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Sustainability of U.S. AI-Related Investment — Growth Drivers and Risks —

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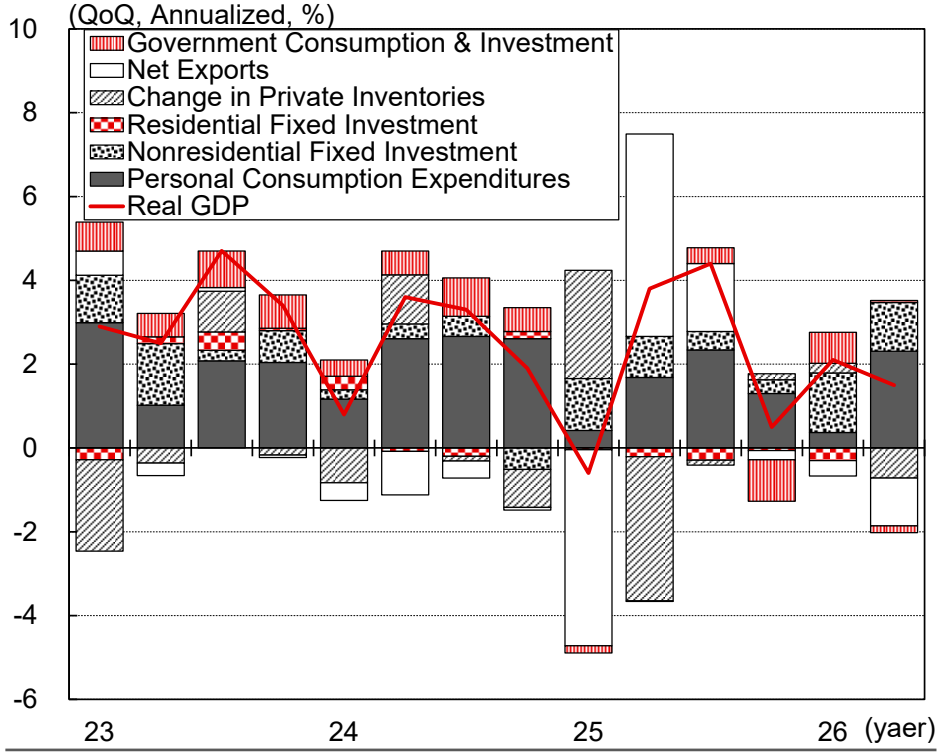
1. (1) AI-Related Investment Driving the U.S. Economy

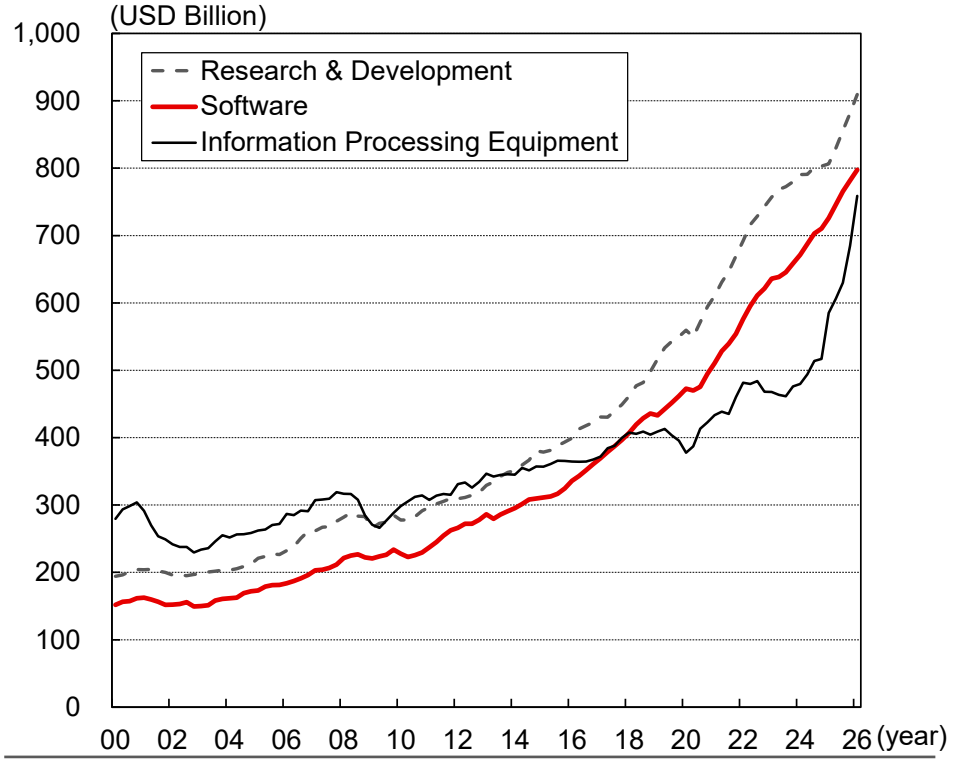
- U.S. real GDP grew at an annualized rate of 1.5% quarter-on-quarter in Q2 2026 (Q1: +2.1%), indicating continued solid economic growth. Looking at contributions by demand component, business fixed investment contributed 1.2 percentage points to annualized growth (Q1: +1.4 percentage points), marking its sixth consecutive quarter of positive contribution. Since the COVID-19 pandemic, business investment has been an important factor supporting the U.S. economy.
- One factor underpinning the expansion in business investment is the rapid increase in AI-related investment. Investment has risen broadly across the infrastructure and technologies needed to develop, provide, and use AI. This includes information-processing equipment, such as GPU-equipped AI servers and networking equipment, as well as software and research and development (R&D), including the development of AI models.

U.S. Real GDP Growth



(Source) IIMA, based on data from the U.S. Bureau of Economic Analysis (BEA).

AI-Related Capital Investment

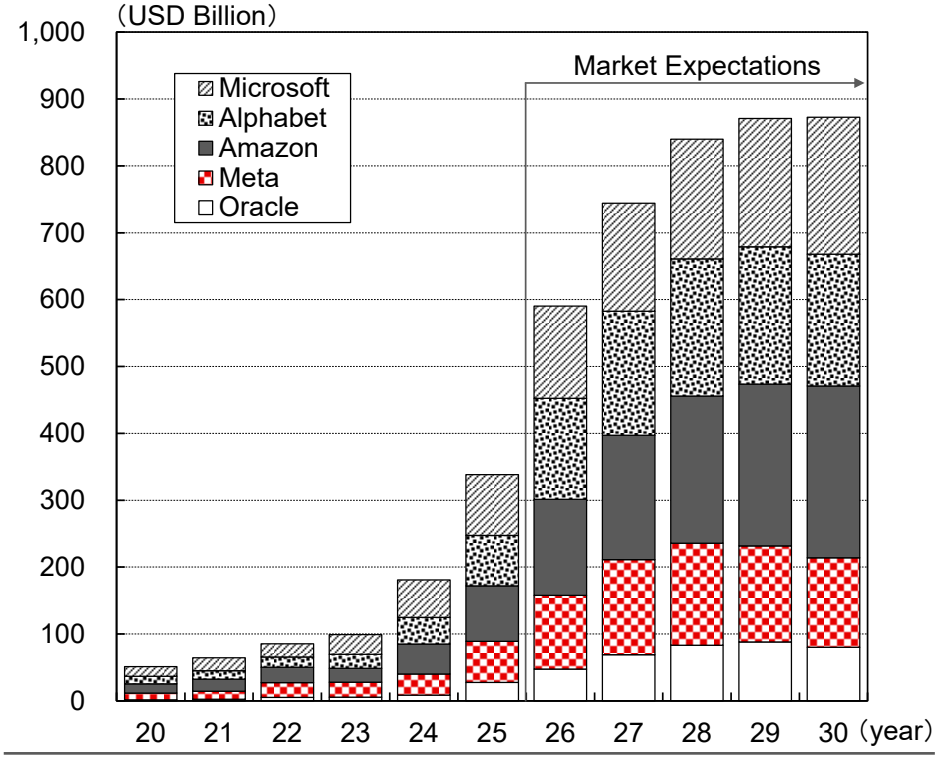


(Source) IIMA, based on data from the U.S. Bureau of Economic Analysis (BEA).

1.（2）Hyperscalers Leading the Investment Boom

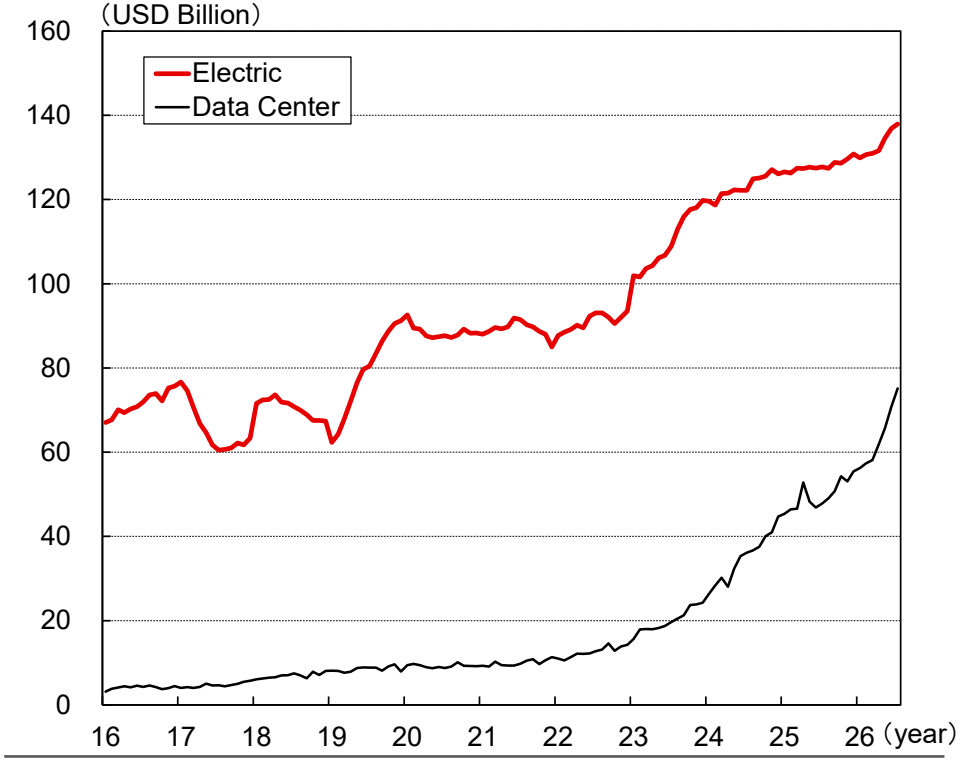
- Hyperscalers such as Microsoft, Amazon (AWS), Alphabet (Google), Meta, and Oracle are leading AI-related investment. Data center investment by these five companies increased from $51.2 billion in 2020 to $310.6 billion in 2025, and substantial investment is expected to continue. AI model developers such as OpenAI and Anthropic are also accelerating investment in AI infrastructure to support their services.
- U.S. data center construction spending increased nearly 24-fold, from $3.2 billion in January 2016 to $75.2 billion in July 2026. Investment in power infrastructure, including generation, transmission, and distribution facilities needed to meet growing data center electricity demand, has also expanded, reaching $137.9 billion in July 2026. AI-related investment is therefore extending beyond GPUs and data centers, stimulating capital investment in the broader power infrastructure needed to support them.

Annual Data Center Investment by Hyperscalers



(Note) Data center investment includes infrastructure equipment such as servers, storage, and networking equipment, as well as land acquisition, cooling systems, and power equipment.
(Source)IIMA, based on Bloomberg data.

Data Center and Power Infrastructure Construction Spending

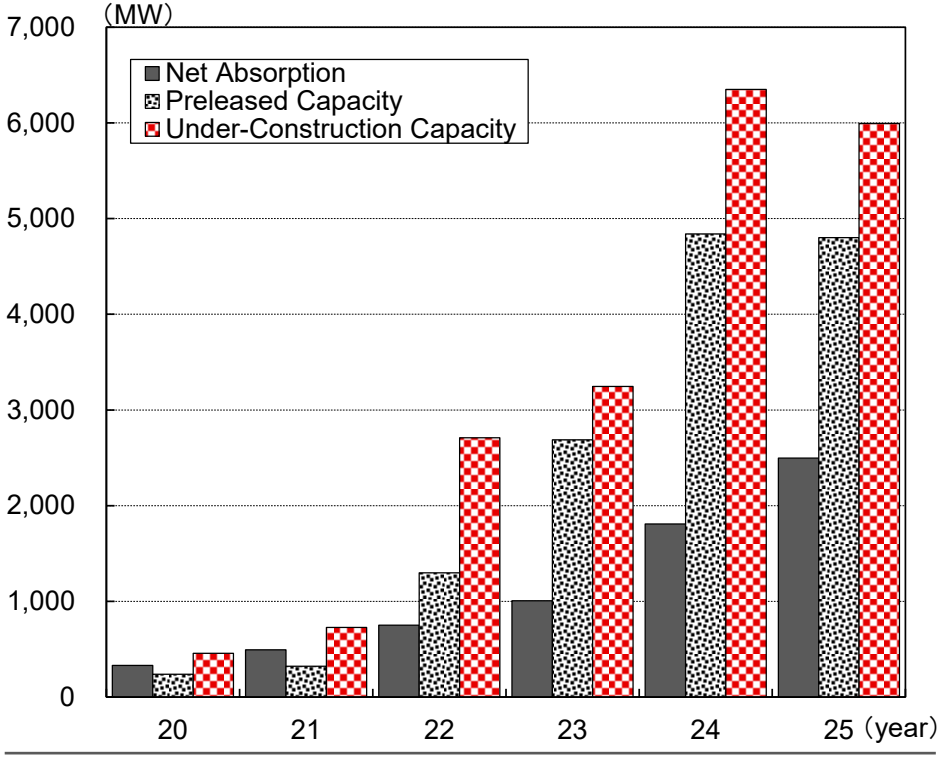


(Source) IIMA, based on data from the U.S. Census Bureau.

1.（3）Demand for AI Infrastructure Remains Strong

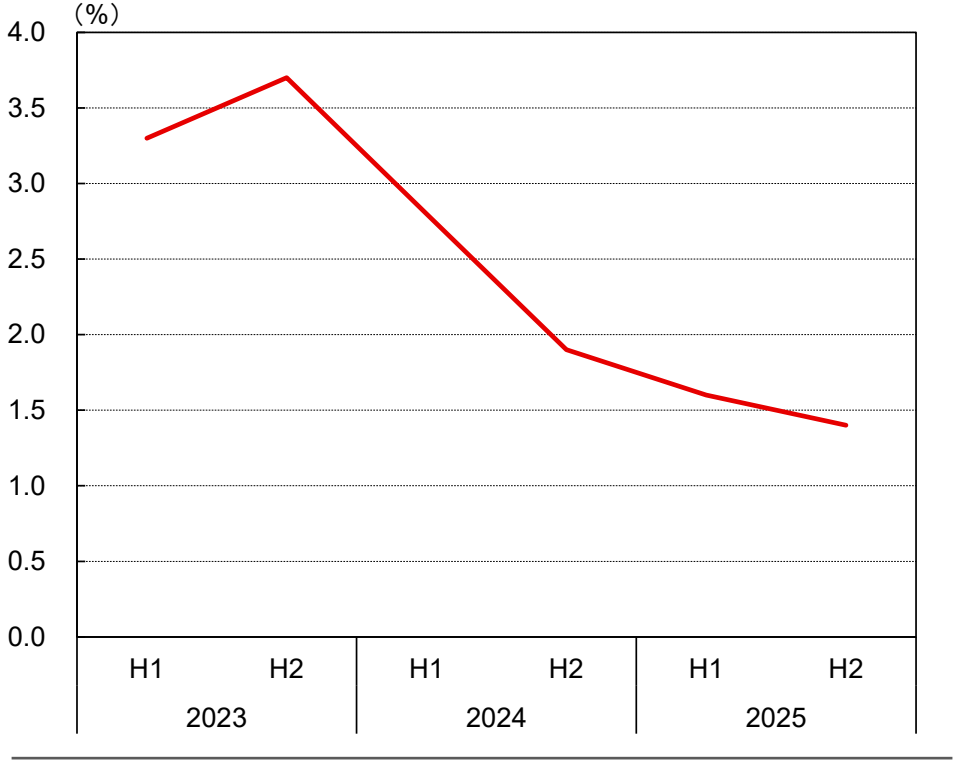
- According to CBRE, supply-demand conditions remain tight in major North American data center markets amid growing AI demand. In 2025, data center absorption reached a record 2,498 MW. Capacity under construction remained high at 5,994 MW, although it declined slightly from 2024, partly due to delays in power infrastructure development and permitting. Meanwhile, approximately 4,800 MW, or 80% of capacity under construction, had already been preleased. In addition, the vacancy rate—the share of available capacity in operational data centers—fell to a record low of 1.4% at the end of 2025, indicating strong demand for data center capacity.
- Demand currently continues to outpace supply in the data center market, as supply expansion has not kept pace with robust demand. Meeting further growth in demand will require addressing key supply constraints, including expanding power infrastructure and securing sufficient construction labor and water resources.

Data Center Capacity



(Note)"Preleased capacity" refers to capacity for which lease agreements have been signed before construction is completed.
(Source)IIMA, based on CBRE data.

Data Center Vacancy Rate

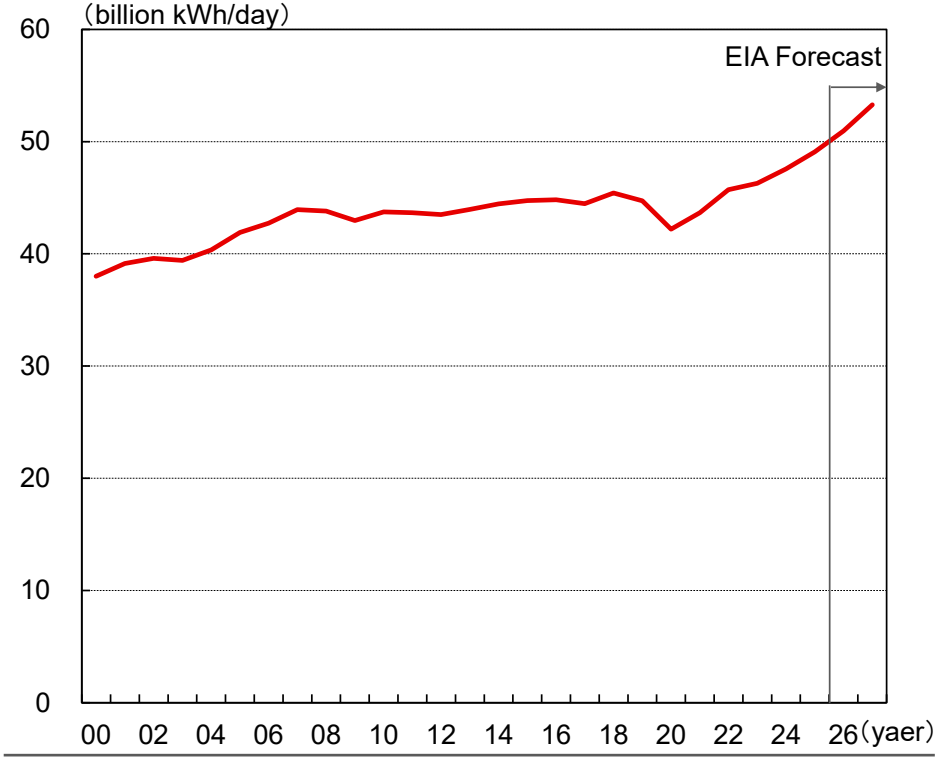


(Note)Vacancy rate is the share of available capacity in operational data centers.
(Source)IIMA, based on CBRE data.

2.（1）Electricity

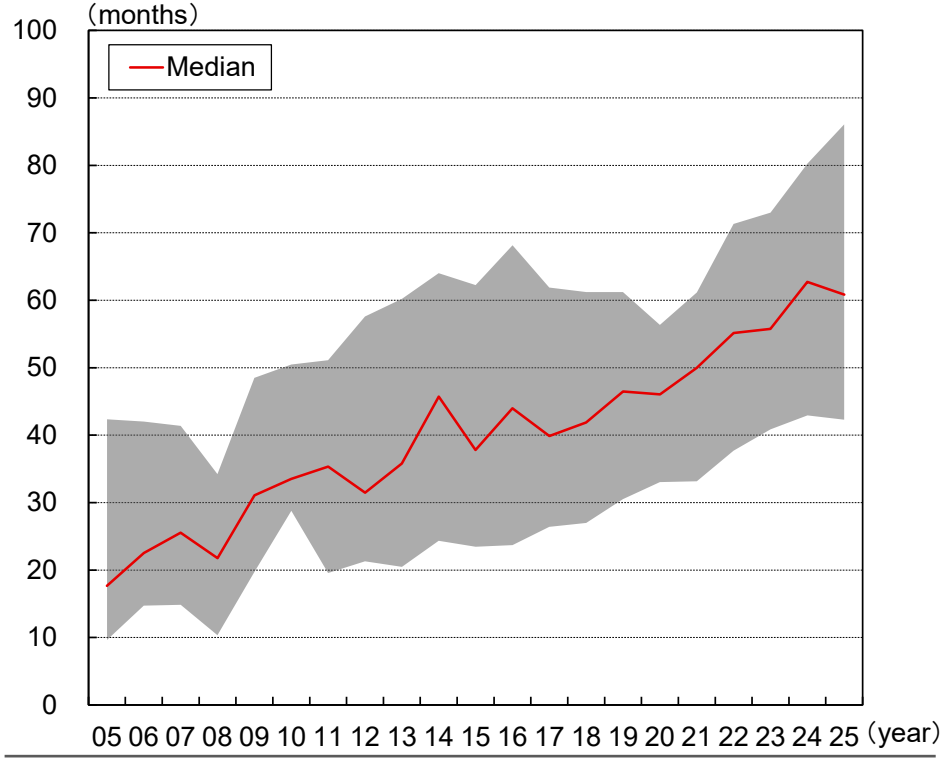
- One of the key supply constraints on AI-related investment is electricity. According to the U.S. Energy Information Administration (EIA), growth in commercial-sector electricity consumption has accelerated sharply since 2020. Data center servers accounted for approximately 7% of commercial-sector electricity consumption in 2025, with this share projected to rise to 22–33% by 2050.
- Meeting this demand will require investment in power generation, transmission networks, substations, and other infrastructure. According to Lawrence Berkeley National Laboratory (LBNL), the median time from an interconnection request to commercial operation increased from 17.7 months in 2005 to 62.7 months in 2024, remaining high at 60.8 months in 2025.Delays in power infrastructure development could postpone data center construction and operation. Timely infrastructure expansion will therefore be critical to meeting growing AI demand.

U.S. Commercial-Sector Electricity Consumption



(Source)IIMA, based on data from the U.S. Energy Information Administration (EIA).

Time from Interconnection Request to Commercial Operation

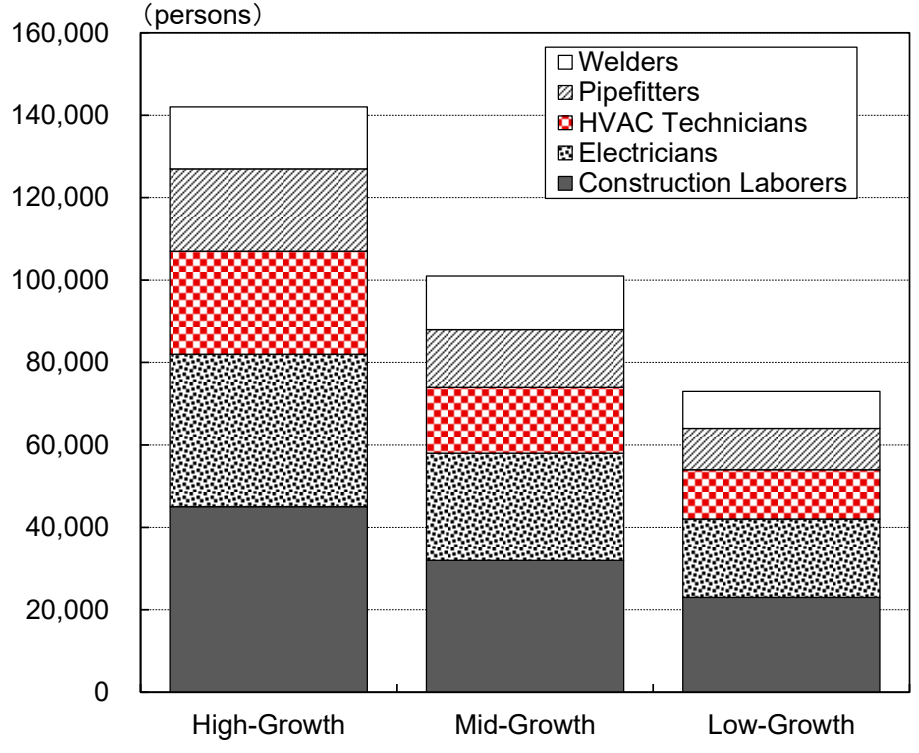


(Note)1.Shaded areas indicate the interquartile range.
2.“Grid interconnection” refers to connecting power generation facilities to the existing transmission grid to enable electricity supply.
(Source)IIMA, based on data from Lawrence Berkeley National Laboratory (LBNL).

2.（2）Labor

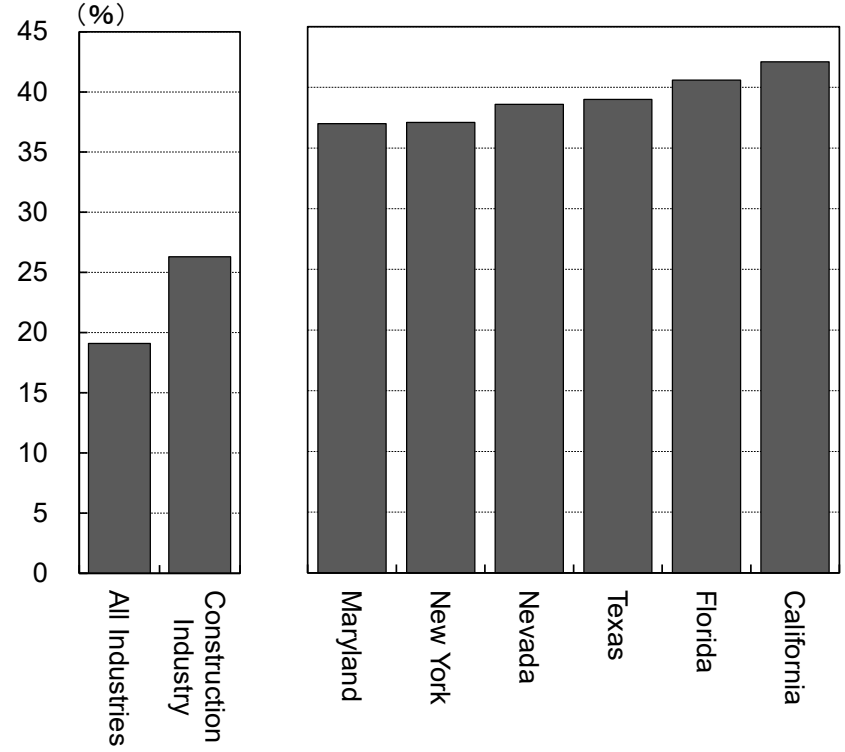
- Securing skilled workers to build data centers and power infrastructure is another key supply constraint. Data center construction requires electricians, plumbers, HVAC technicians, welders, and other skilled workers. The Center for Strategic and International Studies (CSIS) estimates that up to 142,000 additional skilled workers could be needed by 2030 to support AI infrastructure construction, suggesting that labor supply may struggle to keep pace with demand.
- The U.S. construction industry also relies heavily on foreign-born workers, who accounted for 26.3% of construction employment in 2024, rising to 39.0% in Texas, where data center construction is concentrated. Lower immigration or tighter immigration policies could worsen labor shortages, lengthening construction timelines and delaying AI infrastructure development.

Skilled Worker Shortages by Scenario



(Note)Scenario estimates are by CSIS. The low-growth scenario assumes AI investment growth comparable to the Dot-Com Boom (2 years), the mid-growth scenario to the PC Revolution (5 years), and the high-growth scenario to the Second Industrial Revolution (8+ years).
(Source)IIMA, based on CSIS data.

Share of Foreign-Born Workers in Construction by State

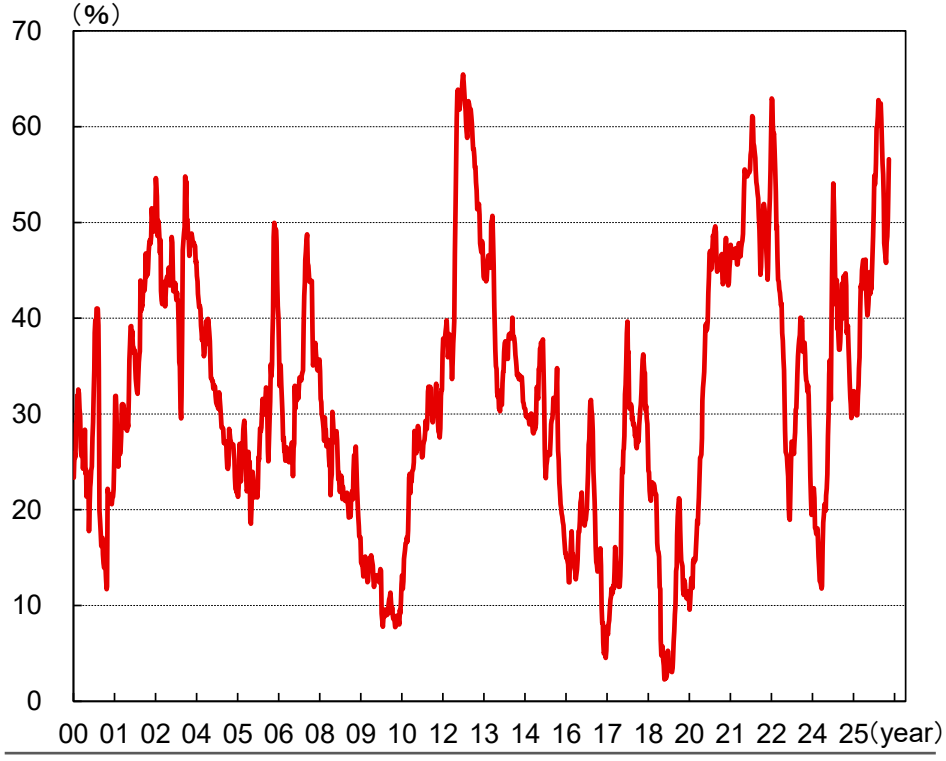


(Note)As of 2024.
(Source)IIMA, based on data from the U.S. Bureau of Labor Statistics (BLS) and the National Association of Home Builders (NAHB).

2.（3）Water Resources

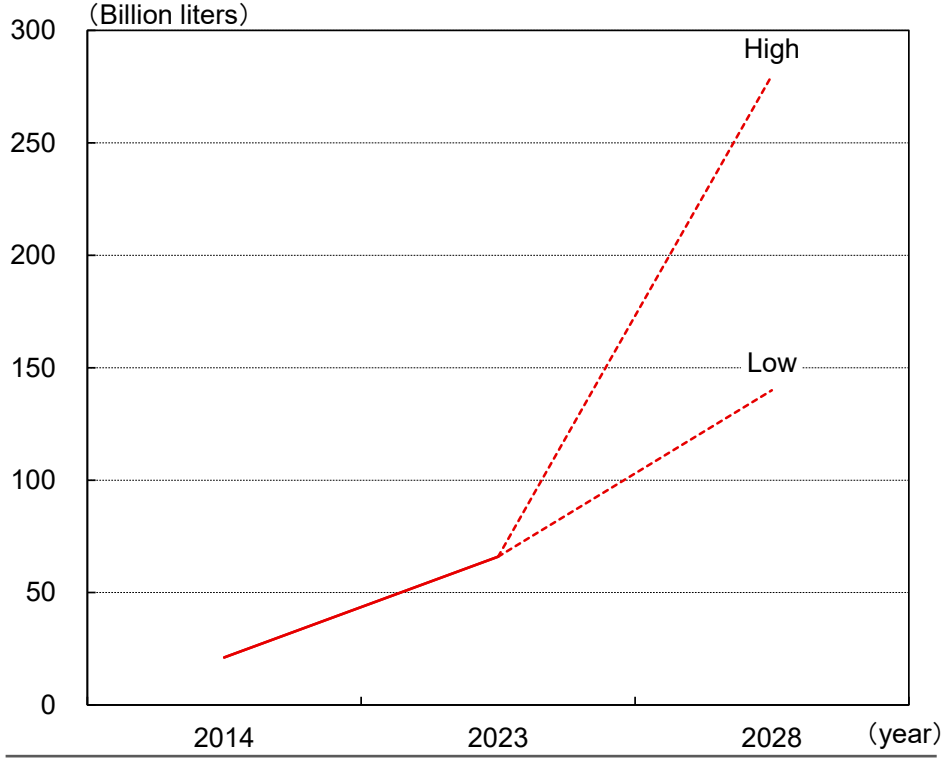
- Water resources could also become a supply constraint. In recent years, drought has at times affected around half of the contiguous U.S. Meanwhile, annual direct water use by U.S. data centers increased from 21.2 billion liters in 2014 to 66.0 billion liters in 2023 and is projected by LBNL to reach 140–280 billion liters by 2028, equivalent to the annual domestic water use of 1.24–2.47 million people (Note).
- Rising water demand could compete with agricultural and household use and generate local opposition, potentially delaying data center development. Securing sufficient water resources and local support will therefore be increasingly important.
- Note: Based on USGS (2018) estimates of per capita domestic water use in 2015 (82 gallons per day).

U.S. Drought Area (D1 or Higher)



(Note)D1 indicates moderate drought.
(Source)IIMA, based on U.S. Drought Monitor data.

Annual Direct Water Use by U.S. Data Centers



(Note)Scenario estimates are by Lawrence Berkeley National Laboratory (LBNL).
(Source)IIMA, based on LBNL data.

3. (1) Financial Strength of Hyperscalers

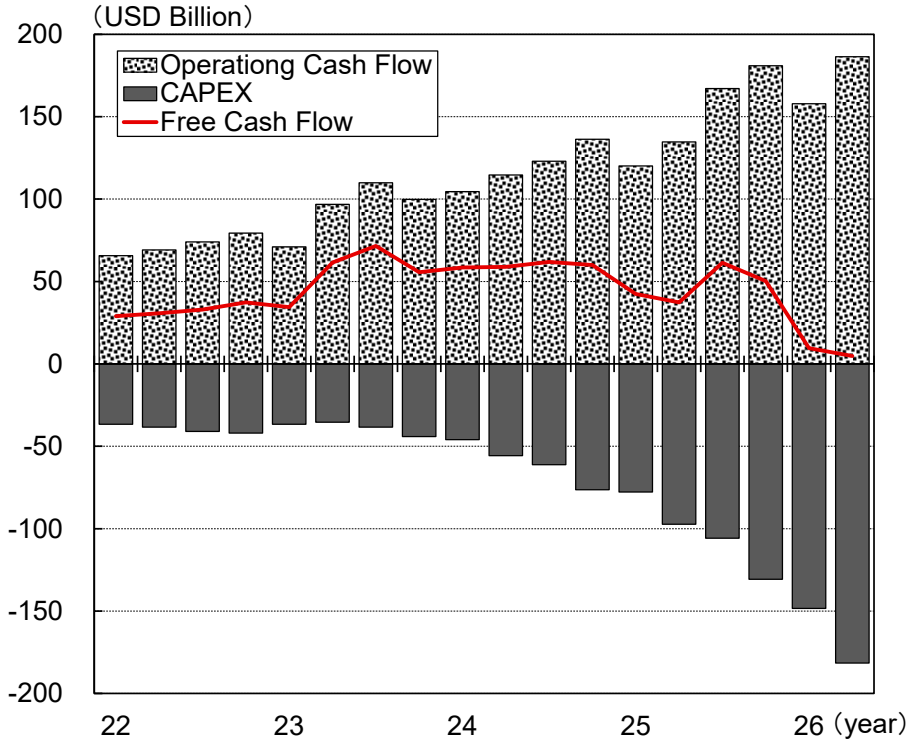
- A key question for the sustainability of AI-related investment is whether AI-related revenues can support continued capital spending. The cloud businesses of Microsoft, Alphabet, Amazon, and Oracle continue to grow strongly, while Meta is benefiting from AI-powered improvements in advertising and recommendations.
- These companies also generate substantial operating cash flow. In Q2 2026, the five companies generated a combined $186.4 billion, while CAPEX reached $181.5 billion. Free cash flow narrowed to $4.8 billion but remained positive.
- Companies are also increasingly using external financing. Despite rising CAPEX, their strong earnings and financing capacity suggest that hyperscalers are likely to maintain high levels of AI-related investment in the near term.

Hyperscaler Financial Results (Apr.-June. 2026)

Company	Revenue Growth (YoY)	Cloud Growth (YoY)	Operating Cash Flow (USD bn)	CAPEX (USD bn)
Alphabet	+24%	+82%	39.1	44.9
Amazon	+20%	+37%	45.4	54.2
Meta	+28%	–	31.9	30.1
Microsoft	+18%	+43%	55.4	35.8
Oracle	+21%	+47%	14.6	16.5

(Note)CAPEX refers to purchases of property, plant and equipment. As Oracle's fiscal year ends in May, its Q2 2026 figures cover the March–May period.
(Source)IIMA, based on company disclosures.

Operating Cash Flow and CAPEX of Five Major Hyperscalers

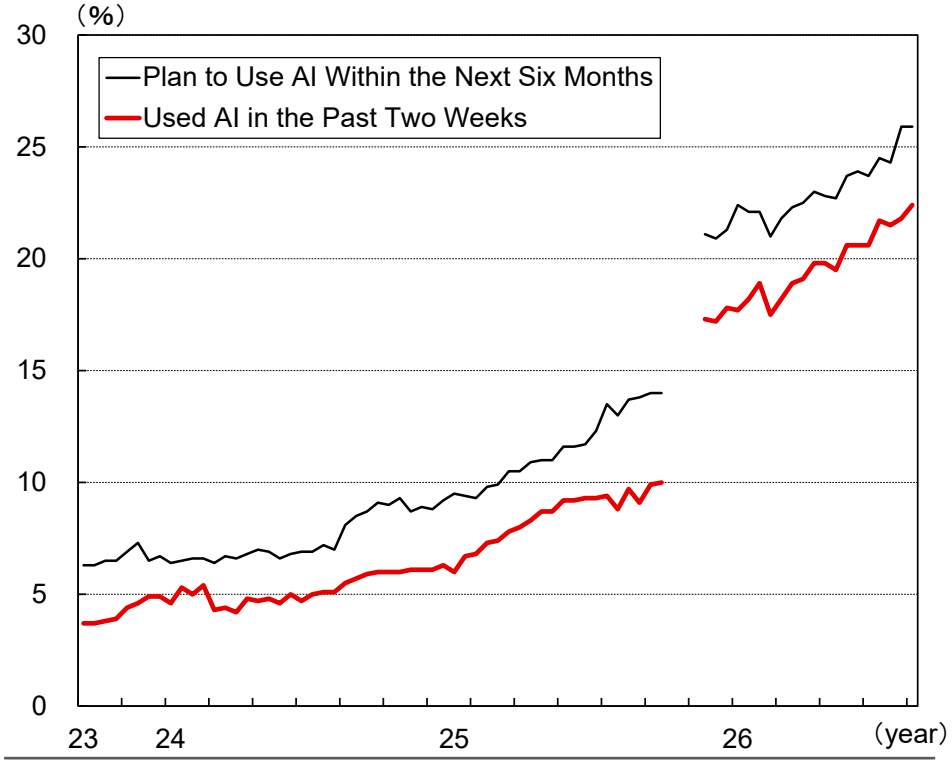


(Note)Covers five companies: Alphabet, Amazon, Meta, Microsoft, and Oracle. As Oracle's fiscal year ends in May, its quarterly reporting periods are one month earlier than those of the other companies.
(Source)IIMA, based on Bloomberg data.

3. (2) Growing AI Adoption and Productivity Gains

- For AI-related investment to remain sustainable, AI adoption by businesses will need to continue expanding. A key prerequisite is whether the use of AI can lead to higher productivity and value added. According to the U.S. Census Bureau, business adoption of AI has been steadily increasing. Empirical studies reviewed by the OECD also find that generative AI can improve performance across a wide range of tasks, including software development, writing, consulting, and customer support.
- However, it remains unclear to what extent these gains will translate into higher profits at the firm level or stronger productivity growth across the broader economy. In the near term, expanding AI adoption is likely to support demand for AI-related investment. Over the medium to long term, however, the sustainability of such investment will depend on whether AI adoption ultimately translates into higher value added and stronger earnings for businesses as a whole.

AI Adoption by U.S. Businesses



(Note)Data are unavailable during the government shutdown. From November 2025, the survey question was changed from AI use "in producing goods or services" to use "for any business function."
(Source)IIMA, based on U.S. Census Bureau data.

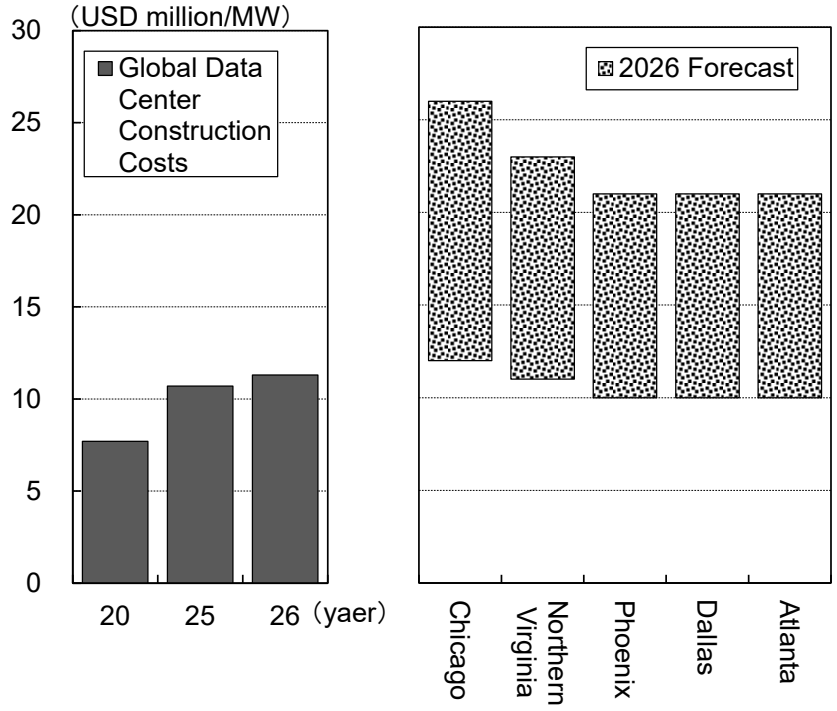
Performance Gains from Generative AI Use

(Note)The figures are based on empirical studies using various performance measures, such as task completion time, number of tasks completed, and output quality, as compiled and standardized by the OECD.
(Source)IIMA, based on OECD data.

3. (3) Downside Risks

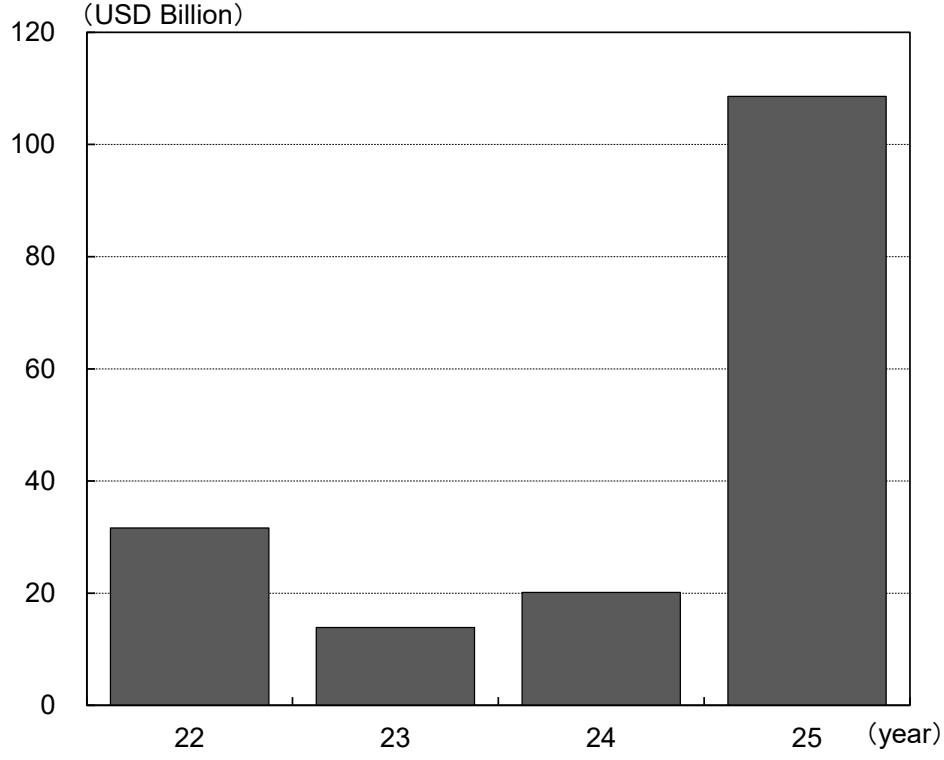
- Rapid AI-related investment is pushing up input costs. According to JLL, global data center construction costs rose from $7.7 million per MW in 2020 to $10.7 million in 2025 and are projected to reach $11.3 million in 2026, potentially putting pressure on investment returns.
- Reliance on external financing is also increasing. According to the BIS, debt issuance by five major hyperscalers surged to $108.6 billion in 2025. Higher interest rates and tighter credit conditions could therefore weigh on investment returns, while competition from Chinese companies and lower-cost AI models could reduce profitability. Rising costs, financial conditions, and price competition are key medium- to long-term risks.

Data Center Construction Costs



(Note)Construction costs cover data center buildings and core infrastructure. They exclude land acquisition, IT equipment such as AI servers, and additional equipment required to operate them. Forecasts are by JLL.
(Source)IIMA, based on JLL data.

Debt Issuance by Hyperscalers



(Note)Covers five companies: Alphabet, Amazon, Meta, Microsoft, and Oracle.
(Source)IIMA, based on BIS data.

3.（4）Views of Major Institutions

- Various major institutions have published analyses of the future potential of the AI market. McKinsey and Morgan Stanley project that generative AI could create substantial economic value and drive significant growth in AI-related revenues. Meanwhile, J.P. Morgan and Bain estimate that justifying the current massive scale of AI investment would require hundreds of billions to trillions of dollars in additional annual revenue.
- The BIS and IMF also point out that while AI has the potential to boost productivity, realizing these gains across firms and the broader economy will require not only widespread AI adoption but also complementary investment in areas such as business process redesign and human capital. Thus, while expectations for the AI market's growth potential remain high, considerable uncertainty remains over investment returns and the realization of its broader economic value.

Key Analyses of AI Market Potential and Investment Returns

Topic	Institution	Key Findings
① AI Market Growth Potential	McKinsey	Generative AI could create $2.6–4.4 trillion in annual economic value globally.
	Morgan Stanley	Global generative AI revenue could grow from about $45 billion in 2024 to $1.1 trillion in 2028.
② Conditions for AI Investments Returns	J.P Morgan	About $650 billion in annual revenue would be needed to generate a 10% return on current AI investment.
	Bain	An additional $800 billion in annual revenue would be needed by 2030 to fund the required AI investment.
③ Conditions for Productivity Gains	IMF	Productivity gains require broader AI adoption and complementary investment and adaptation.
	BIS	Significant productivity gains have been observed at the task level, but their macroeconomic impact remains uncertain.

(Source)IIMA, based on publicly available materials from each institution.

4. Conclusion

- AI-related investment is likely to remain at a high level in the near term.
- Although concerns about overinvestment have emerged, demand continues to exceed supply in the data center market. Vacancy rates remain at historically low levels, while a large share of capacity under construction has already been preleased.
- In addition, the hyperscalers leading AI-related investment continue to generate strong earnings and substantial operating cash flow, while maintaining good access to external financing. Although supply constraints remain in areas such as electricity, skilled labor, and water resources, robust demand and strong investment capacity suggest that a sharp slowdown in AI-related investment is unlikely in the near term. AI-related investment is therefore expected to continue supporting U.S. business investment and economic growth for the time being.
- Over the medium to long term, however, sustainability will depend on whether AI can generate sufficient revenues and cash flows to justify the massive scale of investment. Corporate adoption of AI is expanding, and productivity gains have been observed in some tasks. However, considerable uncertainty remains over the extent to which these gains will translate into higher value added and stronger earnings across firms as a whole.AI-related investment could also slow if investment returns deteriorate due to intensifying price competition in AI services, rising input costs, higher interest rates, or tighter credit conditions.
- For AI-related investment to remain sustainable, AI adoption will need to continue expanding and translate into higher productivity and value added. A key factor to watch will therefore be whether broader AI adoption ultimately leads to sustained growth in revenues, profits, and cash flows sufficient to support continued large-scale infrastructure investment.

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