

Transformative Technologies

Uncertainty, and Bubbles

U.S. stock market gains the last several years have been driven almost exclusively by investment in Artificial Intelligence and its insatiable demand for processing power. The major stock market indexes have gained approximately 20% each year since 2022, while the U.S. economy has expanded much more slowly.

For investors, revolutionary technologies can produce significant wealth. Consider the eight most valuable companies in the world. Three of the eight, Amazon, Alphabet (Google), and Meta (Facebook) didn't even exist before the widespread adoption of the Internet. Another four are also technology companies: Nvidia,

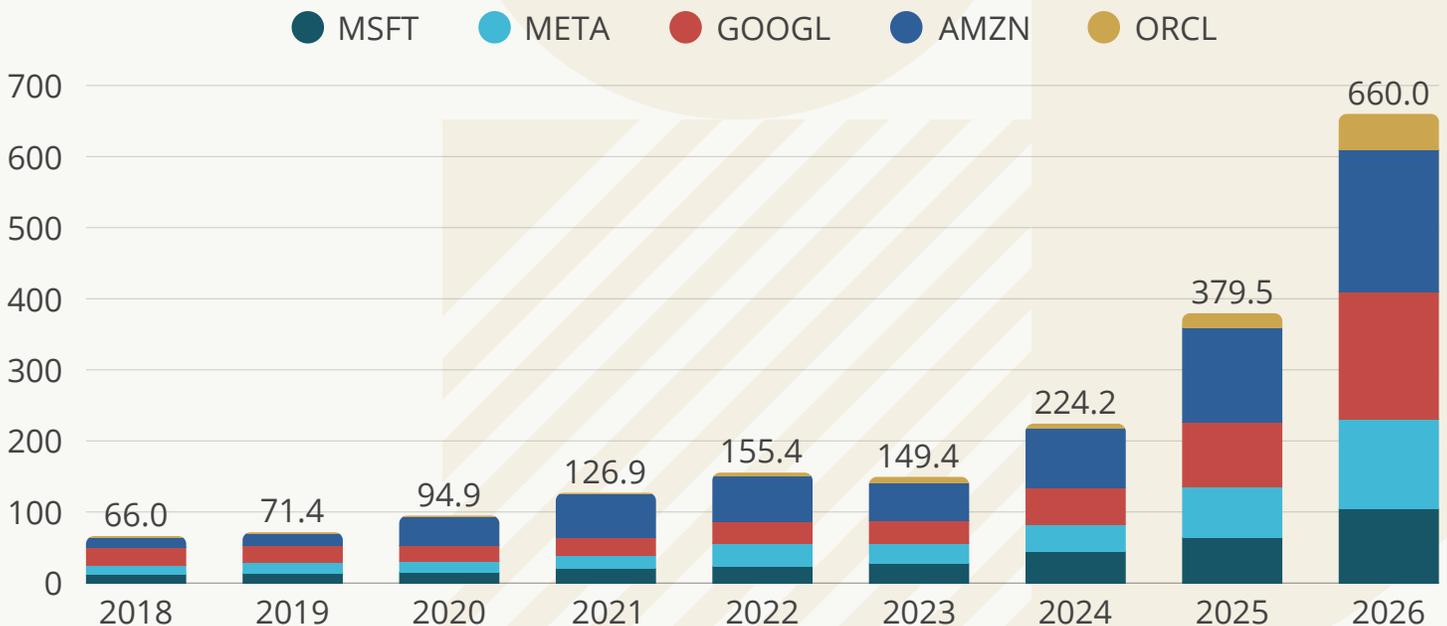
Microsoft, Apple and Taiwan Semiconductor. Investment in the top companies has yielded significant returns.

AI capabilities are likely to develop in a similar fashion to the Internet. After 30 years, it is difficult to imagine life before the Internet. All the things you do on your phone hundreds or even thousands of times a day depend on connectivity. We expect that, like the Internet, AI capabilities will be woven into everything.

With the benefit of hindsight, it seems it should be easy to pick the likely winners. Unfortunately, that's never the case. Even if you do get the winners right, the timing can be

difficult. Investment gains are unlikely to come in a straight line. Take Amazon, for example. From January 2000 to the end of 2001, Amazon lost 90% of its value in the dot com crash. If you abandoned the stock in dark days of 2001 you locked in substantial losses. After the 2001 wash out, shares recovered and went on to generate 27% annual returns for the next 25 years. The capital investment in AI infrastructure is still rapidly expanding. The hyperscalers building the datacenters are expected to spend \$660 billion in 2026. Last year their combined capital expenditure was \$380 billion, more than double from 2023. This investment in datacenter infrastructure is what drives the

HYPERSCALER CAP-EX SPENDING IN BILLIONS OF DOLLARS



SHILLER S&P 500 CAPE P/E RATIO



sales of Nvidia and Broadcom chips, memory and storage capacity, power supply and other components.

The advent of the railroad ushered in a new age of transport for industry and travel, but it required tremendous capital to build rail networks. The widespread adoption of electricity also required tremendous infrastructure. The risk for investors is that it is hard to know what the right level of infrastructure is appropriate for the opportunity. Despite the success of the Internet, telecom companies like Worldcom spent far more building out data bandwidth than the market could support. And investors paid the price.

Overoptimism for transformative technologies is not a new phenomenon. Railroad investors in the 19th century experienced similar circumstances with an overcapacity of impossibly unprofitable rail lines.

Additionally, we don't yet know what the business models around AI will look like. Will hyperscaler profit margins resemble the high level of technology companies at 25%+ margins or the more modest returns of the industrial or utility sector average of 12%?

Lastly, revolutionary technologies are inherently disruptive. Increased efficiencies from new technologies will drive changes in the employment landscape and impact existing industries. Think of how

the Internet has changed everything from finding a taxi to booking travel. There are not many travel agents anymore.

Investors should take advantage of the exciting opportunities in technology. But don't put all your eggs in one basket. Invest in AI and healthcare and financials. International stocks and commodities will protect against a weakening dollar. Use diversification to reduce swings in one asset class. Fixed income and real estate should be used to balance stock market risk.

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