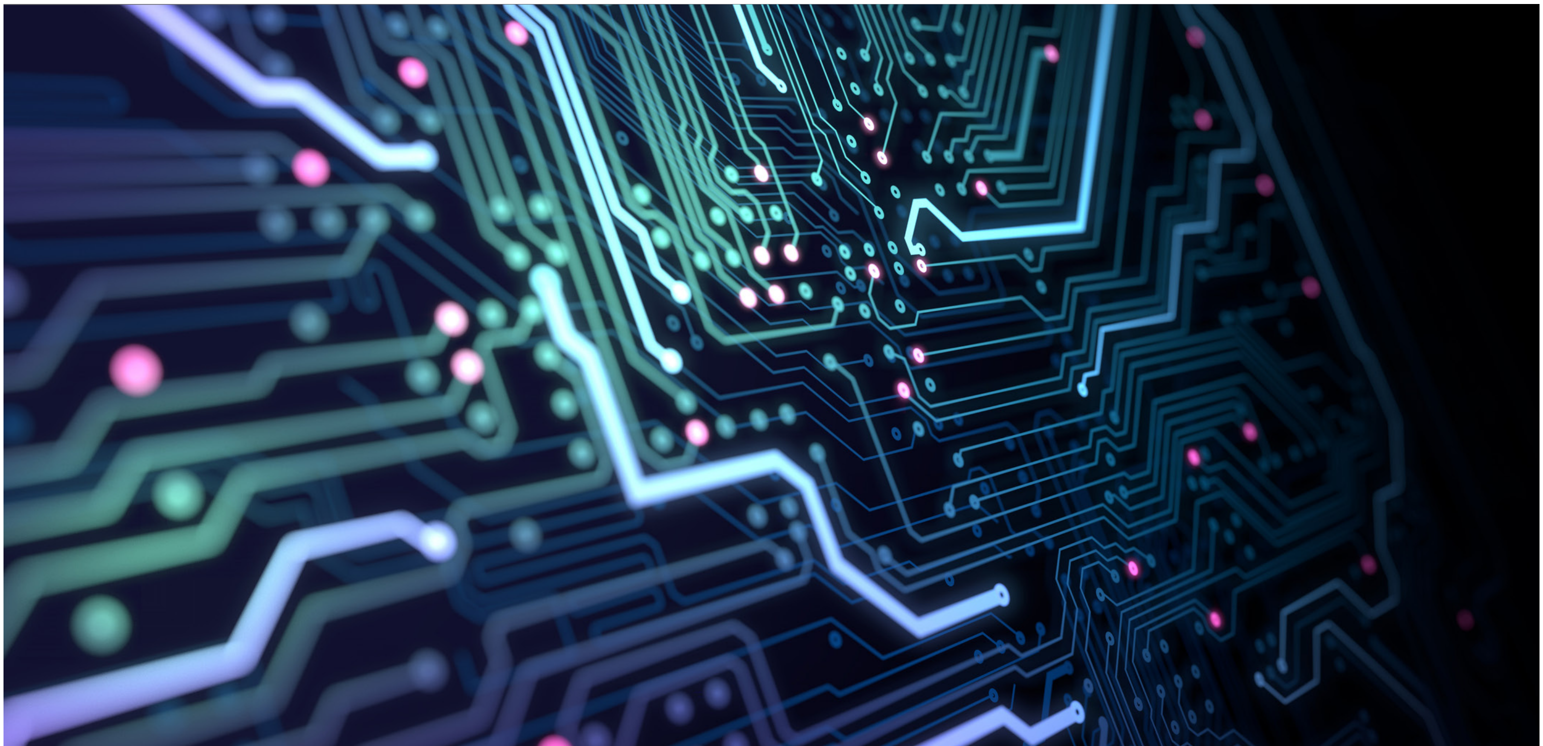


Artificial Intelligence—Investing Beyond GPUs

Artisan Partners Growth Team

ARTISAN PARTNERS
Insights

For Institutional Investors Only—Not for Onward Distribution

A R T I S A N P A R T N E R S

Investment Risks: Investments will rise and fall with market fluctuations and investor capital is at risk. Investors investing in strategies denominated in non-local currency should be aware of the risk of currency exchange fluctuations that may cause a loss of principal. These risks, among others, are further described on the last page, which should be read in conjunction with this material.

Artificial intelligence (AI) has been one, if not the hottest topic in financial markets and corporate boardrooms. Perhaps the most talked-about stock has been Nvidia, whose graphic processing units (GPUs) are an essential component in cutting-edge data centers that power AI models. Demand for Nvidia chips has grown so rapidly that the company's value eclipsed $3tn at one point this year, making it the most valuable company in the world.

But AI has more than one winner, and we are always interested in the broader set of likely winners involved in a big trend. In this case, we see several potential winners with dynamic and durable profit cycles as AI-related interest and investment continues to develop.

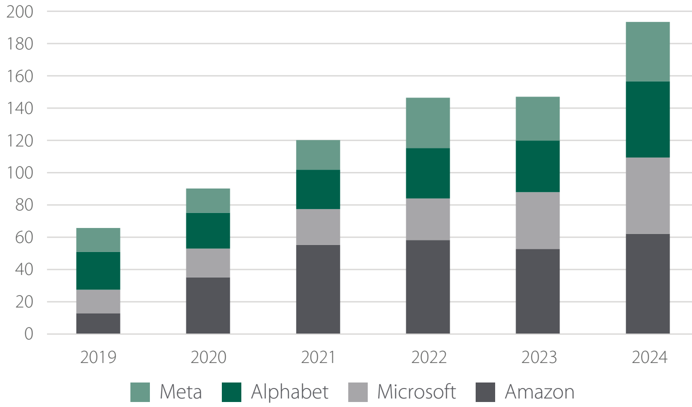
In particular, we see four areas of interest that we divided into two buckets: Enablers and Beneficiaries.

Enablers: Hardware

Mega-cap technology companies have been spending a lot of money on capital expenditures (capex) in recent years as organizations have increasingly shifted their computing resources the cloud. However, spending has accelerated recently as cloud providers scramble to build enough data center supply to match AI demand.

The recipients of all this capex spending have been an area of focus for us. **Advanced Micro Devices** has developed a GPU to compete with NVIDIA, **Taiwan Semiconductor Manufacturing Company** controls most of the market share for producing these leading-edge chips, and semiconductor companies rely on **Synopsys** software to accelerate chip design and improve efficiency. We also remain optimistic about companies exposed to the networking layer, such as **Arista Networks, Astera Labs and MACOM.** As these next-generation data centers are built, the networking will require an upgrade to handle the data intensity of these models.

Exhibit 1: Calendar Year Capex ($bn)



Source: Artisan/FactSet. As of 30 Apr 2024. See notes and disclosures for holdings information.

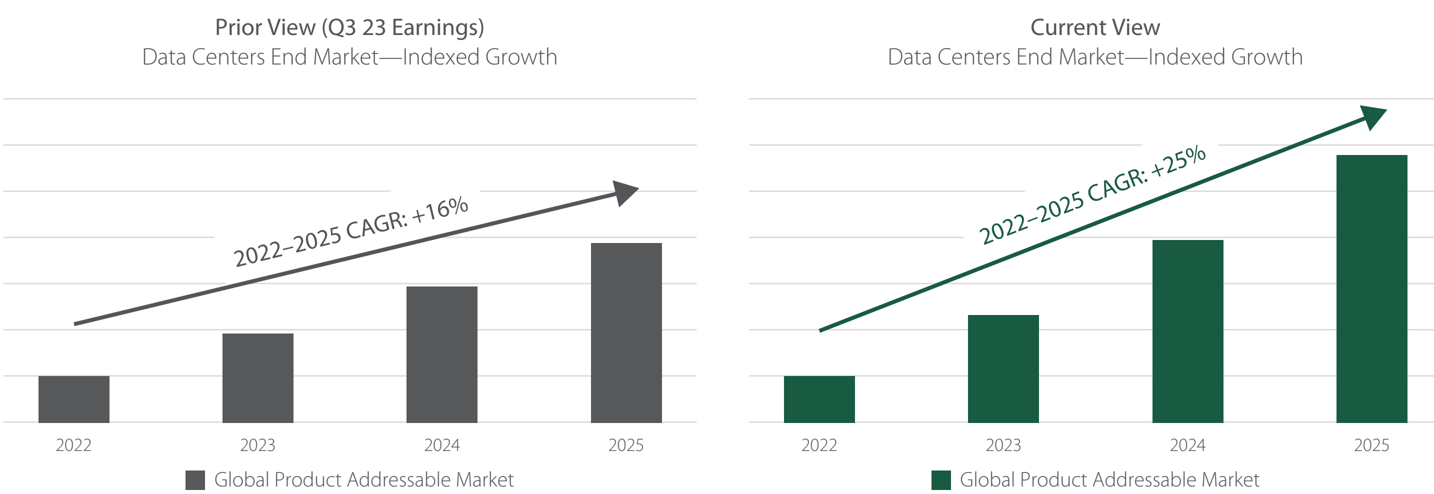
Enablers: Electrification, Power and Cooling

Greater data center spending has added momentum to a trend that we already had conviction in—the generational investment cycle in electrification fueled by government legislation (such as the Infrastructure Act and Inflation Reduction Act). Over the last three years, we witnessed an uptick in activity, with $1.2tn in committed mega projects (those >$1bn) in North America alone. However, data center expansion is now a leading incremental driver of electricity demand.

GPU-intensive data centers are forecasted to use 5X–10X more power than conventional data centers. To illustrate this point, just a few quarters ago, **Eaton**, an electrical infrastructure company with a meaningful portion of its business dedicated to data centers, forecasted a 16% compounded annual growth rate over the next three years for that part of its business. But it has already increased that forecast to 25% based on its visible backlog.

The US had a roughly 15-year period of minimal growth in electrical load demand. Energy efficiency efforts over the last few decades, such

Exhibit 2: Eaton Data Center End Market Growth Projections—Q3 2023 vs Q1 2024

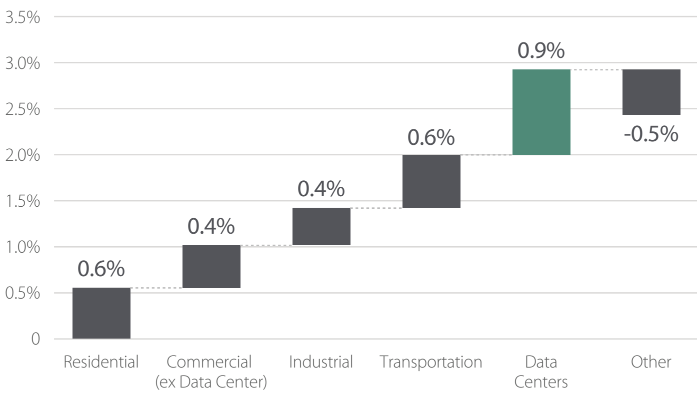


Source: Eaton Corp. As of 30 Apr 2024. See notes and disclosures for holdings information.

as LED lighting changes, HVAC and air conditioning regulations, building code changes, and many other successful efforts, helped limit electrical demand growth. But those efforts are maturing, and demand growth is expected to increase. In early 2024, Goldman Sachs published an expectation of 1.7% annual growth in the electrical load between now and 2030. It has since increased its expectation to 2.4% after factoring in data center growth.

Goldman Sachs also estimated that data centers account for 3% of today's total electrical load and expects this share to reach 8% by 2030. Thus, data centers would be the largest driver of electrical load growth in the next 10 years.

Exhibit 3: Composition of Goldman Sach's 2.4% Projected US Power Demand CAGR, 2022–2030



Source: Goldman Sachs. Generational Growth AI, data centers and the coming US power demand surge. As of 30 Apr 2024.

We have identified other beneficiaries of this trend within the portfolio, such as **Quanta Services**, a key enabler of transmission and distribution line construction. Companies like **Vertiv** are critical to the liquid cooling technologies required for these new-age data centers. And semiconductor companies, such as **Monolithic Power Systems**, are involved in power management.

Beneficiaries: Proprietary Data Providers

When we examine the implications of major changes such as this technological one, we look for the most foundational beneficiaries. In this case, it doesn't get any more foundational than data, which is the lifeblood of all these large language models.

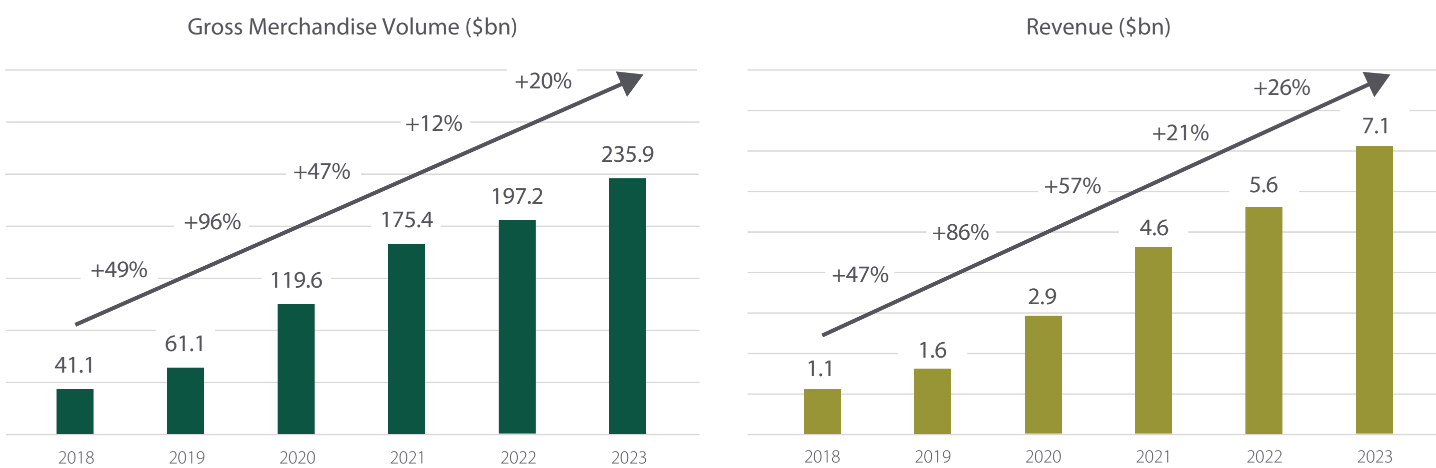
One company we are excited about is **London Stock Exchange Group** (LSEG). At this point, calling it a stock exchange is a misnomer since that business amounts to only about 3% of its earnings. Today, the bulk of LSEG's business is driven by its collection of databases. LSEG monetizes its databases by either licensing the data or building applications on top of them. And we think these data sets' values will increase over time. Microsoft does as well; in December 2022, it bought 4% of LSEG as part of a 10-year partnership that will marry LSEG's data assets with Microsoft's cloud and software assets. We believe its new offerings will help optimize a banker, trader, or analyst's day by potentially saving them hours in workflow and allowing LSEG to monetize those time savings.

Beneficiaries: Business Model Breakthroughs

We believe companies that use digital technology to drive productivity gains for their customers have significant opportunities to leverage AI to improve their value proposition and pricing power.

Shopify is a great example, in our view. Its business model offers e-commerce software and service solutions that empower brands and merchants to establish and expand their online presence. The company's strength is catering to small and medium-sized businesses, which often lack the resources to compete online. Its ability to provide these merchants with world-class technology and expertise at an affordable price has been a key driver of its success. Importantly, Shopify's economics align with those of its customers. It earns a small percentage of its merchants' underlying sales, meaning it does better if its customers do better.

Exhibit 4: Shopify Gross Merchandise Volume vs Revenue



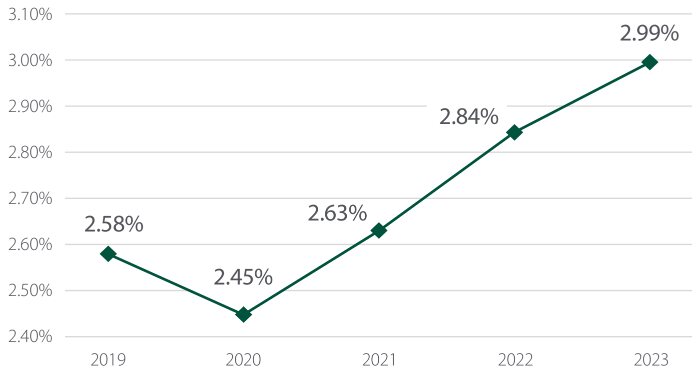
Source: Shopify 2023 Investor Presentation. See notes and disclosures for holdings information.

Shopify offers a wide range of services, including its online storefront, payment processing, and advertising services, and is developing a strategy to leverage AI to improve each of its services. For example, the company has already introduced a few products, such as image and text generation tools, that allow merchants to easily create compelling product pictures and descriptions.

The company has been historically slow to monetize the value it brings to merchants. Its revenue as a percent of merchandise volume that goes through its platform (i.e., the attach rate or take rate) is only about 3% today, which is not much more than a credit card processor's transaction fee.

Shopify does not charge much above the core payments processing function, but we believe it is adding a lot more value and should be able to charge more in the future.

Exhibit 5: Shopify Take Rate



Source: Shopify 2023 Investor Presentation. Attach rate is Shopify's revenue as a percentage of its customers sales. See notes and disclosures for holdings information.

Artisan Partners Growth Team

The following team members contributed to this report

Jim Hamel, CFA
Portfolio Manager

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Portfolio Manager

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Investment Process Highlights

We seek to invest in companies with franchise characteristics that are benefiting from an accelerating profit cycle and are trading at a discount to private market value.

Security Selection

We seek to identify companies with franchise characteristics that are selling at attractive valuations and are benefiting from an accelerating profit cycle. We look for companies that are well positioned for long-term growth, driven by demand for their products and services, at an early enough stage in their profit cycle to benefit from the increased cash flows produced by the emerging profit cycle.

Capital Allocation

Based on our fundamental analysis of a company's profit cycle, we divide the portfolio into three parts. Garden℠ investments are small positions in the early part of their profit cycle that will warrant a more sizeable allocation once their profit cycle accelerates. Crop℠ investments are positions that are being increased to a full weight because they are moving through the strongest part of their profit cycle. Harvest℠ investments are positions that are being reduced as they near our estimate of full valuation or their profit cycle begins to decelerate. We believe that adhering to this process increases the likelihood of delivering upside participation with downside protection.

Broad Knowledge

We overlay security selection and capital allocation with the capability to invest opportunistically across the entire global equity spectrum. It is our goal to have broad knowledge of the global economy to ensure that we are able to find growth wherever it occurs. This capability extends from the design of our team, which leverages the broad experience of the portfolio managers and the deep expertise of the analysts on the team.

Team Overview

We believe deep industry expertise, broad investment knowledge, a highly collaborative decision-making process and individual accountability are a powerful combination. Since the inception of the team in 1997, we have been committed to building a team of growth investors that retains these attributes and is solely dedicated to our process and approach.

Artisan Strategies Managed

- Global Opportunities Strategy
- Global Discovery Strategy
- U.S. Mid-Cap Growth Strategy
- U.S. Small-Cap Growth Strategy

For more information: Visit www.artisanpartners.com

Investment Risks: International investments involve special risks, including currency fluctuation, lower liquidity, different accounting methods and economic and political systems, and higher transaction costs. These risks typically are greater in emerging and less developed markets, including frontier markets. Securities of small- and medium-sized companies tend to have a shorter history of operations, be more volatile and less liquid and may have underperformed securities of large companies during some periods. Growth securities may underperform other asset types during a given period. These risks, among others, are further described in Artisan Partners Form ADV, which is available upon request.

This summary represents the views of the portfolio managers as of 30 Jun 2024. Those views may change, and the Strategies disclaim any obligation to advise investors of such changes. For the purposes of determining the Strategy's holdings, securities of the same issuer are aggregated to determine the weight in the Strategy. The holdings mentioned above comprise the following percentages of a representative account within the Composites' total net assets as of 30 Jun 2024: Artisan Global Opportunities Strategy: Advanced Micro Devices Inc 4.2%, Taiwan Semiconductor Manufacturing Co Ltd 3.8%, Amazon.com Inc 3.2%, Microsoft Corp 3.1%, London Stock Exchange Group PLC 3.0%, Alphabet Inc 2.8%, Arista Networks Inc 1.7%, Quanta Services Inc 1.6%, Eaton Corp PLC 1.4%, Shopify Inc 1.3%. Artisan Global Discovery Strategy: London Stock Exchange Group PLC 3.2%, MACOM Technology Solutions Holdings Inc 3.2%, Monolithic Power Systems Inc 1.7%, Quanta Services Inc 1.5%, Advanced Micro Devices Inc 1.1%, Arista Networks Inc 1.0%, Vertiv Holdings Co 0.7%. Artisan U.S. Mid-Cap Growth Strategy: Synopsys Inc 2.6%, Monolithic Power Systems Inc 2.1%, Quanta Services Inc 1.9%, Arista Networks Inc 1.7%, Shopify Inc 1.4%, MACOM Technology Solutions Holdings Inc 1.2%, Vertiv Holdings Co 0.8%. Artisan U.S. Small-Cap Growth Strategy: MACOM Technology Solutions Holdings Inc 2.9%, Astera Labs Inc 0.9%. Portfolio holdings are subject to change without notice and are not intended as recommendations of individual securities. Securities named in the commentary but not listed here are not held in the portfolio as of the date of this report.

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Our capital allocation process is designed to build position size according to our conviction. Portfolio holdings develop through three stages: Garden℠, Crop℠ and Harvest℠. Garden℠ investments are situations where we believe we are right, but there is not clear evidence that the profit cycle has taken hold, so positions are small. Crop℠ investments are holdings where we have gained conviction in the company's profit cycle, so positions are larger. Harvest℠ investments are holdings that have exceeded our estimate of intrinsic value or holdings where there is a deceleration in the company's profit cycle. Harvest℠ investments are generally being reduced or sold from the portfolios.

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