in force March 2026) introduces a three-tier, risk-based governance framework for emerging tech	Standard & governance[1]	**Establishing regulatory clarity** for AI safety and quality standards to de-risk distributed AI adoption across devices at homes and factories

1. Cuts across all layers
Source: Access Partnership analysis

Targeted investment is needed to advance Vietnam's progress in establishing a distributed AI ecosystem

We conservatively estimate that the incremental investment required is around $5.2B over 2026-2035.

Estimated investment required for effective distributed AI deployment (2026-2035)

~$5.2B

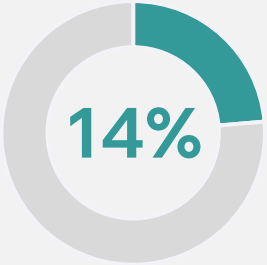
(or ~0.52B per annum over a decade)

Includes funding for:

- Distributed AI hardware and software ecosystem
- Robotics & automation application development
- Digital infrastructure & connectivity
- Workforce & skills transition

If the required investment were spread over a decade (~0.52B per annum), the annual investment…

Equates to



of Vietnam's relevant science & tech budget announced for 2026

Generates

of total annual economic returns – based on the three major use cases *(Page 7)*

Source: Access Partnership analysis

Vietnam can consider four key policy actions to consolidate its distributed AI leadership

Spurring deployment and development requires targeted policies

1. Leverage regional platforms to champion AI standards and interoperability	Vietnam's own national AI standards already prioritize interoperability between AI systems and alignment with international norms. As host to APEC 2027, Vietnam has a window to project that domestic agenda outward: coordinating Asia-Pacific cross-border data standards, edge AI safety benchmarks and digital trade rules so that its national AI standards framework anchors regional norms.
2. Establish clear data portability guidelines for vendor diversity as key norms for AI cloud and compute investment	Vietnam's national AI Data Centre program concentrates public and SOE spending in a small number of cloud and accelerator stacks. Attaching conditions to ensure open ecosystems – such as open APIs, documented model and data export formats and multi-vendor procurement – to that spending keeps switching costs low and preserves the ability to run the same workloads at the edge and on-device as Vietnam's stack matures.
3. Front-load investment in 5G and 6G connectivity – a leap-frogging opportunity for OEMs in an era of agentic and physical AI	Vietnam has already achieved 90% outdoor and 70% indoor 5G coverage and is aiming to establish AI Data Centres (Resolution 57) – further investment in 6G infrastructure will be necessary to support broader deployment of agentic and physical AI. By working alongside distributed AI deployment targets, Vietnamese OEMs managing telecommunication infrastructure can commit their investments in advance and in lockstep.
4. Embed distributed and edge AI, with concrete benchmarks, across Vietnam's core tech policy instruments	Vietnam has already named edge computing and edge-AI cameras strategic (Decision 21/2026). The priority now is operationalizing them via concrete benchmarks (pilot counts, lead institutions, a commercialization milestone) and further writing them into Resolution 57, the Law on AI (134/2025), the National Data Strategy (Decision 1308) and the Strategic Technologies list itself.

Source: Access Partnership analysis

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Key definitions: the AI computing continuum

Cloud AI	AI training and inference executed in hyperscale data centers. Cloud AI provides the capacity needed for model training, global model hosting, orchestration, and the heaviest workloads, ensuring consistency across large user populations, but requires data to travel to and from centralized servers.
Edge AI	AI inference executed at or near the network edge (i.e., factory gateways, hospital edge servers, or micro-data centers) rather than in centralized cloud. Edge AI delivers real-time responsiveness, reduces backhaul costs, and keeps data within local or organizational boundaries.
On-device AI	A subset of edge AI, on-device AI operates inference directly on end-user hardware (smartphones, PCs, robots, industrial endpoints) without connectivity, which enhances privacy and offline resilience with the lowest latency.
Distributed AI	The hybrid computing continuum in which AI workloads are dynamically partitioned across on-device, edge, on-premises, and cloud tiers based on latency, privacy, bandwidth, energy, and cost requirements. No single tier can meet the demands of real-time, multimodal AI at scale; distributed AI treats the tiers as one tightly integrated system, with each handling the workloads it serves best.
Sovereign AI	A nation's ability to independently build, deploy, and govern AI using its own infrastructure, data, and talent that advances its laws, cultures, and values.
Physical AI	Unlike the compute tiers above, physical AI describes a class of applications: AI systems that perceive, reason, and act in the physical world in real time–robots, autonomous machines, drones, and connected vehicles. Physical AI must operate, learn, and scale reliably under real-world conditions, on-device and at the edge, coordinated with cloud-based learning across fleets.

Source: BCG (2026), 6G: The Network for the Future of AI and Immersive Connectivity, and Access Partnership analysis

Top-down framework for estimating AI compute inference

Overall description of approach taken

- To describe **total compute available**, the total compute capacity[1] available in data centers (public and on-premise) dedicated to AI up to 2030 was used as proxy (including compute used for training and inference) and modelled based on publicly available data.
- To measure the **potential on-device AI compute capacity, the overall AI compute capacity demanded** was also estimated – the "gap" between demand and current supply represents the total compute that will happen away from data centers.

Compute capacity
(AI DC supply)

Key assumptions for projecting supply of data center (DC) compute capacity

- Projected compute capacity of DCs dedicated to AI workloads using: (a) total DC power capacity in gigawatts (GW) and; (b) total AI compute[2] to estimate a *compute-per-GW ratio* that changes over time
- **Assumption**: Of total cloud workloads, the share dedicated to AI would grow from 14% in 2025, estimated by Goldman Sachs, to 70% by 2030 based on McKinsey's projections. Additionally, around 40% of workloads are dedicated to training-related compute based on analysts from Centre for the Governance of AI.

Compute demanded
(AI demand)

Key assumptions for projecting demand for AI compute

- Estimated total demand for AI by leveraging estimates by McKinsey that projects "annual FLOP demand" from use of **generative AI** to be 0.2 QFLOPs in 2024 – growing to be 25 QFLOPs in 2030.
- It also estimates that by 2030, 40% of total compute demanded by businesses and consumers will be toward generative AI applications. Additionally, we assume that of total demand by businesses and consumers, demand for training applications will range between 10% and 25% of total compute.

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1. Given limited research on TOPs (tera operations per second) used to describe neural processing units, compute is measured in terms of FLOPs (or floating point operations per second) as a proxy of potential capacity to complete calculations.
2. Estimates on the total AI compute were estimated in April 2025 by the AI Futures Project, a team of AI developers and researchers. See AI Futures Project (2025), *AI 2027*. Available at: https://ai-2027.com/about

Top-down framework for country-specific AI compute projections

Overall description of approach taken

- Existing modelled figures on global compute capacity and demand were apportioned into country-specific figures. This illustrates the relative levels of installed DC capacity (AI DC supply) and AI demand for each country, with the assumption that DC capacity available within each country is dedicated to its domestic users.

Country-level compute capacity (AI DC supply)

Key assumptions for projecting country-level supply of data center (DC) compute capacity

- Existing modelled figures were apportioned into country-level figures based on a count of DCs (Data Center Map) and DC energy usage (IEA). These two factors served as proxies for supply of DC compute capacity.
- Growth in Vietnam's supply of DC compute capacity is based on growth of domestic DC capacity (CBRE Vietnam).

Country-level compute demanded (AI demand)

Key assumptions for projecting country-level demand for AI compute

- Existing modelled figures were apportioned into countries based on the relative usage of AI tools (aitools.xyz). This is measured by utilising web traffic analysis software to track the number of average visits[1] to a database of over 10,500 AI tools, applications, and platforms. This serves as a proxy for demand from both B2B and B2C users.
- Growth in Vietnam's demand for AI compute is based on global growth rates (McKinsey). Global growth rate was further adjusted based on the respective CAGR of AI spending as measured by market research firms, including IDC.

1. The number of average visits refers to the monthly average visits for each month between January and December 2025.

Impact of distributed AI use cases

Overall description of approach taken

- Three scenarios were developed to assess the potential economic value of edge AI adoption across various distributed AI use cases in 2035.
- The conservative scenario assumes that edge AI adoption in Vietnam follows the baseline AI adoption in Vietnam (i.e., SME AI adoption rates) (OECD). It also assumes adoption is consistent with Vietnam's national smart city program targets (Resolution 57).

Autonomous manufacturing & robotics

Key assumptions for projecting the economic value of autonomous manufacturing and robotics

We assume that economic value is due to three value drivers:

- Productivity gains (based on productivity gains or increased output per worker)
- Downtime reduction (based on the reduction in downtime and the corresponding monetary losses through predictive maintenance)
- Safety improvements (based on the reduction in safety incidents and the corresponding reduction in cost of workplace incidents)

Smart city management

Key assumptions for projecting the economic value of smart city management

We assume that economic value is due to three value drivers:

- Traffic and mobility efficiency (based on the reduction in traffic congestion costs)
- Public safety and surveillance (based on the reduction in crime and safety incidents and the corresponding costs of insecurity)
- Energy and environmental efficiency (based on the percentage of energy savings from smart city AI systems)

AI-enabled healthcare delivery

Key assumptions for projecting the economic value of AI-enabled healthcare delivery

We assume that economic value is due to three value drivers:

- Healthcare system efficiency (based on efficiency gains in healthcare operations from AI)
- Reduction in hospitalizations (based on average hospitalization reduction from AI-enabled remote monitoring)
- Workforce productivity from better health outcome value (based on the reduction in sick days due to manageable illness)

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