# AI infrastructure boom faces funding shortfall and supply constraints



The rapid rise of artificial intelligence is fuelling massive growth in data centre infrastructure, but the sector must overcome steep financial and logistical challenges to sustain its momentum. A new report from Bain & Company warns that the industry will need to generate $2 trillion in annual revenue by 2030 to maintain the current pace of investment in data centres and associated hardware — a goal that remains elusive.

Bain’s analysis focuses on the United States, where surging demand for AI computing is expected to require an additional 100 gigawatts of capacity by 2030. Meeting this demand would mean spending around $500 billion a year on new data centre construction and upgrades. Even under optimistic scenarios, including redirecting all on-premises IT budgets to the cloud and reinvesting productivity gains, the sector faces an $800 billion annual funding gap.

Four core issues threaten to slow progress: energy supply, construction capacity, availability of GPUs, and shortages in essential equipment such as switchgear and cooling systems. Bain notes that building new power infrastructure in the US can take four years or more due to regulatory hurdles, creating a bottleneck that could hinder AI’s growth.

Still, investment in AI infrastructure is surging. Synergy Research Group reports that hyperscale operators increased capital spending to $127 billion in Q2 2025 — a 72 percent rise year-on-year — largely due to AI-driven projects. Microsoft is allocating around $80 billion in fiscal 2025 to build AI-enabled data centres. The $500 billion Stargate project, a consortium including OpenAI and SoftBank, plans to deliver 10 gigawatts of computing power across five sites, creating thousands of jobs.

Yet some analysts question whether this level of investment is justified. A recent report found that 95 percent of US companies using generative AI have not seen a return on their projects. Sid Nag, president and chief research officer at Tekonyx, warned that if demand fails to match supply, capital expenditure could fall. John Dinsdale, chief analyst at Synergy Research, said it is difficult to isolate AI-specific infrastructure spending from broader data centre investment. He argued that the projected $500 billion annual figure may not be reached for two to three years.

Bain cautions that without technological breakthroughs in areas such as energy efficiency and chip production, future infrastructure growth may depend on government subsidies. At present, tech giants are outspending some national economies — Amazon’s capital expenditure now exceeds $100 billion, rivalling the GDP of countries like Costa Rica.

Despite these hurdles, optimism about AI’s transformative potential remains high. OpenAI CEO Sam Altman has said 10 gigawatts of compute power could unlock breakthroughs such as curing cancer or personalised education. OpenAI also announced plans to build a facility capable of producing a gigawatt of AI infrastructure each week.

The industry’s ambition is clear, but turning vision into sustainable reality will require more than capital. Coordinated efforts between the private sector and government will be essential if countries like the UK hope to lead in global AI innovation.

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## Bibliography

1. <https://www.theregister.com/2025/09/24/bain_ai_costs/> - Please view link - unable to able to access data
2. <https://www.theregister.com/2025/09/24/bain_ai_costs/> - An article discussing Bain & Company's Technology Report 2025, which highlights the need for the AI industry to generate $2 trillion in annual revenue by 2030 to sustain infrastructure growth. The report estimates that $500 billion per year is required for data center investments, but even with all on-premises IT budgets shifted to the cloud and AI productivity savings reinvested, there's an $800 billion shortfall. The article also notes that 95% of US firms investing in generative AI projects have seen no return on investment.
3. <https://www.reuters.com/business/us-data-center-build-hits-record-ai-demand-surges-bank-america-institute-says-2025-09-10/> - A Reuters article reporting that in June 2025, U.S. data center construction spending reached a record $40 billion, marking a 30% year-over-year increase. This surge is driven by the explosive growth in generative AI and machine learning technologies, which require vast computing resources. Major tech companies like Microsoft, Alphabet, and Amazon are leading the charge, investing billions to expand their AI infrastructure.
4. <https://www.reuters.com/technology/artificial-intelligence/microsoft-plans-spend-80-bln-ai-enabled-data-centers-fiscal-2025-cnbc-reports-2025-01-03/> - A Reuters report detailing Microsoft's plan to invest approximately $80 billion in fiscal 2025 to develop data centers designed to train AI models and deploy AI and cloud-based applications. This significant investment underscores the surging interest in AI since the launch of OpenAI's ChatGPT in 2022, highlighting the substantial computing power required for AI development.
5. <https://www.reuters.com/business/media-telecom/openai-oracle-softbank-plan-five-new-ai-data-centers-500-billion-stargate-2025-09-23/> - An article by Reuters announcing that OpenAI, Oracle, and SoftBank have launched the $500 billion Stargate project, aiming to build five new AI data centers. The initiative seeks to deliver 10 gigawatts of AI computing capacity and is expected to generate 25,000 onsite jobs, reflecting the massive demand for AI infrastructure.
6. <https://www.reuters.com/business/autos-transportation/companies-pouring-billions-advance-ai-infrastructure-2025-09-23/> - A Reuters article highlighting that leading tech companies are investing billions in AI infrastructure, including chip manufacturing and cloud computing. Notably, Nvidia plans to invest up to $100 billion in OpenAI and supply it with data center chips, reflecting the massive demand spurred by ChatGPT’s success since 2022.
7. <https://www.srgresearch.com/articles/justifying-the-explosive-growth-in-hyperscale-capex> - An article from Synergy Research Group discussing the explosive growth in hyperscale capital expenditure, which reached $127 billion in the second quarter of 2025, up 72% from the previous year. The article attributes this surge to the need for AI infrastructure and highlights the rapid expansion of digital services.