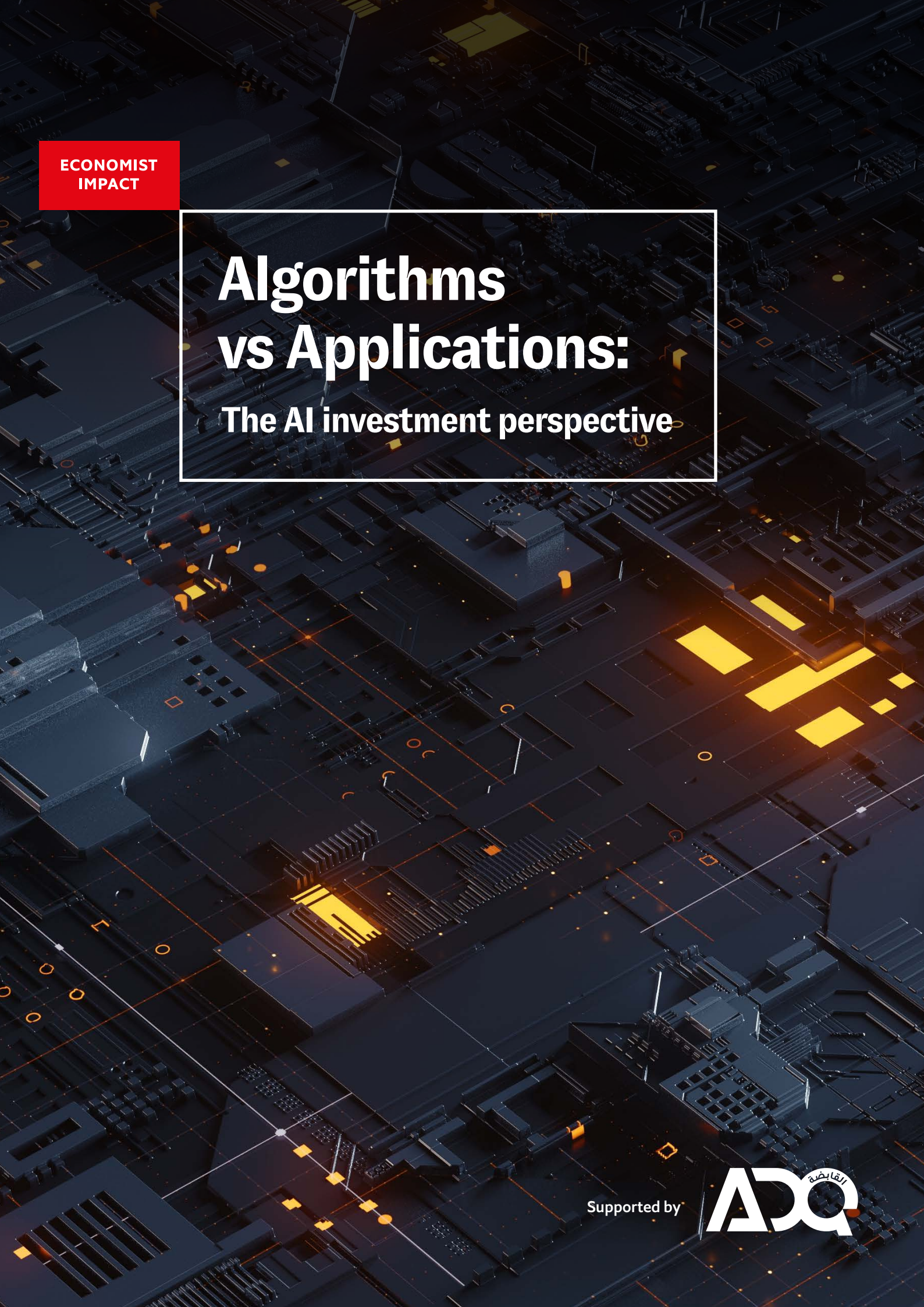
ECONOMIST
IMPACT
Algorithms
vs Applications:
The AI investment perspective
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Contents

Foreword by ADQ

Hamad Al Hammadi
Deputy Group CEO, ADQ

Some technologies are so ubiquitous, so embedded in our everyday lives—think of the internet and your smartphone—that you might struggle to recall what life was like before them. Indeed, younger generations have never known a time without them. These digital tools have transformed our hyper-connected lives, from business to healthcare, education to travel, with virtually no sector left untouched.

With artificial intelligence (AI), we now stand on the cusp of a new era, one that will drive innovation at an unparalleled pace and transform inefficiencies into streamlined operations. For example, AI algorithms can analyse vast datasets to identify market trends across industries, optimise strategies and support insight-driven decision making.

With the arrival of this novel technology and a burgeoning market offering lucrative prospects, investors face the perennial dichotomy of opportunities and challenges. The ethical implications of AI, including concerns about privacy, bias and accountability, are widely debated, as existing frameworks struggle to keep pace with technological advancements. While these concerns cannot be overlooked, it is clear that AI is here to stay, and those who identify and capitalise on emerging AI trends stand to benefit.

So, what does this mean for investors? This report contributes to the debate about where to invest in AI, which falls broadly into two camps: algorithms vs applications. In other words, the choice is between investing in developers, who create and advance critical AI technology, or in adopters, who deploy these technologies to enhance their operations. Which should be prioritised, and why?

For their market leadership, AI developers can command an innovation premium; combined with scalability, the potential returns are high, but the risks are greater, including high research and development costs, technological uncertainty and regulatory challenges.

For AI adopters, the returns may be lower, but the risks are smaller. They typically have established business models and revenue streams, reducing the risks associated with their operations. This also allows for diversification across different industries, mitigating sector-specific risks. However, the gains can be incremental rather than transformative, and there is a dependence on external developers.

Considering and weighing both options can help investors create a portfolio that includes AI developers and adopters, capturing the upside potential of AI innovation while benefitting from rapidly growing demand for AI solutions across sectors.

As an investment and holding company with numerous companies under its umbrella and a strong commitment to creating future-ready business models, ADQ is a prime example of an entity that has been challenged to weigh the complexities of AI investment options. Our journey thus far has included investments in AI developers as well as infrastructure, and the deployment of relevant cutting-edge AI technologies throughout our portfolio has been a priority for many years.

We hope that by commissioning this paper we bring forward valuable insights that are relevant for companies around the world as we enter this new era of AI-driven transformation.

About the research

Algorithms vs Applications: The AI investment perspective, written by Economist Impact and supported by ADQ, examines the factors influencing investment decisions in the artificial intelligence (AI) ecosystem. As AI technologies become more widely adopted, investors around the world are ensuring that AI has a place in their portfolios. Against this backdrop, the research homes in on two central questions. First, will AI adopters generate more returns than AI developers as the industry matures? And, second, how do the key considerations driving decisions to invest in AI developers or adopters differ based on investor preferences and risk profiles?

This research incorporates insights from expert interviews, proprietary data analysis and extensive desk research. We conducted in-depth discussions with executives from investment firms; C-suite leaders overseeing strategy and investor relations at companies developing AI solutions; and technology leaders responsible for AI implementation and digital transformation. They represented a variety of sectors such as energy and utilities, financial services, and manufacturing.

The interviews were conducted by Economist Impact between August and October 2024. Economist Impact would like to thank the following interviewees (listed alphabetically) for their time and insights:

- **Dennis Cinelli,** chief financial officer, Scale AI
- **Christopher d'Arcy,** managing director E.ON Digital Technology and chief data & AI officer
- **Sara Ittelson,** partner, Accel
- **Roger Jakeman,** chief technology officer, Akzonobel
- **Stephanie King-chung Hung,** chief information officer, Asian Development Bank
- **Vinnie Lauria,** founding partner, Golden Gate Ventures
- **George Mathew,** managing director, Insight Partners
- **Jeffrey Paine,** founding managing partner, Golden Gate Ventures
- **Nimish Panchmatia,** chief data and transformation officer, DBS bank
- **Thomas Robinson,** chief operating officer, Domino Data Lab
- **Trina Van Pelt,** AI investor
- **Craig Wiley,** senior director of product, AI, Databricks

The report was produced by a team of researchers at Economist Impact, including:

- **Project manager: Anushree Sharma,** manager, Policy & Insights
- **Project director: Melanie Noronha,** principal, Policy & Insights
- **Project advisor: John Ferguson,** global head, New Globalisation, Policy & Insights

Executive summary

Companies involved in large language models (LLMs), chip manufacturing and data centres have attracted substantial funding and experienced remarkable growth in recent months. However, a major challenge to fully realising AI's economic potential is the extent of its adoption in businesses. Amid this transition, investors are assessing how the AI industry will transform over the next decade. Will AI developers (which create AI technologies and applications, algorithms, frameworks, and tools) continue to deliver most of the value or will adopters (which use AI solutions to enhance business processes or offerings) generate greater returns? A balanced investment approach ensures AI technologies progress and scale effectively, avoiding overinvestment in one area at the expense of the other.

In our research, *Algorithms vs Applications: The AI investment perspective*, we explore the factors that motivate investors to choose between AI developers and adopters. We analyse how they manage the risks associated with each option and how they can balance these risks to achieve their desired returns.

Key findings:

- Global AI funding saw a recovery in Q2 2024, increasing to US$24.9bn from US$13.3bn in the first quarter. Funding in 2024 is set to surpass the total for 2023. Amid this recovery, there has been a mindset shift among investors that are focusing on AI developers: from "growth at all costs" to "capital-efficient growth". Although the potential for profitability was always a consideration, investors are now prioritising developers who can demonstrate profitability (through discipline around costs) and create measurable value for their clients.
- Investor interest in AI adopters has surged, especially after the launch of generative AI (genAI), given its promise to enhance productivity. However, concerns remain that genAI may overshadow established AI technologies, such as predictive analytics and robotic process automation, particularly in asset-heavy industries where these traditional solutions could be more effective. As such, investors are scrutinising how AI is being implemented, assessing its ability to drive operational efficiencies and productivity, reduce costs and drive revenue.

- Late-stage venture capital (VC) is generally more open to risk than private equity (PE), which tends to favour lower-risk, mature investments. As such, VC firms are likely to maintain their focus on AI developers, while PE firms are more likely to increase investment in adopters.
- Beyond developers and adopters, there is a substantial investment opportunity in AI infrastructure such as data centres, cloud platforms and chips. The growing demand for computational power to support AI applications over the next five to ten years underscores the long-term need for such infrastructure. There was a sharp increase in global funding in data centre hardware and software companies in 2024: the first eight months of this year saw investments worth US$12.5bn announced, up from an average of US$2.5bn annually between 2021 and 2023.
- Constructing an investment portfolio with both developers and adopters creates a valuable feedback loop. Investing along the AI value chain helps investors deepen their understanding of adoption timelines, implementation challenges and unmet market needs. Sharing this feedback with developers in their portfolios allows these firms to refine their offerings, boosting potential returns. More broadly, ecosystem partnerships—among developers, adopters and infrastructure enablers—can drive value and the ultimate growth of the AI industry.

Introduction

If AI was a country, it would become the world's third-largest economy after the US and China by 2030, contributing an estimated US$15.7trn to global GDP.[1] Indeed, over the past decade, more than US$250bn has been raised to fund AI technology developers.[2] Despite a slump in investment from its peak in 2021, investment is showing signs of a recovery: by mid-August 2024 total funding had reached US$51.5bn, nearing the US$55.6bn raised in all of 2023. Indeed, OpenAI, the poster child of genAI, which made waves with the launch of ChatGPT two years ago, is on track to become a hectocorn—valued at more than US$100bn.[3] OpenAI is not alone in this remarkable growth; Anthropic, another genAI firm, raised over US$7.3bn in funding in 2023.[4] Meanwhile, shares of NVIDIA, which produces graphics processing units that are essential for AI computing, have surged by nearly 450% since 2023, making it America's third-most valuable company.[5]

US$51.5bn

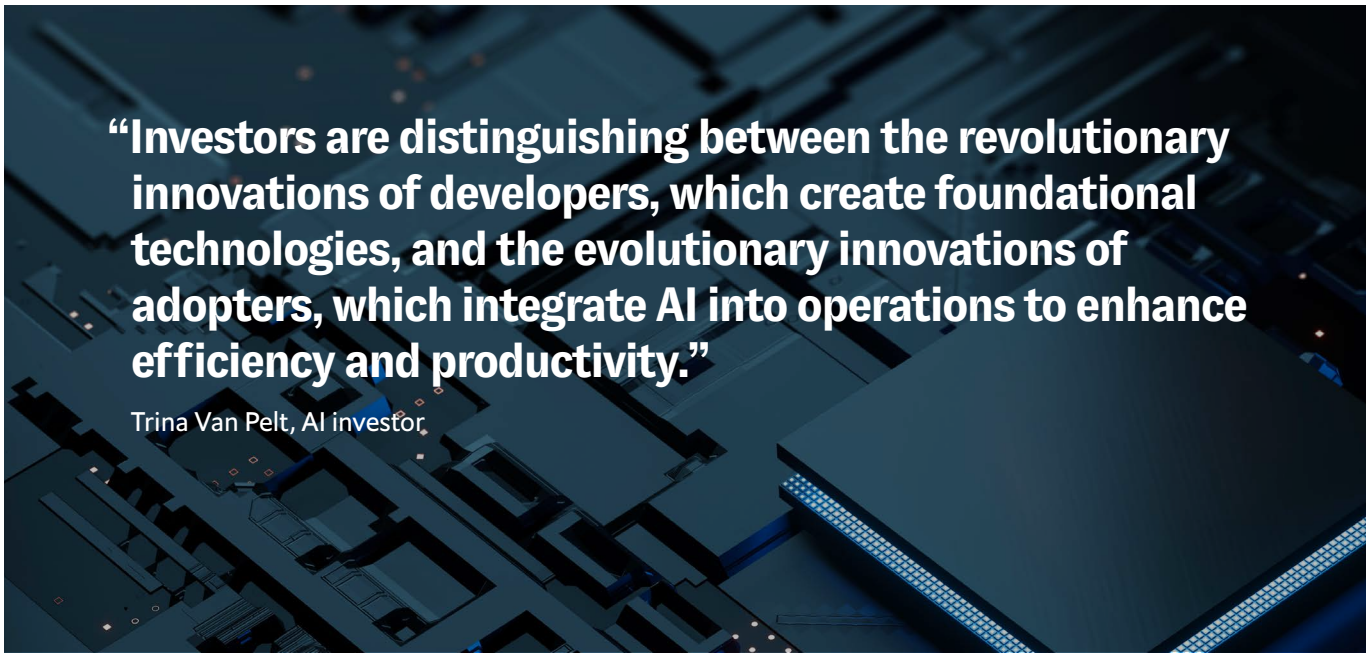
Total funding in AI developers Jan-mid-August 2024

But during the slowdown in 2022-23, there was a critical shift in investors' mindsets. Doubts emerged about the transformative potential of current AI technologies, some of which struggled to scale up as expected. Concerns over inflated valuations reduced willingness to fund some new AI entrants, especially in capital-intensive sectors such as foundational models.[6]

However, the shift has not dampened investor interest in the broader AI industry. There is a renewed focus on investing in businesses adopting AI, especially following the launch of genAI and its potential to enhance productivity, improve operational efficiency, reduce costs and drive revenue growth. AI adopters span a range of industries: from healthcare companies like Johnson & Johnson, which uses AI for early disease detection, speeding up drug development, optimising clinical trials and streamlining supply chain management, to energy companies like E.ON, which leverages AI for grid management and dynamic pricing.

A key question for investors over the next decade is whether AI adoption will deliver greater value than AI technology development. "Investors are distinguishing between the

[1] PwC, "Sizing the prize", https://www.pwc.com/gx/en/issues/data-and-analytics/publications/artificial-intelligence-study.html
[2] Statista, "Artificial intelligence (AI) startup funding worldwide from 2011 to 2023 (in billion U.S. dollars), by quarter", https://www.statista.com/statistics/943151/ai-funding-world-wide-by-quarter/.
[3] The Economist, "OpenAI's new fundraising is shaking up Silicon Valley", https://www.economist.com/business/2024/09/19/openais-new-fundraising-is-shaking-up-silicon-valley
[4] The New York Times, "Inside the Funding Frenzy at Anthropic, One of A.I.'s Hottest Startups", https://www.nytimes.com/2024/02/20/technology/anthropic-funding-ai.html
[5] See: https://companiesmarketcap.com/
[6] TechCrunch, "Investors are growing increasingly way of AI", https://techcrunch.com/2024/04/15/investors-are-growing-increasingly-wary-of-ai/



revolutionary innovations of developers, which create foundational technologies, and the evolutionary innovations of adopters, which integrate AI into operations to enhance efficiency and productivity," explains Trina Van Pelt, an AI investor based in San Francisco. The conundrum lies in striking the right balance between AI developers and adopters. Startups carry risks, such as unproven technologies, ethical risks related to biased or stolen data, and uncertain market demand, while adopters may offer more stability by using established solutions. However, AI developers delivering breakthrough solutions also present the potential for higher returns.

This report examines the factors underpinning the choice between AI developers and adopters. By understanding these dynamics, investors can align their decisions with their risk appetite and investment priorities. The report also explores other sources of value in the AI ecosystem beyond adopters and developers, specifically infrastructure such as data centres that will enable adoption. Across the AI ecosystem, there are opportunities for partnerships between developers and adopters, which will prove crucial for maximising returns and mitigating risks in this rapidly evolving market.

Chapter I: Developers vs adopters

There are new dynamics at play in the AI investment landscape. Investors are now focusing on AI technology developers that can demonstrate profitable growth, rather than growth at all costs, and deliver tangible value to clients. As attention turns towards firms adopting AI solutions, the emphasis remains on successful integration with legacy systems and the ability to generate measurable outcomes such as cost savings and revenue growth. In this chapter, we explore these evolving trends in more detail.

The profit pivot: investors shifting from growth to returns

In 2023 AI startups globally attracted US$55.6bn in funding, a fall from previous years but still outperforming other sectors such as fintech, digital health and retail tech.[7,8,9,10] While total deal volume and funding fell by 24% and 10%, respectively, AI funding proved more resilient, dipping less sharply amid broader market declines of 30% and 42%. Although average deal size grew (from US$12.6m in 2022 to US$15m in 2023), the number of deals—2,500—hit its lowest level since 2017.

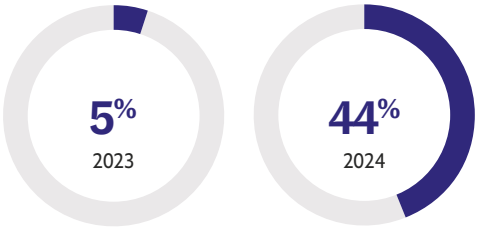
The slowdown in AI funding reflects not only macroeconomic challenges (such as economic uncertainty driven by geopolitical tensions and rising interest rates), but also a change in how investors are evaluating AI investments. "There has been a significant shift from a few years ago when capital was inexpensive," explains Thomas Robinson, the chief operating officer of Domino Data Labs, which enables companies to build and operate AI at scale. "Since then, companies have gone out of business or have had to sell amid difficulties raising capital." Investors are becoming increasingly selective, prioritising startups that demonstrate long-term market value through unique value propositions, proven use cases and clear market validation. "There are many funds that truly need to realise cash returns, and I think they could be incredibly focused on [profitability] and synergistic partnerships," says Trina Van Pelt, an AI investor based in San Francisco.

As investors prioritise long-term value creation and capital-efficient growth, industry-specific AI solutions are gaining traction. Companies are embracing AI solutions for their potential to enhance operational efficiency and productivity. For instance, AI-driven chatbots have attracted significant attention for their ability to streamline customer service, improve response times and enhance the overall user experience. This growing interest in AI solutions has fuelled

[7] HIT Consultant, "State of Digital Health 2023: From Gold Rush to Consolidation in a Cooling Market", https://hitconsultant.net/2024/01/29/state-of-digital-health-2023-report/
[8] S&P Global, "Fintech funding falls 42% to $35B in 2023, but downturn may be nearing end", https://www.spglobal.com/market-intelligence/en/news-insights/research/fintech-funding-falls-42-to-35b-in-2023-but-downturn-may-be-nearing-end
[9] KPMG, "Global fintech investment drops to five-year low in 2023", https://kpmg.com/xx/en/our-insights/value-creation/pulse-of-fintech-h2-2023-global-insights.html
[10] Crunchbase, extracted August 15th 2024. Economist Impact's analysis includes Seed (angel, pre-seed, seed), Early Stage Round (series A and B), Late Stage Round (Series C onwards and private equity), Other Venture (series unknown) and Corporate Round (when a company, rather than a venture capital firm, makes an investment in another company). It excludes debt financing, equity crowdfunding, grants, initial coin offerings, post-IPO funding. We have also excluded deals with no value mentioned from our analysis.

genAI investments, which soared from just 5% of total AI funding in 2022 to 44% in 2023.

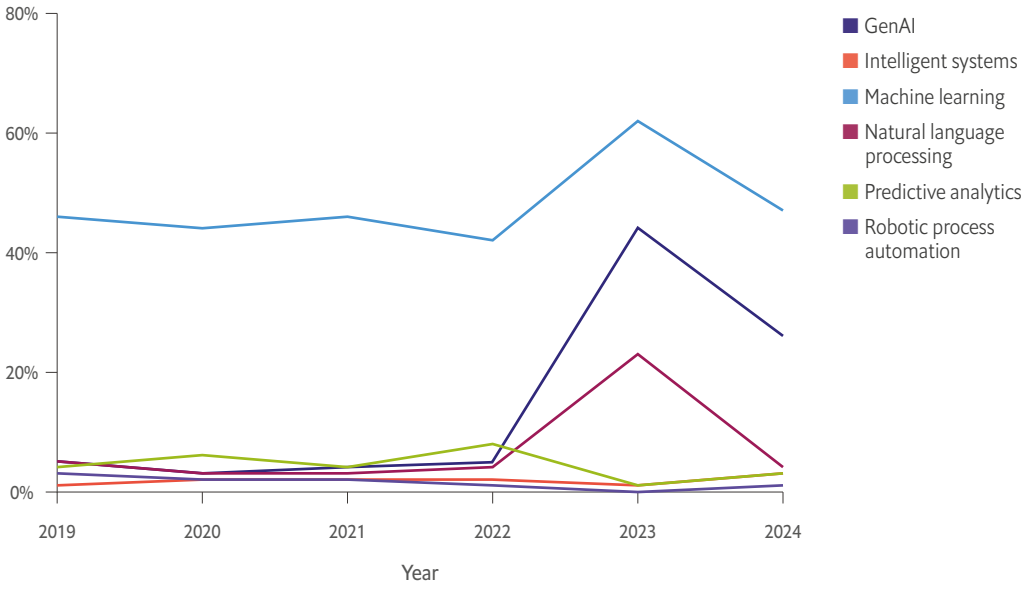
GenAI's share of total AI funding



Leading the charge are companies like OpenAI, backed by a US$10bn investment from Microsoft in 2023, and Anthropic, which launched its Claude chatbot the same year. Elon Musk's xAI, known for its chatbot Grok, secured the largest funding round of 2024 with US$6bn, underscoring the growing demand for conversational AI technologies. These multi-billion-dollar investments are being led by corporate investors such as Microsoft, NVIDIA and Google, and VC/PE firms such as Sequoia Capital, Accel, Index Ventures, Intel Capital and Menlo Ventures.[11]

Firms offering AI solutions to tackle industry-specific challenges are also attractive to investors. Wayve, which focuses on autonomous driving, and Xaira Therapeutics, which focuses on drug discovery, secured the largest deals in 2024, each raising US$1bn. This trend underscores the strategic role of AI-powered chatbots and tailored solutions in transforming business operations across various sectors. George Mathew, the managing director of Insight Partners, emphasises this point: "It's crucial to understand how AI software generates value for organisations. Investors should focus on solutions that can clearly demonstrate their impact on business outcomes."

Fig. 1 Global funding of AI developers by sub-industry.



Source: Crunchbase[12]
The chart displays announced funding by sub-industry. Some companies are listed in multiple categories (e.g., generative AI and machine learning), so the percentages for each year may not add up to 100%.

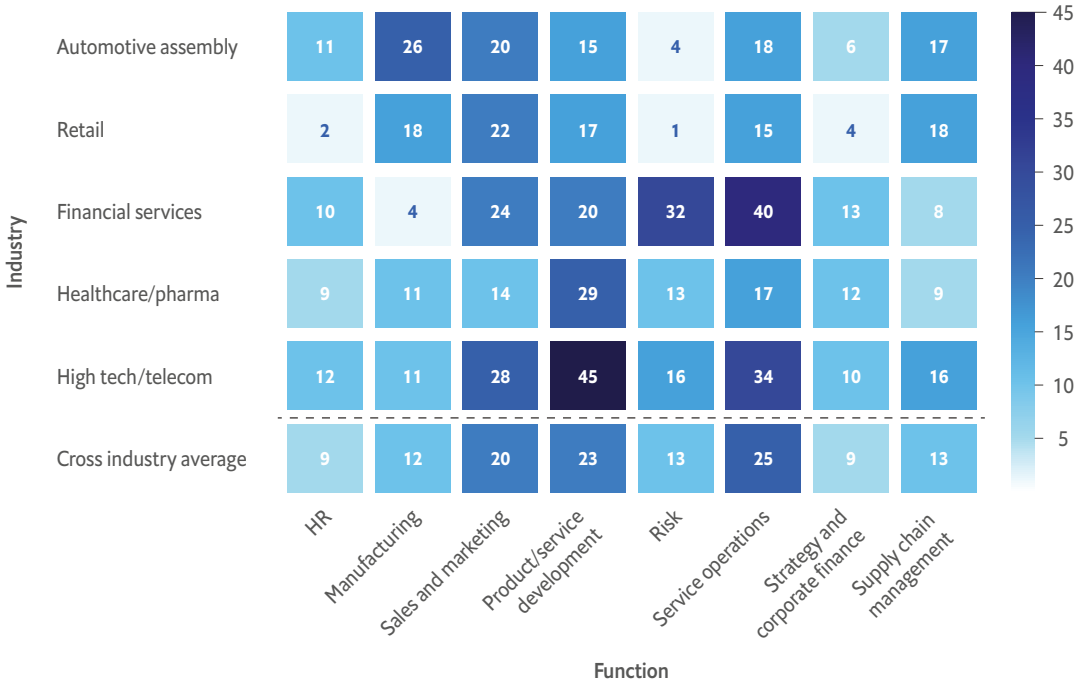
[11] Crunchbase, "Microsoft, Nvidia Lead In Investing In AI Startups, But Others Close Behind", https://news.crunchbase.com/ai/msft-nvda-lead-big-tech-startup-investment/
[12] Crunchbase, extracted August 15th 2024. Economist Impact's analysis includes Seed (angel, pre-seed, seed), Early Stage Round (series A and B), Late Stage Round (Series C onwards and private equity), Other Venture (series unknown) and Corporate Round (when a company, rather than a venture capital firm, makes an investment in another company). It excludes debt financing, equity crowdfunding, grants, initial coin offerings, post-IPO funding. We have also excluded deals with no value mentioned from our analysis.

Adopter appeal: the genAI gold rush

Corporate interest in AI has swelled, with over 16% of Russell 3000 companies in the US mentioning AI in earnings calls in 2023—up from less than 1% in 2016—largely following the launch of ChatGPT in late 2022.[13] Investors are drawn in by the potential for tangible returns: GenAI is expected to boost productivity by 6-7% and revenue by 3-4%.[14] These applications are reshaping key business functions and could reduce working hours by 40%.[15] A study by Accenture, a management consultancy, assessed the impact of AI implementation on four companies in a PE firm's portfolio, estimating that profit could increase by US$460m.[16]

But realising these gains is a complex endeavour, so investors are focused on how AI is being implemented. The effectiveness of AI depends heavily on how well it integrates with existing systems and processes, including the ease of deployment and its potential to improve workflows. "Successful AI implementation requires a deep understanding of the specific domain," explains Mr Robinson. "While creating random AI applications is relatively easy, integrating AI into complex systems—like banking risk models, autonomous vehicles, or insurance underwriting—necessitates expertise in the relevant field." Ultimately, a few key metrics will determine return on investment (ROI), Ms Van Pelt explains: "As an investor in adopters, typically larger companies, you need to assess how technology will help them scale—whether through revenue growth, reduced operational costs, or improved employee productivity by automating mundane tasks."

Global AI adoption rates across industries and functions, 2023



Source: PwC and Data Science Group, Statista 2023[17,18]

[13] Goldman Sachs, "AI investment forecast to approach $200 billion globally by 2025", https://www.goldmansachs.com/insights/articles/ai-investment-forecast-to-approach-200-billion-globally-by-2025.html
[14] Accenture, "Unleashing the power of generative AI for private equity", https://www.accenture.com/us-en/blogs/business-functions-blog/private-equity-generative-ai
[15] Ibid
[16] Ibid
[17] PwC, "AI Adoption in the Business World: Current Trends and Future Predictions", https://www.pwc.com/il/en/mc/ai_adopion_study.pdf
[18] Statista, "Artificial intelligence (AI) adoption worldwide 2023, by industry and function", https://www.statista.com/statistics/1464584/ai-adoption-worldwide-industry-function/

AI in action

Companies are adopting AI to foster innovation, enhance efficiency and improve customer service

Financial services	Fraud detection, risk management and investment analysis
Technology	Machine learning, cognitive computing and robotics
Healthcare	Patient diagnosis, treatment planning and drug development
Energy	Aiding oil and gas discovery, customer apps to optimise energy demand
Automotive	In-vehicle voice assistants, chatbots to facilitate sales leads online

Artificial intelligence is rapidly transforming industries across the globe, reshaping operations and delivering significant improvements in efficiency, decision-making, and customer experience. According to recent reports, 42% of companies are exploring AI opportunities, while 35% have already integrated AI into their business operations, and the possibilities are boundless.[19]

In the finance and banking sector, AI is revolutionising security, efficiency and customer engagement. It powers fraud detection systems to help prevent fraudulent transactions and facilitates predictive maintenance to reduce costly unplanned downtime. AI also supports risk management by analysing large data sets to identify potential risks. DBS Bank, for instance, engaged 8.6 million customers in 2023 through personalised nudges, guiding them to make informed financial decisions. DBS's AI-powered financial planning tool helped over 3 million customers in Singapore to improve their financial health. In institutional banking, DBS uses AI to alert SMEs to credit risks; the bank identified over 95% of non-performing loans three months in advance, allowing 80% of at-risk borrowers to take proactive steps. Furthermore, their "iGrow" platform supports career development for over 10,000 employees, offering personalised advisory services through Natural Language Processing.

In the energy sector, genAI is driving discovery and innovation. In May 2023, Shell announced a partnership with SparkCognition, a US-based AI tools provider, to enhance the imaging of subsurface structures for oil discovery.[20] On the operational front, Japanese firm Cosmo Oil developed a digital twin of its three refining facilities, leveraging genAI to analyse historical data. This approach enables the company to optimise various processes, including site design, maintenance schedules, and production estimates, ultimately maximising operational efficiency.

Healthcare is another industry experiencing a profound transformation through AI. It enhances disease detection and diagnosis through medical image analysis. It also facilitates personalised medicine by tailoring treatment plans to individual genetic profiles. AI-powered chatbots and virtual assistants improve patient engagement and communication with healthcare providers. Johnson & Johnson is leveraging AI to enhance patient outcomes and operational efficiency, using it to analyse surgical videos and enable drug discovery.[21] Their CARTO™ 3 System helps electrophysiologists create 3D heart maps, while other AI tools streamline clinical trial recruitment, ensuring diverse patient participation. By integrating AI, Johnson & Johnson aims to accelerate therapy delivery and broaden healthcare accessibility.

[19] PwC, "AI Adoption in the Business World: Current Trends and Future Predictions", https://www.pwc.com/il/en/mc/ai_adopion_study.pdf
[20] Economist Intelligence, "AI: from experimentation to implementation?", https://www.eiu.com/n/campaigns/ai-from-experimentation-to-implementation-registration-confirmation
[21] Johnson & Johnson, "Six ways Johnson & Johnson is using AI to help advance healthcare" https://www.jnj.com/innovation/artificial-intelligence-in-healthcare

A notable example is Singapore-based DBS Bank. Nimish Panchmatia, its chief data and transformation officer, highlights AI's impact there. "Our AI/ML (machine learning) initiatives have delivered incremental tangible economic value year on year: from S$75m (US$57.48m) in 2021 to S$180mn (US$137.97m) in 2022 to S$370m (US$283.61m) in 2023.[22] This economic value includes AI-driven revenue and cost savings. We expect the impact of these AI/ML initiatives to exceed US$766.51m (S$1bn) in 2025."

S$370m

Total economic value generated by AI initiatives at DBS Bank in 2023

Importantly, as investors seek to assess ROI, a distinction needs to be made between established AI solutions that primarily process numerical data and newer genAI solutions that process text, audio and video information. Firms that have employed traditional AI solutions, such as predictive analytics driven by numerical data, have honed their thinking around defining value for many years. In firms that are experimenting with genAI applications, assessing ROI may be premature.

An example of more advanced thinking around ROI can be seen in E.ON SE, a German multinational electric utility company. Christopher d'Arcy, their chief data and AI officer, explains that the firm is implementing "value accelerators" for AI applications, offering essential guidance on legal considerations, central data and AI platforms and required skills, allowing teams to focus on value creation. E.ON is also developing a standardised approach to help its business units evaluate their AI ideas and projects more effectively.

Beyond implementation challenges, investors are aware of operational challenges, including hallucinations, model degradation and data privacy risks. Despite these, investors remain optimistic. On this point, Sara Ittelson, partner at Accel, explains: "The opportunity at the AI adopter level is substantial, but the key factors to consider are durability and defensibility." So quick wins must be supported by a solid foundation to ensure lasting success. Investors should approach AI with a long-term strategic mindset, balancing immediate gains with future resilience.

"Our AI/ML initiatives have delivered incremental tangible economic value year on year."

Nimish Panchmatia, chief data and transformation officer, DBS Bank

[22] For calculation purposes, we used the exchange rate from October 7th 2024, which was US$1:S$1.30

Generative AI: unlocking potential and navigating pitfalls

GenAI promises to boost productivity, and evidence of early success is emerging. At DBS Bank, headquartered in Singapore and one of Asia's largest banks, a genAI-enabled virtual assistant was implemented for call transcription and summarisation, service request generation and product recommendations for the bank's customer service workforce. According to Nimish Panchmatia, their chief data and transformation officer, it reduced the amount of time needed to handle customer requests while improving response quality. Analysis conducted by DBS Bank estimates that the accuracy of the virtual assistant for transcription and identifying solutions was nearly 100% and it has reduced call handling time by 20%.

Despite remarkable success at DBS Bank, the broader adoption of genAI remains in its infancy,[23] with many companies still experimenting. Consistent benefits across industries have yet to be realised. Experts caution that a significant portion of genAI projects may fail: "Analysts may say 30% of genAI projects will be abandoned, but I think it's more like 85-90%," states Thomas Robinson, chief operating officer of Domino Data Lab. "We need to attach AI to business problems to realise value."

Maintaining data integrity and governance is crucial for leveraging multiple LLMs. "The biggest challenge we face is ensuring the quality of our data," says Stephanie King-chung Hung, chief information officer at Asian Development Bank. "Over 50 years of projects across 49 member countries in Asia and the Pacific mean we have a vast amount of information, but it's crucial that this data meets high standards. Without quality data, our AI adoption will struggle to deliver meaningful results."

To ensure better data quality, companies should establish robust data governance frameworks, including clear policies and responsibilities, regular assessments for accuracy and completeness and strong data privacy measures, like anonymisation. Transparency about data sources is also critical for building trust and identifying biases. Additionally, a risk management framework can mitigate unintended consequences and ensure accountability for data integrity.

More broadly, there are also concerns that the hype around genAI could overshadow proven AI solutions, such as predictive analytics or robotic process automation. In asset-heavy industries such as manufacturing and utilities, where machine-to-machine interaction is more prevalent than human-to-machine interaction, traditional solutions may be more effective. If genAI fails to deliver real business value, it may put off investors and increases the risk for another AI winter, warns Christopher d'Arcy, chief data & AI officer at E.ON.

"The opportunity at the AI adopter level is substantial, but the key factors to consider are durability and defensibility."

Sara Ittelson, partner, Accel

[23] CFO, "67% of Companies Continue to Adopt AI Slowly: Report", https://www.cfo.com/news/67-of-companies-continue-to-adopt-ai-slowly-report/707456/

Chapter II: Investment framework: Developers vs Adopters

There is a place for both developers and adopters in investor portfolios as the AI industry matures. Indeed, engaging in investments along the AI value chain, targeting developers and adopters, provides valuable feedback on AI solutions. Investors can gain insights on adoption timelines, points of friction in implementation and, perhaps most interestingly, unmet needs in the market. Sharing this insight with AI developers in their portfolio enables them to hone their offering, increasing chances of higher returns.

The extent of investor focus on the two groups, however, depends on their risk appetite and growth expectations, in addition to investor priorities within their portfolio. It determines the structure of the investment or partnership and the level of engagement in strategy and operations. We explore these considerations in this chapter, concluding with a framework for investors as they weigh the choice between developers and adopters.

"As VCs, we are more drawn to AI-native startups, seeing them as the key innovators, while established companies struggle with the uncertainty of effective AI adoption."

Jeffrey Paine, founding managing partner, Golden Gate Ventures

Risk vs stability: a financial crossroad

Among investors, venture capital (VC) firms are typically more willing to take on risk, seeking innovative technologies, whereas private equity (PE) firms gravitate towards lower-risk, mature investments. As such, VC firms are likely to continue targeting AI developers whereas PE firms are more likely to increase investment in adopters. "As VCs, we are more drawn to AI-native startups, seeing them as the key innovators, while established companies struggle with the uncertainty of effective AI adoption," notes Jeffrey Paine, founding managing partner of Golden Gate Ventures.

However, as of Q2 2024, a global survey of PE firms by EY reveals that about 77% of their AI-focused investments still target AI developers, while AI adopters comprise the remaining.[24] PE firms have struggled with borrowing costs in a high-interest rate environment and found it difficult to exit investments as valuation expectations diverged. The latter is the top impediment to exiting a portfolio company in Q2 2024, according to the same EY survey. "PE groups are facing challenges in divesting their portfolios, leading to a tighter cash

[24] EY, "Private Equity Pulse: key takeaways from Q2 2024", https://www.ey.com/en_gl/insights/private-equity/pulse

environment," explains Thomas Robinson, chief operating officer of Domino Data Labs. "Investors are now prioritising profitability [over growth], focusing on stability rather than just growth to avoid valuation declines." This shift may push PE firms towards investing in adopters that can clearly demonstrate the value of their AI implementation.

AI is drawing significant interest beyond just VC and PE firms. Major corporate investors such as Google, Microsoft and Amazon are heavily investing in AI to strengthen their capabilities and sustain leadership in the field. Their strategic investments include AI infrastructure, platforms and startups, aimed at securing a competitive edge in cloud computing, AI chips and machine learning models.[25] Meanwhile, sovereign investors are taking a distinct approach. They are forging global partnerships while investing in AI developers, adopters and infrastructure, thereby positioning themselves as long-term backers of technological innovation.[26,27,28,29]

Navigating the geographical divide

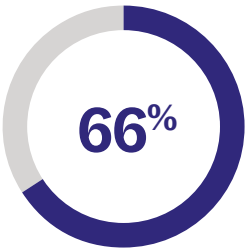
North America, particularly the US, has dominated investment attraction in AI developers, securing nearly two-thirds of the total funding between 2019 and 2024 (as of mid-August).

By contrast, Asia accounted for 22% and Europe for 12%. But as adoption of AI ramps up around the world, and adopters are brought into the investment mix, these regional funding trends may shift.

A key factor in this shift will be the evolution of regulatory frameworks governing AI, both in terms of technology development and its application in specific sectors. For instance, Germany imposes strict regulations on autonomous vehicles, requiring high safety standards and human oversight, and restricting their use to test zones; this has hindered wider adoption. Similarly, several US cities, including San Francisco, Portland, and Boston, have banned the use of AI-based facial recognition technology by law enforcement over concerns about privacy and bias. These evolving regulations will be instrumental to the extent of AI access and adoption in countries. But more than restrictive regulations themselves, fragmentation of AI governance frameworks across countries may lead to geographical divides in access to AI solutions.

These geographical divides are likely to hurt adopters more than developers. "You can build and scale a compelling company from just about anywhere in the world," claims Mr Mathew of Insight Partners. Ms Ittelson echoes this sentiment: "Investors are focusing on investments that have the potential to be category-defining and lead innovative eras, without being constrained by geographic boundaries."

On the other hand, an adopter, for instance, a pharmaceutical company or a call centre, is less mobile. Their access to and use of AI will be determined by the regulatory framework and quality of the digital infrastructure in the country in which it operates. This could significantly impede or enhance implementation of AI solutions, and ultimately ROI.



Global AI funding secured by North American AI developers (2019-2024)

[25] CNBC, "AI craze is distorting VC market, as tech giants like Microsoft and Amazon pour in billions of dollars", https://www.cnbc.com/2024/09/06/ai-craze-getting-funded-by-tech-giants-distorting-traditional-vcs.html
[26] WION, "West Asian sovereign funds pour billions in AI investments", https://www.wionews.com/business-economy/middle-eastern-sovereign-funds-pour-billions-in-ai-investments-761160
[27] Siddharth Asthana via LinkedIn, "The AI Gold Rush: How Sovereign Wealth Funds (SWFs) are powering Middle East's AI Revolution", https://www.linkedin.com/pulse/ai-gold-rush-how-sovereign-wealth-funds-swfs-powering-asthana-u2gye
[28] AsianInvestor, "China's $1.3tn sovereign fund to invest in AI to power 'growth dividends'", https://www.asianinvestor.net/article/chinas-1-3tn-sovereign-fund-to-invest-in-ai-to-power-growth-dividends/498682
[29] PYMNTS, "AI Startups Find Financing Pipeline in Middle Eastern Sovereign Wealth Funds", https://www.pymnts.com/artificial-intelligence-2/2024/ai-startups-find-financing-pipeline-in-middle-eastern-sovereign-wealth-funds/#

Investments in developers are generally made in the form of equity stakes, while with adopters, investors may choose either equity investments or strategic partnerships. Some investors are actively engaged in AI implementation in their portfolio companies. Blackstone's PE business has a team of data scientists that supports its portfolio companies with AI tools and resources.[30] For larger companies in their portfolio, they help define their AI strategy, build capabilities and hire leadership to implement initiatives.

Creating value through ecosystem partnerships

Success in this new era requires more than just technical prowess; it demands ecosystem partnerships that foster scalability and shared value. "Successful AI projects require engagement with a network of ecosystem players, including various technologies and partners," emphasises Ms King-chung Hung.

Developers such as Domino Data Lab are actively pursuing strategic partnerships with adopters to create long-term value. In a recent partnership, they have paired an equity stake with a three-to-five-year commitment to use their technology. Explaining this further, Mr Robinson states, "We have established an excellent collaborative agreement with one of the big four accounting firms, which aims to work with us to implement AI across their customer base."

Craig Wiley, senior director of product, AI at Databricks, highlighting the impact of strategic collaborations, states, "Our strongest collaborations are with enterprise customers, where we actively help them unlock the full potential of their technology investments. We aim to achieve the same high returns expected by investors like venture capitalists and private equity firms. It is about ensuring the technology is ROI-positive and helping enterprises meet their strategic goals, making their internal investments as effective and impactful as their external ones."

Dennis Cinelli, chief financial officer, Scale AI adds, "There's not that many people who know AI and understand how to actually adopt this technology. Many organisations have access to AI tools but lack the skilled personnel needed for effective integration. This gap in expertise can lead to missed opportunities and inefficient implementations, underscoring the importance of partnerships to help bridge this knowledge gap and facilitate smoother transitions to AI-driven solutions."

Within firms adopting AI solutions, executives are discerning in their choice of partners. "We need to differentiate between genuine value and 'smoke and mirrors'— some many companies are trying to sell illusions rather than real solutions," warns Mr d'Arcy.

"There's not that many people who know AI and understand how to actually adopt this technology. Many organisations have access to AI tools but lack the skilled personnel needed for effective integration. This gap in expertise can lead to missed opportunities and inefficient implementations, underscoring the importance of partnerships to help bridge this knowledge gap and facilitate smoother transitions to AI-driven solutions."

Dennis Cinelli, chief financial officer, Scale AI

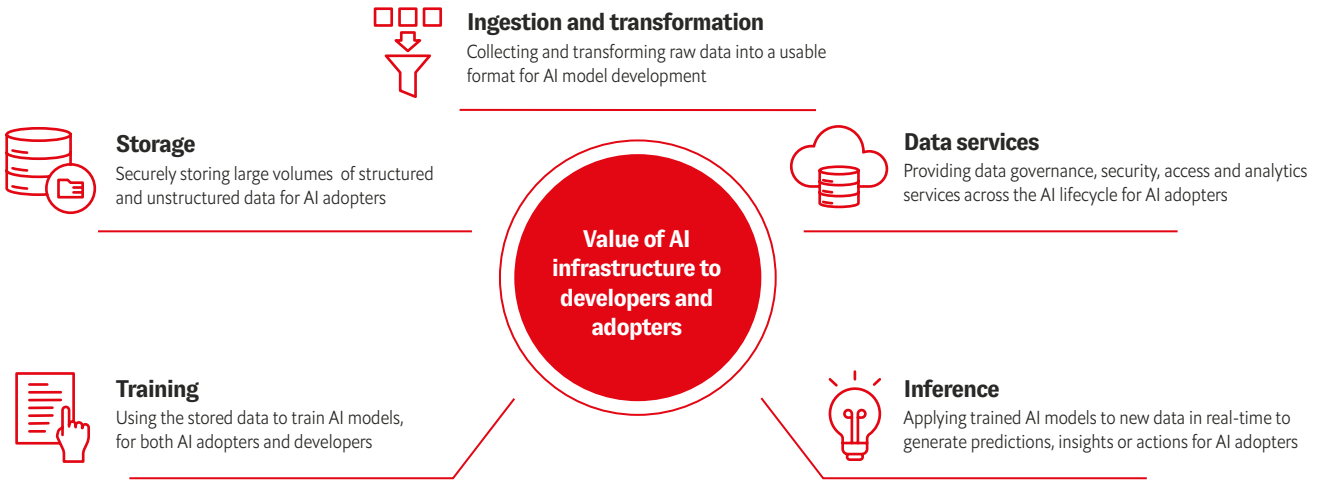
[30] Blackstone, "Accelerating Value with AI", https://www.blackstone.com/insights/article/accelerating-value-with-ai/

Investment framework: developers vs adopters

	Developers	Adopters
Technology and commercial value	• Investors focus on groundbreaking technologies with high growth potential. The emphasis is on the innovation's novelty and its potential to disrupt existing markets or create new ones.	• Investments are made in companies integrating AI for improving operations or scale. • These investments are generally lower risk, as they involve more mature technologies and established companies.
Evaluation criteria	• **Technical feasibility:** investors assess the viability and scalability of the technology. This includes evaluating development hurdles and the potential for future advancements. • **Market potential:** investors assess the competition and how the solution can address unmet needs or create new demand. • **Foundational models:** in cases involving foundational models (like those from OpenAI), investors are interested in the long-term impact and scalability of these models.	• **Operational impact:** investors evaluate how AI can improve operational efficiency, reduce costs, and drive revenue growth. • **Integration capabilities:** investors assess the ease of deployment and compatibility with existing systems. • **Compliance and security:** for regulated industries, AI applications must address compliance, data security and privacy concerns. • **Durability and defensibility:** investors assess whether the AI solution offers sustainable, long-term value.
Funding structure	• **Equity stakes:** investments are typically in the form of equity stakes, reflecting the high-risk, high-reward nature of early stage innovations. • **Convertible notes:** early funding may involve convertible notes that convert into equity during later funding rounds.	• **Equity investments:** similar to developers, equity stakes are common, but focus more on scaling proven technologies rather than supporting new innovations. • **Strategic partnerships:** investments may involve partnerships that provide both capital and strategic benefits, like technology integration or market access.
Performance metrics	• **Return on investment (ROI) and key performance indicators (KPIs):** profitability is the primary goal when investing in developers.	• **ROI and KPIs:** investors focus on measurable outcomes, such as ROI, cost savings, improved productivity and revenue growth. • **Other operational gains:** investors also monitor the impact on operational efficiencies, such as faster decision making or improved accuracy.

Chapter III: AI infrastructure investment opportunities

AI, with its enormous data and processing requirements, is set to become a major driver of data centre demand, potentially surpassing cloud computing.[31] Major tech companies are fiercely competing to advance AI technologies, necessitating cutting-edge chips and servers housed in state-of-the-art data centres. According to an executive at IDC, an IT market intelligence company, data consumption is expected to grow by 20% per annum globally over the next few years, significantly increasing data centre loads and energy use.[32] Furthermore, the projected increase in global data creation, consumption, copying and capturing from 2020 to 2025 is approximately 180%.[33] Facilitating AI adoption, therefore, presents a substantial investment opportunity to support a rapid expansion in ancillary data centre hardware along with solutions to optimise power, cooling and space utilisation.



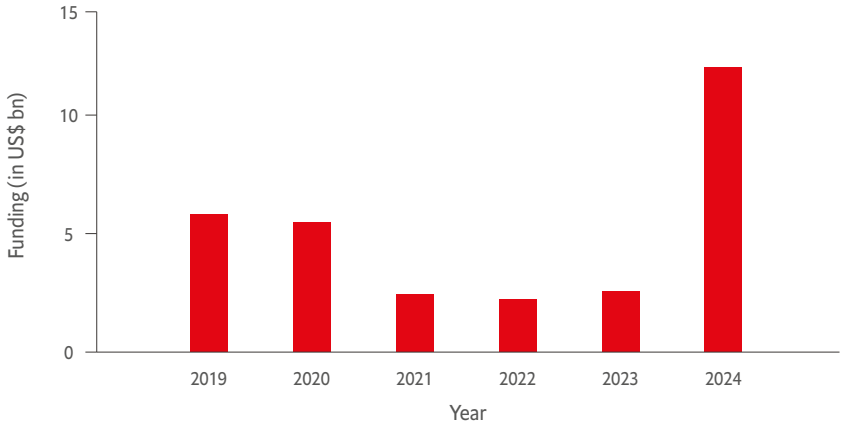
Source: https://www.felicis.com/insight/ai-data-infrastructure

[31] KKR, "Data Centers: The Hubs of Digital Infrastructure", https://www.kkr.com/insights/hubs-digital-infrastructure
[32] Data Center Frontier, "Summer of AI: Hyperscale, Colocation Data Center Infrastructure Focus Tilts Slightly Away From Cloud", https://www.datacenterfrontier.com/cloud/article/33010064/summer-of-ai-hyperscale-colocation-data-center-infrastructure-focus-tilts-away-from-cloud
[33] Statista, "Volume of data/information created, captured, copied, and consumed worldwide from 2010 to 2020, with forecasts from 2021 to 2025", https://www.statista.com/statistics/871513/worldwide-data-created/

In 2024 (as of mid-August) global investments in data centre hardware and software companies soared to US$12.5bn, from about US$2.5bn per year between 2021 and 2023. The spike in investment in 2024 was driven by two large funding rounds in the US (a total of US$9.2bn for Vantage Data Centers) and US$1.3bn for ST Telemedia Global Data Centres in Singapore. In September 2024 BlackRock, Global Infrastructure Partners, Microsoft and MGX formed a new AI partnership to invest in data centres and the associated power infrastructure.

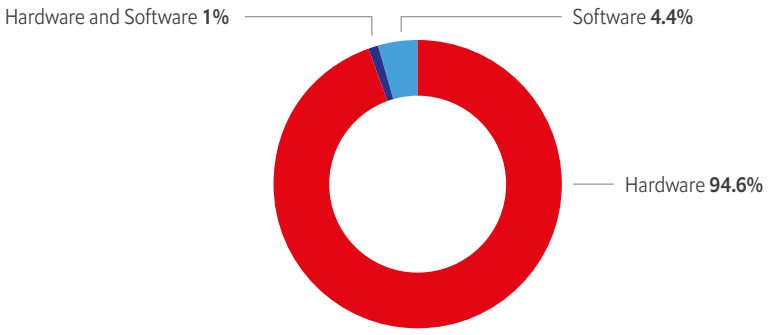
Major deals this year have seen interest from prominent investors including DigitalBridge Group, Silver Lake, KKR and Morgan Stanley Venture Partners. But data centres are also drawing interest from investors focused on growth capital, buyouts, real estate and

Global funding of data centre companies (hardware and software)



Source: Crunchbase[34]
This chart shows the total funding raised by data centre hardware and software companies, not the expenditure on building data centres. Crunchbase covers all announced investments.

Global funding of data centre companies by type (2019-24)



Source: Crunchbase[35]
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[34] Crunchbase, extracted August 15th 2024. Economist Impact's analysis includes Seed (angel, pre-seed, seed), Early Stage Round (series A and B), Late Stage Round (Series C onwards and private equity), Other Venture (series unknown) and Corporate Round (when a company, rather than a venture capital firm, makes an investment in another company). It excludes debt financing, equity crowdfunding, grants, initial coin offerings, post-IPO funding. We have also excluded deals with no value mentioned from our analysis.
[35] Crunchbase, extracted August 15th 2024. Economist Impact's analysis includes Seed (angel, pre-seed, seed), Early Stage Round (series A and B), Late Stage Round (Series C onwards and private equity), Other Venture (series unknown) and Corporate Round (when a company, rather than a venture capital firm, makes an investment in another company). It excludes debt financing, equity crowdfunding, grants, initial coin offerings, post-IPO funding. We have also excluded deals with no value mentioned from our analysis.

infrastructure. This diverse pool of investors highlights the sector's appeal, characterised by stable, utilities-sector-like cash flows, attractive risk-adjusted returns and long-term growth.

Although private equity (PE) and infrastructure funds find investment in data centre hardware firms more appealing, venture capital (VC) firms tend to focus on data centre software firms. Jeffrey Paine, the founding managing partner at Golden Gate Ventures says, "Investing in data centre software is less capital intensive, which allows for [a] more strategic allocation of resources. This sector offers a high-risk, high-reward dynamic, making it particularly appealing for VC, as it aligns with the goal of supporting innovative start-ups that can deliver substantial returns."

Power struggles: the energy dilemma in AI data centres

Investing in data centres presents significant challenges, particularly due to electricity supply constraints, which are becoming a major bottleneck for AI development. A Reuters article from May 2024 noted that some data centres require 1,000 MW—enough to power 750,000 homes. By the end of the decade, data centres could consume up to 9% of the total electricity generated in the US, more than double their current usage.[36] These centres are highly energy intensive, and their growing needs are placing immense pressure on power grids. If energy resources fail to meet this demand, the advancement and deployment of new AI technologies may be severely hindered.

"There is a tremendous need to build data centres that are oriented towards clean power."

George Mathew, managing director, Insight Partners

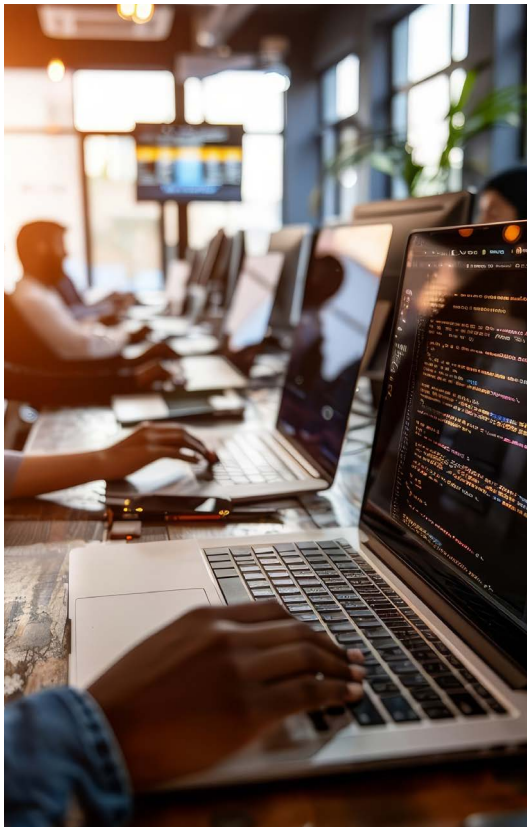
However, opportunities are emerging in optimising energy consumption and load balancing within AI infrastructure, giving rise to a software market focused on cost management and efficiency. Sara Ittelson, partner at Accel, explains this further, stating: "The data boundary is a core component of the ecosystem. Like pure energy, which has various ingredients, there are opportunities in those categories. For instance, how to better load balance energy consumption to manage costs while creating the desired impact. People are pursuing that as a software opportunity."

In response to the environmental impact of rising power consumption, investors are increasingly prioritising companies building sustainable data centres—those designed to minimise environmental impacts and resource consumption. For instance, in Abu Dhabi, UAE, renewable energy developer Masdar and French utility EDF have been awarded a project to build a 7 MWp solar plant to power a new data centre operated by UAE-based Khazna.[37] Similarly, in 2023 Stack Infrastructure raised US$3bn in green financing for data centre developments in California, Milan and Loudoun County.[38]

Building sustainable data centres not only involves minimising the environmental effects but also meeting regulatory standards related to energy and water usage. But the opportunity is clear. "There is a tremendous need to build data centres that are oriented towards clean power," emphasises George Mathew, the managing director of Insight Partners. "This is not just a trend; it's a long-term vision for sustainable infrastructure that will support the growing demands of AI systems over the next decade and beyond."

[36] Reuters, "Data centers could use 9% of US electricity by 2030, research institute says", https://www.reuters.com/business/energy/data-centers-could-use-9-us-electricity-by-2030-research-institute-says-2024-05-29/
[37] Renewables Now, "UAE's Khazna to power Abu Dhabi data centre with 7-MWp solar plant", https://renewablesnow.com/news/uaes-khazna-to-power-abu-dhabi-data-centre-with-7-mwp-solar-plant-801707/
[38] Data Center Dynamics, "Stack Infrastructure raises $3bn in green financing for US data center projects", https://www.datacenterdynamics.com/en/news/stack-infrastructure-raises-3bn-in-green-financing-for-us-data-center-projects/

Conclusion



The AI investment landscape has been volatile, with funding for AI developers slowing in recent years due to macroeconomic challenges like rising interest rates and a shift in investor priorities to capital-efficient growth. But the arrival of genAI is driving AI adoption across businesses in search of operational efficiencies, contributing to a notable increase in AI investments during the second quarter of 2024.

However, investors remain cautious, scrutinising how AI is being implemented to generate measurable outcomes such as cost savings, revenue growth and innovation. High-quality data and robust infrastructure are key enablers for successful AI implementation, especially as adopters integrate these technologies into complex legacy systems.

Ultimately, the fortunes of AI developers and adopters are intertwined: many investors see the future of AI shaped by a symbiotic relationship, with developers reliant on adopters for growth, and adopters looking to developers for solutions to drive profitability. For AI developers to thrive, their solutions must deliver meaningful value and scale for adopters. In this dynamic environment, those who can forge robust partnerships and demonstrate clear returns will shape the future of AI investment. For investors, this means ensuring the right mix of developers and adopters in their portfolios, aligned with their risk tolerance and strategic goals. This will enable them to benefit from a valuable feedback loop and generate returns across multiple areas within the AI ecosystem.

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