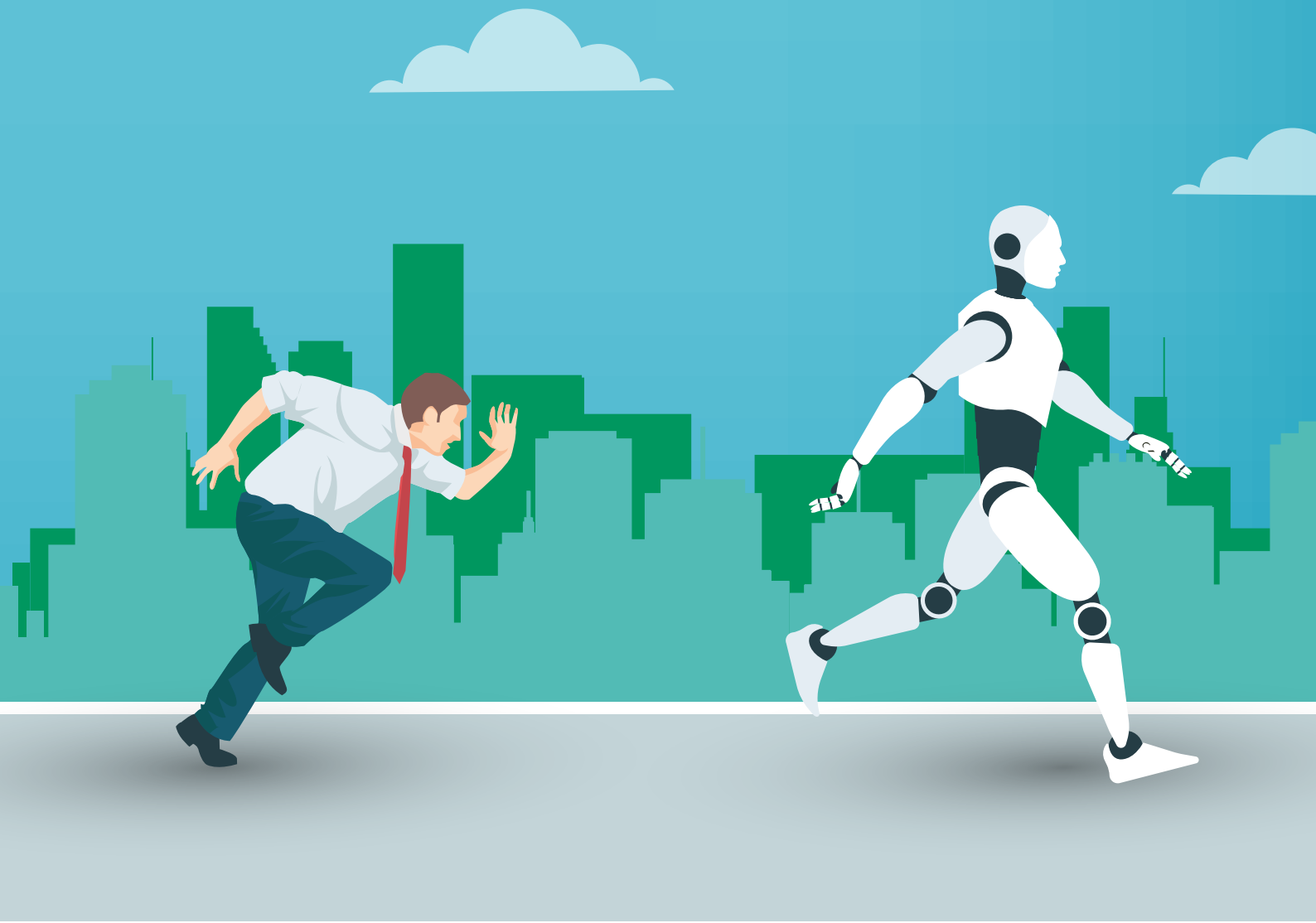
Marketing communication - For professional investors - October 2025

ARTIFICIAL INTELLIGENCE: NOT A BUBBLE... YET



BNP PARIBAS
ASSET MANAGEMENT

The sustainable investor for a changing world

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INTRODUCTION

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Artificial intelligence (AI) is the most impactful digital transformation theme since the development of the Internet. The public launch of ChatGPT in November of 2022 catalyzed a wave of investment and innovation that continues to build momentum. As excitement about the potential for this new technology builds toward very high expectations, investors and industry participants are questioning if we are entering a bubble. Our current conclusion is that AI is not a bubble… yet. In this essay, we review similarities and differences between the AI era and the Internet and telecom bubble of the late 1990s and describe how we are trying to navigate the environment and manage risk.

RISKS AND SIMILARITIES TO THE INTERNET AND TELECOM BUBBLE

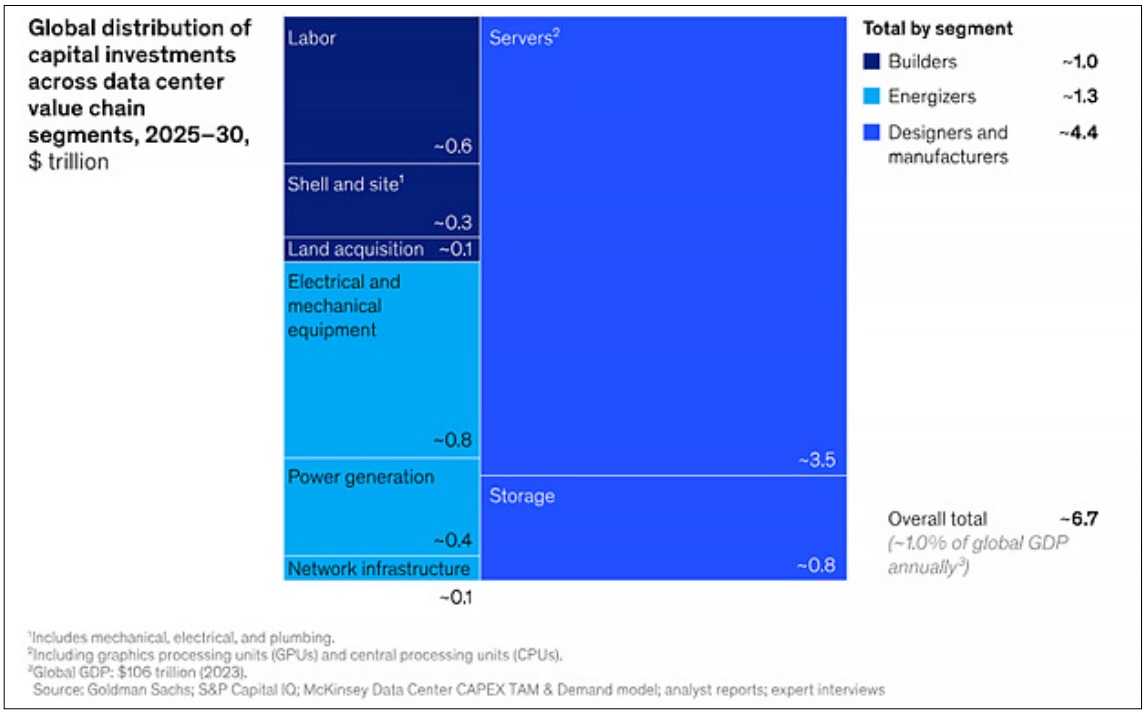
The **desire to be first to market** with leading AI models is creating an arms race that may result in an overbuilding of infrastructure, as not all players will be successful. This is an echo of the behavior during the late 1990s. At some point there may be industry consolidation and a digestion period for excess capacity.

Massive up-front investment is required for training and running large language models (LLMs) and other sophisticated AI models, with revenues and earnings expected at some future date. In many cases, the business models, applications, and products are uncertain and thus difficult to forecast. This creates uncertainty about the return on invested capital (ROIC) for many AI players and initiatives.

By most estimates, the total amount being invested in data centers is higher than the infrastructure investment during the dot-com boom. Following the Telecommunications Act of 1996, it is estimated that $500 billion was invested in fiber optic and wireless networks over the next five years, yet as of 2002, only 2% of the long-distance capacity was in use.

The estimates of AI spending have a wide range but are generally much higher. As of early October 2025, Bank of America forecasted AI capital spending (capex) to be $1.2 trillion by the end of 2030. The leading provider of graphics processing units (GPUs) has a much higher estimate of $3 - $4 trillion of total infrastructure investment in the year 2030 (i.e. not a cumulative number). A reasonable middle ground projection from McKinsey forecasts $6.7 trillion of cumulative capital expenditure for data center infrastructure from 2025 through 2030 (see Exhibit 1)[1].

Exhibit 1: Projections suggest $6.7 trillion of capital will be cumulatively deployed for data center infrastructure through 2030.



Source: The future of US hyperscale data centers | McKinsey

1. Robert Litan, "The Telecommunications Crash: What To Do Now?", Brookings Institute, 12-1-2002.

The emergence of debt financing including the use of private credit and off-balance sheet structures (joint ventures and special purpose vehicles), and **the reported use of GPUs (a fast-depreciating asset) as collateral** in some cases, introduces significant risk. This is worrisome for companies, including "neo clouds" (less mature cloud service providers that focus on providing accelerated computing as-a-service by renting graphics processing units (GPUs) to their customers), that do not have strong free cash flow (FCF) or solid balance sheets.

Goldman Sachs reports that "AI-related issuers have accounted for $141 billion in corporate credit issuance" in 2025 year-to-date, including both technology and utility companies. This figure does not include private credit or "bilateral vendor financing agreements." They also note that the asset-backed securities market has seen $20 billion of data center deals since the beginning of 2024[2].

Circular relationships – where a supplier of components invests in their customer (who provides a service) and then recognizes revenue from sales to that customer – are a red flag. In some cases, the supplier is also a customer of their customer's service. We are concerned about revenue recognition for some of these deals as well as the systemic risk associated with the interrelated financial dependencies.

The lack of adequate regulations poses significant risks. The late '90s bubble was fueled by deregulation; to the extent that AI remains unregulated, this could result in heightened risk for investors.

In addition, there are **externalities** that are beyond the scope of this essay but warrant a brief mention. These include the potential displacement of human labor by AI-powered automation, and the extremely high energy requirements for training and running AI models.

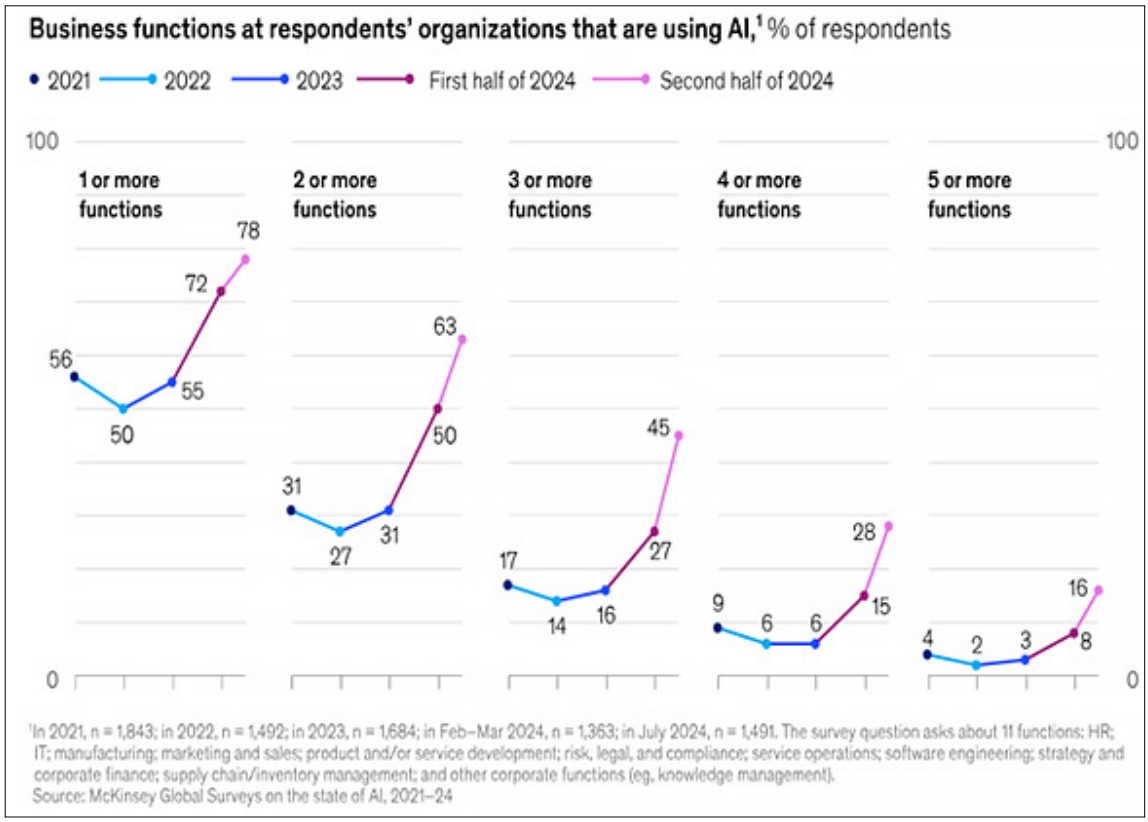
MITIGATING FACTORS AND POSITIVE DIFFERENCES FROM THE INTERNET AND TELECOM BUBBLE

The leading cloud **service providers (CSPs) are large, rational companies with strong balance sheets and positive free cash flow generation.** To date, they have self-funded their AI capex with operating cash flows, and they have the capacity to raise and service debt if necessary. During the Internet and telecom bubble of the late 1990s, the companies bearing the brunt of the infrastructure investment were primarily debt-funded and did not have stable cash-generating business segments to support them through the cycle.

It is still very early in terms of adoption by enterprises. Organizations must first establish robust data infrastructure before they can effectively adopt AI. It requires appropriate database systems, scalable storage, and rigorous data security and governance. A recent survey found that while 78% of enterprises have adopted AI in at least one department, only 16% have deployed it across five or more. AI adoption is accelerating but it remains far from being a fully embedded enterprise capability. In past technology cycles, it was not unusual for steep investments to occur ahead of widespread adoption and monetization. The adoption of cloud computing and software-as-a-service began in 2006 and proceeded without any dramatic digestion periods, and the profitability of cloud service providers has improved over time.

2. Goldman Sachs, "AI Capex Turns to the Debt Side", October 2, 2025.

Exhibit 2: Analysis suggests that organizations are increasingly using AI in multiple functions.



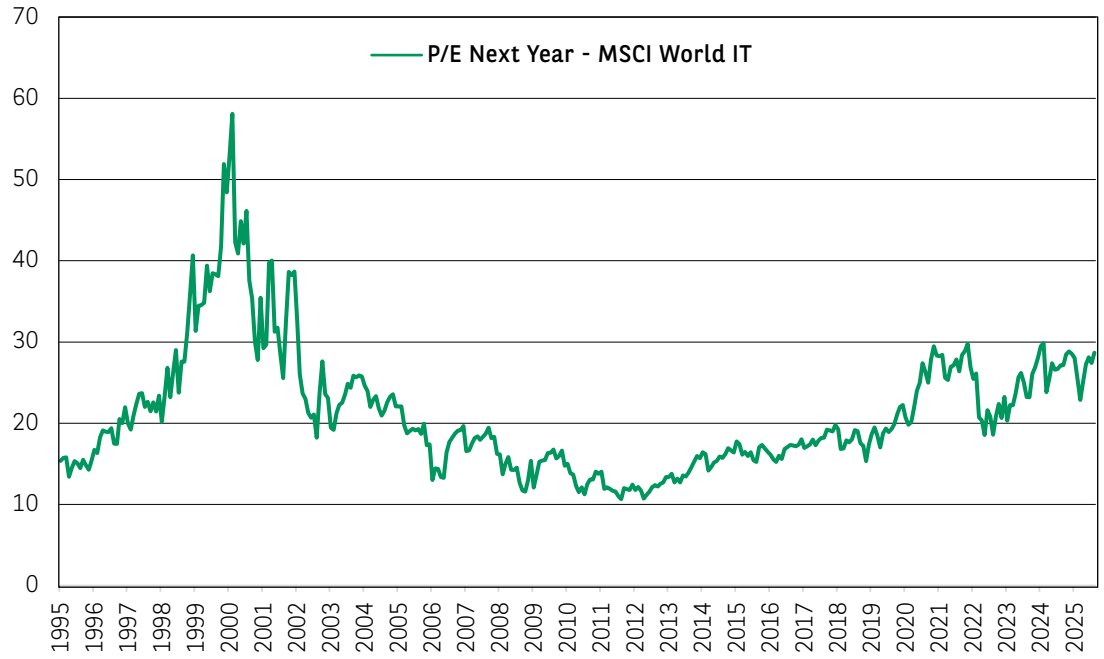
Source: McKinsey & Company, March 2025. The state of AI: How organizations are rewiring to capture value

AI capabilities and tools are still immature, but innovation is happening rapidly. Agentic AI holds the promise of enabling new use cases where autonomous agents, powered by AI, will reason, plan, and act across IT systems and data, and thus automate many tasks. Physical AI is also on the horizon as AI converges with robotics and other consumer devices. IoT (the Internet of Things) and edge computing – a distributed computing model that brings data processing and storage closer to where the data is generated, rather than relying on a centralized cloud – will unlock additional use cases.

The infrastructure exists (in the form of high-speed Internet access, smartphones, and other connected devices) to immediately deliver AI-based applications to end users, including enterprises and consumers. That was not true during the Internet and telecom bubble, as the fiber buildout occurred well ahead of the existence of the "last mile" networks that provide broadband access, and well before the availability of smartphones. ChatGPT has already reached 800 million weekly active users in less than three years, as of October 2025, compared to 13 years for Internet adoption.

Valuations of publicly traded technology stocks are not nearly as stretched as in the late 1990s. While expectations are as high now as they were then, the valuations are still reasonable for many (but not all) leaders in AI. Valuations are as higher than in the 2005 – 2020 period, but this is supported by higher profitability metrics. In a bubble, valuations become untethered from reality, with investors paying high multiples on heightened forecasts.

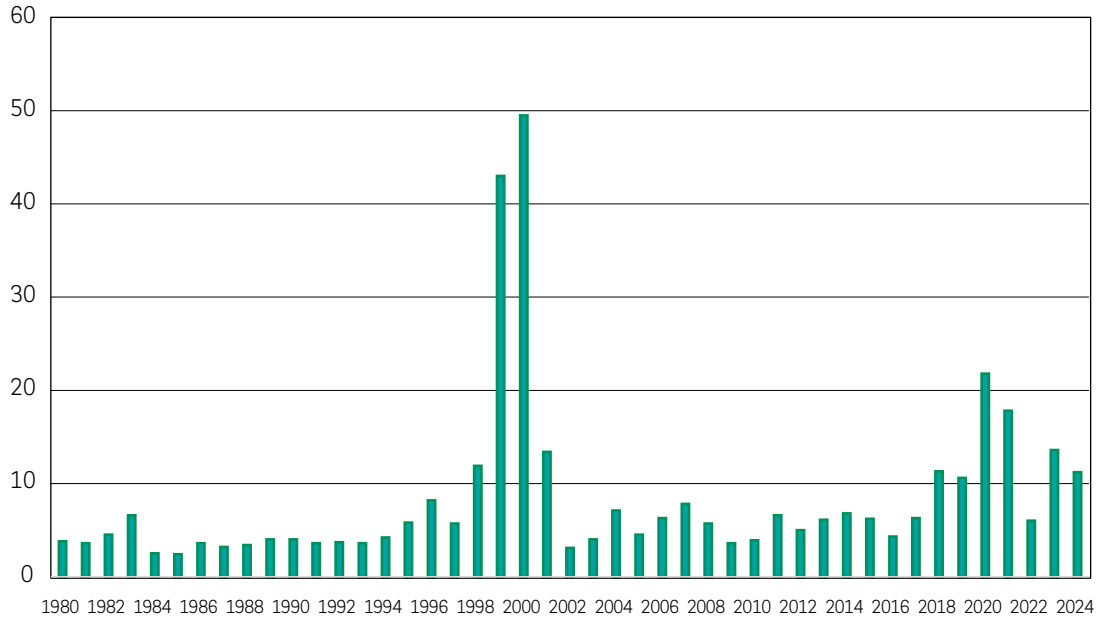
Exhibit 3: Valuations of the MSCI World Information Technology (IT) Index are far from dotcom bubble levels



Source: MSCI, Bloomberg; September 30, 2025

During the Internet/ telecom bubble, high multiples were placed on high expectations. For example, the median price/sales multiples of tech sector initial public offerings (IPOs) spiked to 43x in 1999 and 49.5x in 2000.

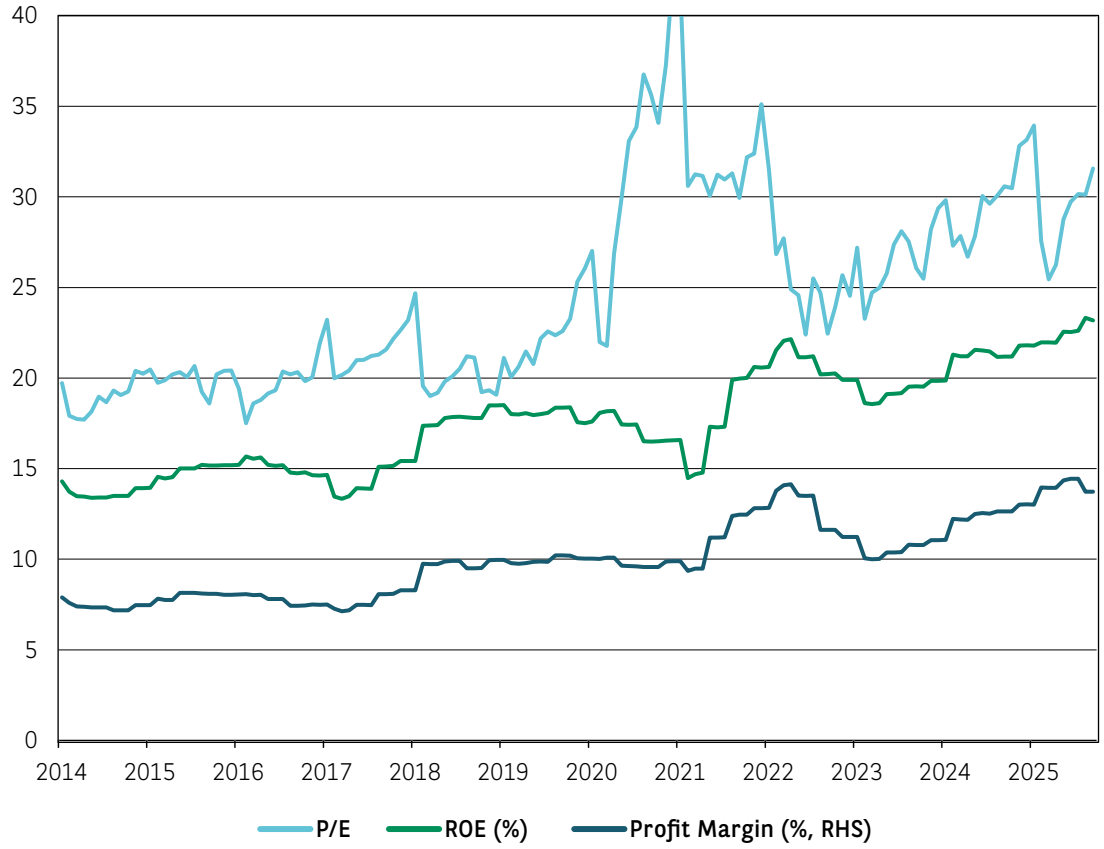
Exhibit 4: Tech sector Initial Public Offerings (IPOs), median price/sales multiple by year



Source: Initial Public Offerings: Updated Statistics, Jay R. Ritter, University of Florida, September 29, 2025, table 4a.

Today we have reasonable multiples on high expectations. Higher multiples compared to 10 years ago reflect higher profit margins and returns on equity (ROE) of growth companies.

Exhibit 5: Change in selected metrics of the MSCI World Growth Index, 2014-2025

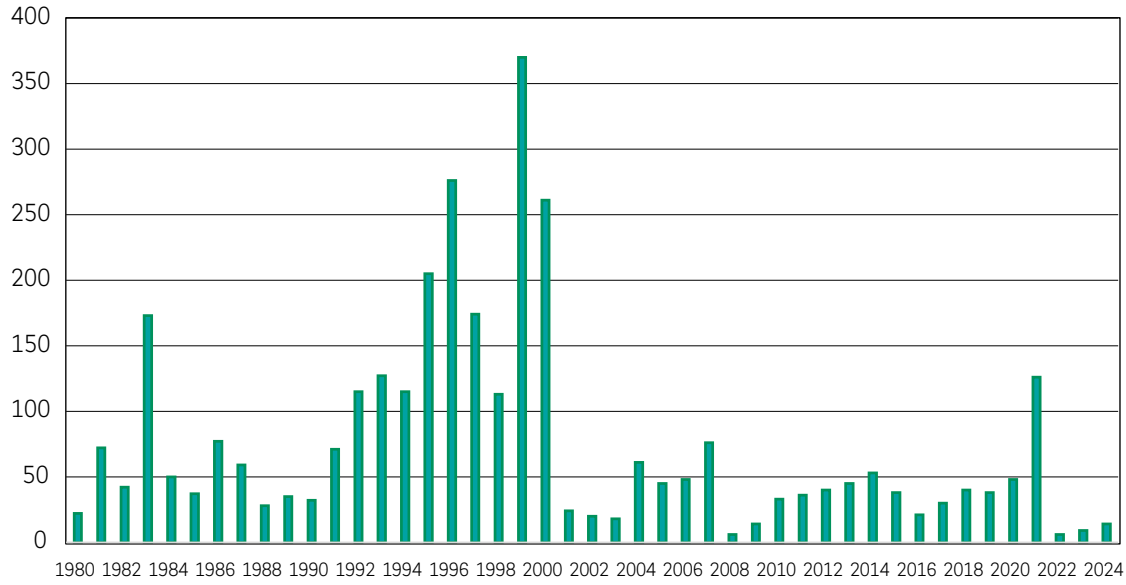


Source: MSCI, Bloomberg; September 30, 2025

Most AI companies are staying private for longer, instead of coming to the public equity markets through IPOs. Thus, some of the more speculative valuations are concentrated in private equity and venture capital. From 1991 through 2000 there were an average of 183 tech sector IPOs per year, compared to 37 per year average in the past 10 years. In 1999 alone there were 370 IPOs in the technology sector compared to only 14 in 2024. Meanwhile, there are 793 "unicorns", or private companies with valuations of more than $1 billion, in the United States as of July 2, 2025.[3] In the first half of 2025, 36 additional technology unicorns were created. [4]

3. Visual Capitalist, August 1, 2025: Visualizing Unicorns by Country in 2025.
4. TechCrunch At least 36 new tech unicorns were minted in 2025 so far | TechCrunch.

Exhibit 6: Number of tech sector IPOs, 1980-2024



Source: Initial Public Offerings: Updated Statistics, Jay R. Ritter, University of Florida, September 29, 2025, table 4a

Constraints continue to limit the pace of investment in AI infrastructure, which is positive for the long-term durability of the investment cycle. Until recently, shortages of GPUs, the semiconductors that enable parallel processing for AI model training and inferencing, have been one limiting factor. Other constraints include availability of land and power for data centers, power transmission capacity, and shortages of power generation and data center equipment.

We are less likely to see the same level and scope of accounting shenanigans, as regulations are in place from the Sarbanes-Oxley Act of 2002 to separate the duties of auditor from that of consultant, at least for work done for publicly traded companies. In the late 1990s, accounting companies were deriving just over half of their revenue from consulting[5] which created significant conflicts of interest that led many of them to support and approve the questionable accounting practices of their clients. For accounting firms providing services to private companies, there are ethics rules but no strict requirement for this separation of duties.

Investors in public equity markets have a healthy level of skepticism about the economics of AI, which may serve as a limiting factor in the multiples applied to value AI stocks. Such skepticism is often lacking in the hype cycle of a bubble.

5. Roger Lowenstein, "Origins of The Crash", paperback edition 2005, page 90.

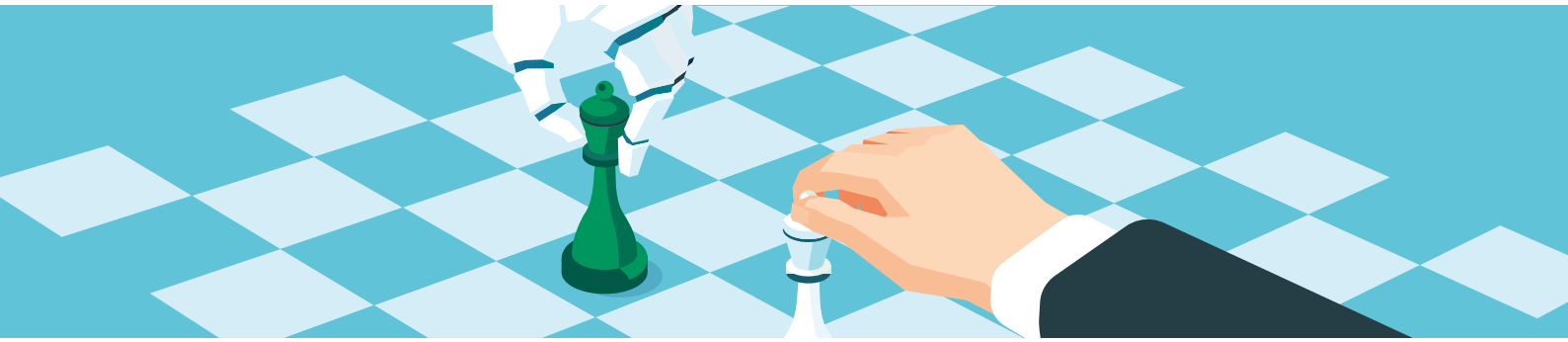
HOW OUR INVESTMENT APPROACH HELPS US TO MANAGE RISK

We have **a seasoned team of investment professionals** who are sector specialists with experience in analyzing companies and managing money through many economic cycles and market environments, including the Internet and telecom bubble of the late 1990s.

We **consistently focus on balancing the three pillars of our investment philosophy: resilient companies with strong moats and compelling valuations.** Our valuation work is heavily dependent on discounted cash flow (DCF) and returns on invested capital (ROIC) analyses.

In addition, **we take many shots on goal by investing in a diverse set of companies that play in different parts of the value chain,** including cloud service providers, model developers, foundational technologies, companies with proprietary data, and beneficiaries of AI adoption. Most of our holdings have revenue streams that are independent of the AI opportunity.

And finally, **our investment process involves deep, bottom-up fundamental research** to separate the wheat from the chaff, which requires an active approach to investing. We are closely monitoring investment plans, revenues derived from AI, off-balance sheet financing, and other leading indicators to remain alert to the risk of bubble formation.



CONCLUSION

We believe the AI theme is not yet in bubble territory. Expectations for the leaders of AI are high, but valuations remain reasonable. However, we are aware of and monitoring several risk factors going forward and are watching for signs of a digestion period in the spending cycle. It is possible that industry consolidation and disruption will occur over time as winners emerge from the arms race. We remain intensely focused on bottom-up fundamental research at the company level to identify winners and avoid losers, and on monitoring developments closely as the adoption of AI progresses.

AUTHORS

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Pamela is the lead portfolio manager for the disruptive technology strategy and is responsible for helping guide the team's investments in the technology, communication services and utilities sectors. She joined the company in 2016.
Before joining BNP Paribas Asset Management, Pamela has worked as a portfolio manager and equity analyst at Boston Common Asset Management, State Street Global Advisors and Baring Asset Management.
Pamela began her career at Janus Capital Group in 1995 as a Senior Analyst for seven years, where she conducted analysis of stocks with a specialisation in the technology sector.
She graduated Cum Laude from Harvard University with a degree in Applied Mathematics and received her MBA With Distinction from the Johnson School of Management at Cornell University.
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Prior to this position, Derek was a Senior Research Analyst and Vice President at Consumer Edge Research covering the Consumer Mobility and Automotive industries. Prior to that, he spent four years at Quad Capital where he assisted in all aspects of the portfolio management process.
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