

THEMATIC EQUITY INSIGHT

Two Years Into the Generative Artificial Intelligence (AI) Age

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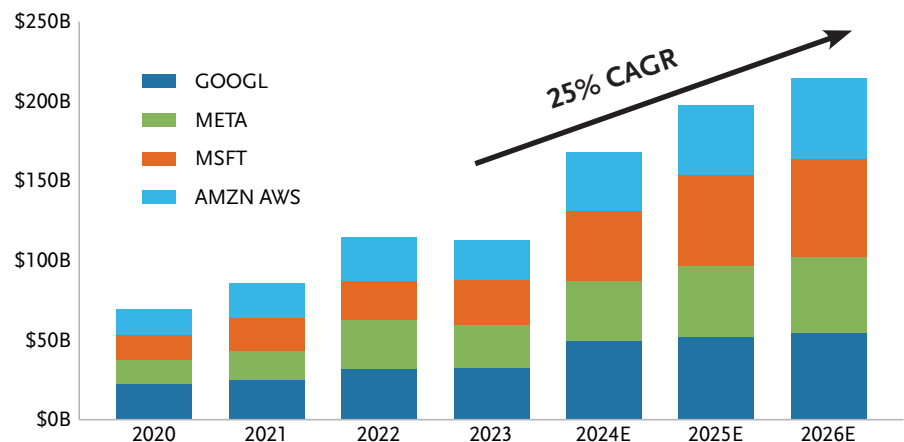
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Mr. Feagans is Co-Portfolio Manager of the TCW Global Artificial Intelligence Equity, TCW Next Generation Mobility Equity, TCW Global Entertainment Technology Equity, TCW Opportunistic Recovery Equities, and TCW Emerging Markets Next Generation Technology strategies. In addition to these responsibilities, he is a Senior Equity Analyst with research coverage for the Internet, Media, and Gaming and Lodging sectors. Mr. Feagans joined TCW in 2015 as an Associate Analyst supporting equity research coverage of the Healthcare Services & IT, Life Science Tools, Industrials, and Basic Materials sectors before becoming an analyst in 2018 with coverage of the REIT sector. Previously, he was a Research Associate at Fred Alger Management covering financial institutions. Mr. Feagans holds a BA in Economics from Hamilton College and an MA in Finance from Claremont McKenna College. Mr. Feagans is a Chartered Financial Analyst charterholder (“CFA”).

The world was introduced to Generative AI in November 2022 with the launch of ChatGPT, which captivated users with unprecedented capabilities. This launch marked the start of the “Generative AI Age,” immediately sparking a wave of innovation and investment. As we approach the two-year anniversary of this important milestone, we pause to reflect on both the progress made over the past two years as well as the tremendous opportunity ahead.

Big tech immediately recognized the opportunity presented by Generative AI. Though these companies were looking to reduce costs after a challenging 2022, they ramped up their investment in the datacenter infrastructure needed to train and operate generative AI models. The inflection happened in May 2023, when Nvidia guided the following quarter’s revenues a whopping 53% higher than the consensus estimate. Three months later, Nvidia’s actual revenue result beat that impressive guide by another 23%. These results were driven by its datacenter segment and were reflected in rising capital expenditure (CapEx) budgets at the hyperscalers: Microsoft, Google, Amazon AWS, and Meta. **The collective CapEx of these four companies is set to exceed \$200 billion next year, triple its level three years ago, driven primarily by investments in AI infrastructure.**

Hyperscaler CapEx



Source: Bloomberg, TCW

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This massive wave of investment particularly benefitted what we call **AI Enablers**, suppliers of the key AI infrastructure these companies needed a lot more of. This includes not only suppliers of computing power like Nvidia, but also companies providing memory, storage, networking, servers, power, and cooling equipment. Demand remains robust for all these products today.

The ROI Question

After a run of strong performance through the first half of 2024, investors started to question whether technology companies were seeing a return on all this investment in AI infrastructure, and by extension, if these investment levels were sustainable. Though many early generative AI products are promising, a “killer app” that garners mass adoption has yet to emerge.

We believe more patience and a holistic view are necessary. Though there isn't a horizontal app that everyone is using, companies are creating meaningful value through more specialized applications. **Areas like software development, image/video editing, autonomous vehicle software, online advertising, and e-commerce have been early adopters of AI with encouraging returns thus far.**

Furthermore, we are still just two years into the Generative AI age. By comparison, two years after the iPhone's initial launch Apple still lacked an App Store and thus many of the apps that ultimately created so much value in the smartphone ecosystem. It is far too early to judge the product set available using Generative AI when the groundwork for what's to come is still being laid.

What's Next?

We believe the best is yet to come for the leaders in artificial intelligence. Here are a few of the things we are looking for in the coming years:

- 1. Product improvements enabling new use cases.** Though Generative AI products can create some impressive outputs, they also generally currently lack the reliability required for many use cases. We are seeing dramatic improvements with each successive model generation, driven by improvements in hardware, software, and implementation. We believe this pace of innovation is highly encouraging given the ultimate size of the addressable market for Generative AI products is dependent on how good these products are.
- 2. Continued growth in capital expenditures at the hyperscalers.** These product improvements will not be cheap. The hyperscalers need the latest AI chips and more of them than ever before to keep up with the pace of innovation. These companies cannot afford to fall behind in a technology megatrend and will continue to invest what is necessary to maintain leadership positions. We believe this will result in a substantially higher level of AI-related capital expenditures than what is currently modeled by sell-side analysts.
- 3. A broadening out of infrastructure investment beyond the hyperscalers.** Though we expect the hyperscalers to continue to be by far the largest customers for AI Enablers, corporations are set to move from planning their AI strategies to executing them. Some companies will use their cloud service provider for this (supporting the demand for AWS, Azure, or Google Cloud Platform), but others will choose to build out their own infrastructure to maintain total control of their data and systems. We expect a similar dynamic from start-ups, where we believe an increasing proportion of venture capital dollars raised will go directly towards technical AI infrastructure in the years to come.
- 4. The investment opportunity moving up the technology stack.** The **AI Enablers** have been the primary winners in the early days of the Generative AI Age, but we expect the investment opportunity to broaden out. We are already starting to see impressive growth and investment opportunities from what we call **AI Systems** companies, or the producers of AI models and AI-enabled software. Further down the line, we expect **AI Adopters** that utilize AI products better than their peers to create substantial value from productivity gains and new product innovations. Our AI investment team invests in all three of these categories and seeks to shift our exposure as the investment opportunity expands. ■

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