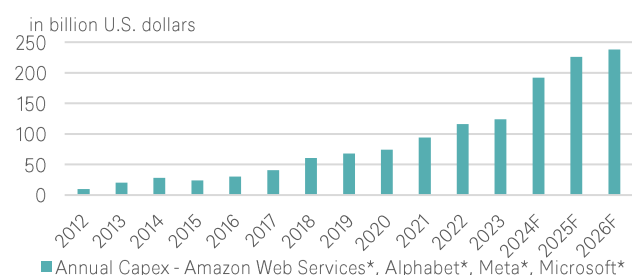


AI: Billion-dollar questions

The third theme in our series examines how investors could take advantage of the already big and exponentially growing AI market

The question of whether artificial intelligence (AI) is hyped (just as virtual reality was not so long ago) or a sustainable game changer (such as the cloud) is no longer really up for discussion. AI has already propelled such substantial investments (and we think will continue to do so) that it has created its own realities. The Mag7¹ companies all have high AI exposure and have contributed 42% of the S&P 500's growth since ChatGPT's introduction. They are also expected to contribute half the index's 2024 earnings growth.² Individual AI startups are getting billion-dollar valuations out of the gate.³ And, last but not least, the investments speak volumes. As the chart shows, the four largest hyperscalers⁴ alone are already investing more than \$200 billion annually.

There's a lot of money behind AI



Sources: Company data; Wells Fargo Securities LLC; VisibleAlpha for consensus forecasts; DWS Investment GmbH as of August 2024

However, whether the huge investments in AI will one day pay off still remains the big question. In the past, the pioneers of major innovations have rarely made the big money. This may be because overcapacity was quickly created or because broad applications and profitable business models only emerged in a second wave.⁵ This is complex because, when it comes to AI, we probably haven't even seen the most promising business models yet. The breathtaking speed at which AI has developed over the past two years, coupled with the efficiency gains⁶ it has already enabled, are likely, notwithstanding the skepticism⁷, to humble us, showing the market's inability to forecast AI's future potential.

AI applications are likely to continue to grow exponentially⁸ despite obstacles such as: data security concerns; the lack of qualitative data; copyrights; costs; high electricity consumption; and regulation. However, in our view, these challenges are not insuperable and could provide further business opportunities. This is especially the case given that, unlike in the dotcom bubble of the 1990s, the big companies pushing the new technology have deep pockets and are fighting for sector leadership. "The risk of underinvesting is significantly higher for us than overinvesting," said Google's CEO in July.⁹

This, however, increases the risk that individual AI providers may never see a positive return on their investments. "Accordingly, we cover and look for winners across the entire AI production chain and its users," explains Sebastian Werner, Head of Growth Equities Americas at DWS. Those in the AI production chain include semiconductor companies, data centers, networks, utilities, software and IT services. Sectors such as pharma, consumer goods and industrials are prominent users. This breadth makes it clear that there is no getting around the demanding task of stock picking. Simply investing in all listed AI-related companies would be risky given that, in the history of innovation euphoria, the market value of the sector often clearly exceeded the discounted sector's medium-term profits.¹⁰

Since it is not yet clear how large the AI market will one day be, and which companies will dominate the market and with what margins, we will have to continue to expect dynamic developments, including on the stock market, and in both directions. "For investors, this means that they can still jump on the AI bandwagon," says Tobias Rommel, IT Equity Sector Head at DWS. This is especially the case since valuations today are well below the levels of the 1990s.¹¹ However, the absolute size and profitability of the tech giants today also leaves less room for upward movement. That is the downside of more matured companies.

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Footnotes

¹ The Magnificent 7 consist of Apple, Microsoft, Nvidia, Alphabet, Amazon, Meta and Tesla. With varying degrees of intensity, they are among the most important drivers of AI and are all among the ten most expensive companies in the US. Since November 1, their combined market value has risen by \$7.5 trillion, compared to \$18 trillion for the entire S&P 500. Source: Bloomberg Finance L.P. as of 9/24/24.

² The consensus estimates assume profit growth of 10 percent for 2024 compared to the previous year for the companies included in the S&P 500. Without the Magnificent 7, it would only be half that, or 5 percent. Source: IBES, Factset, DWS Investment GmbH; as of 11.09.2024

³ See Reuters, "Open AI co-founder Sutskever's new safety-focused AI startup SSI raises \$1 billion" as of 9/4/24

⁴ Hyperscalers are large cloud providers that offer IT programs and services through their own cloud systems. The investments shown here do not only concern AI topics, but the acceleration of investments is mainly attributed to AI investments. Just as impressive as the capital investments of the large U.S. IT companies is the growth of their R&D expenses. For the Mag7 alone, they have increased fivefold from 2018 to 2023 to USD 370 billion. Source: Bloomberg Finance L.P. as of 9/24/24.

* Companies involved in artificial intelligence and big data face intense competition, may have limited product lines, markets, financial resources and personnel. Artificial intelligence and big data companies are also subject to risks of new technologies and are heavily dependent on patents and intellectual property rights and the products of these companies may face obsolescence due to rapid technological developments.

⁵ There are many examples of this in the past, whether it be railways, telegraphs or, of course, the internet. Even if some of the creators of the newly created infrastructure had already disappeared, subsequent companies were able to use the infrastructure for their own new business ideas. See also Goldman Sachs Research "Global Strategy Paper: AI: To buy, or not to buy, that is the question" as of 9/10/24

⁶ 1. The number of parameters used increased from 2010 to 2020 from 1 billion to 100 billion, and by 2024 it had already reached 100 trillion, according to Our World in Data, Epoch "Parameters in notable artificial intelligence systems" as of 9/9/24. 2. In a university math test, the pass rate increased from 13 to 83 percent between May and September of 2024 alone, according to iblnews.org "OpenAI's o1 Correctly Solved 83.3% of the Problems, While GPT-4o Only 13.4%" as of 9/14/24. 3. Both AI customers and AI providers are already using the technology with impressive efficiency gains, although so far these seem to be concentrated in software programming, word processing and call centers. For example, Andy Jassy, the CEO of the world's largest online retailer, Amazon, wrote on LinkedIn this summer about the impact of large language models on coding productivity: "The average time to upgrade an application to Java 17 dropped from typically 50 developer days to just hours; we estimate that this saved us the equivalent of 4,500 developer-years of work (yes, this number is crazy but real)." Source: LinkedIn, 8/22/24.

⁷ One of the fundamental concerns is the inherent limitation of AI, as well as the fact that its use has significantly higher marginal costs than previous technical innovations. One criticism is that AI is trying to replace cheap labor with expensive applications.

⁸ What also needs to be considered in relation to the growth of AI revenues is the potential arising from government investments in AI. Government AI initiatives aim to control data sovereignty, advance economies and use AI for specific national priorities. This could lead to higher investments in local AI companies and infrastructure. However, public sector AI could also fragment the AI market and lead to more regulation as different nations develop their own AI ecosystems and standards. See also World Economic Forum "Sovereign AI: What it is, and 6 strategic pillars for achieving it" as of 4/25/24.

⁹ Alphabet 2Q2024 analyst meeting, 7/23/24.

¹⁰ See also Goldman Sachs Research "Global Strategy Paper: AI: To buy, or not to buy, that is the question" as of 9/10/24

¹¹ The price-earnings ratio for the Nasdaq 100 today is around 30, compared with over 70 at the end of 1999. See Pacer ETFs "The NASDAQ-100 – is this time really different?" as of 12/2023

Glossary

Artificial intelligence is the theory and development of computer systems able to perform tasks normally requiring human intelligence.

ChatGPT, launched in 2022 by OpenAI, is a generative artificial intelligence tool that can provide replies similar to humans when receiving questions and instructions (so-called prompts). Its introduction is generally considered as greatly accelerating the AI boom as it gained millions of users within a few days and triggered rapid investments in associated AI technology by other companies.

The **S&P 500** is an index that includes 500 leading U.S. companies capturing approximately 80% coverage of available U.S. market capitalization.

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