JENNISON ASSOCIATES

PERSPECTIVES

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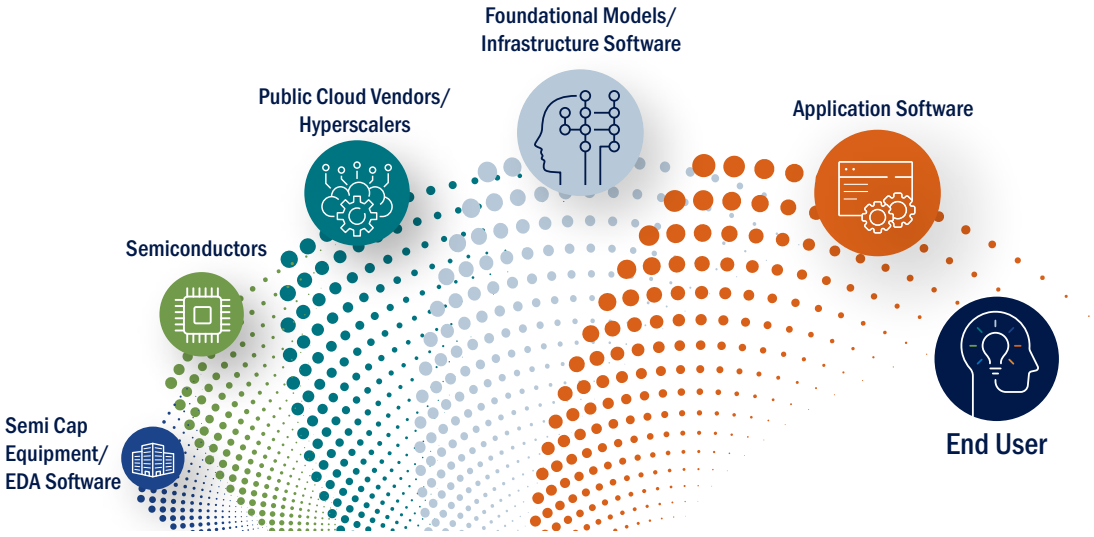
The AI Wave Keeps Building: Applications and Agents

We believe artificial intelligence (AI) represents the most far-reaching technological development since the advent of the internet. Today, AI is reaching a new and important phase: applications that have direct and visible impacts on business operations, enterprise offerings, and individuals' daily lives. At the heart of this development are breakthroughs in AI reasoning capabilities, which have implications for the entire AI ecosystem.

AI has become a strategic imperative across the global economy, with substantial resources from giant US technology companies dedicated to its continued development and implementation. Additionally, AI represents a generational paradigm shift in how consumers and enterprises interact with and use computing services. For enterprises, AI offers enhanced efficiency, superior execution, strategic differentiation, and deeper insights. For consumers, AI provides instantaneous access to information, personalized content experiences, and advanced problem-solving capabilities. The latest AI models have the potential to deliver these capabilities at new levels of efficiency and effectiveness.

Exhibit 1: The AI Wave Sweeping through the Economy



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Source: Jennison.

Everything Happens for a Reason

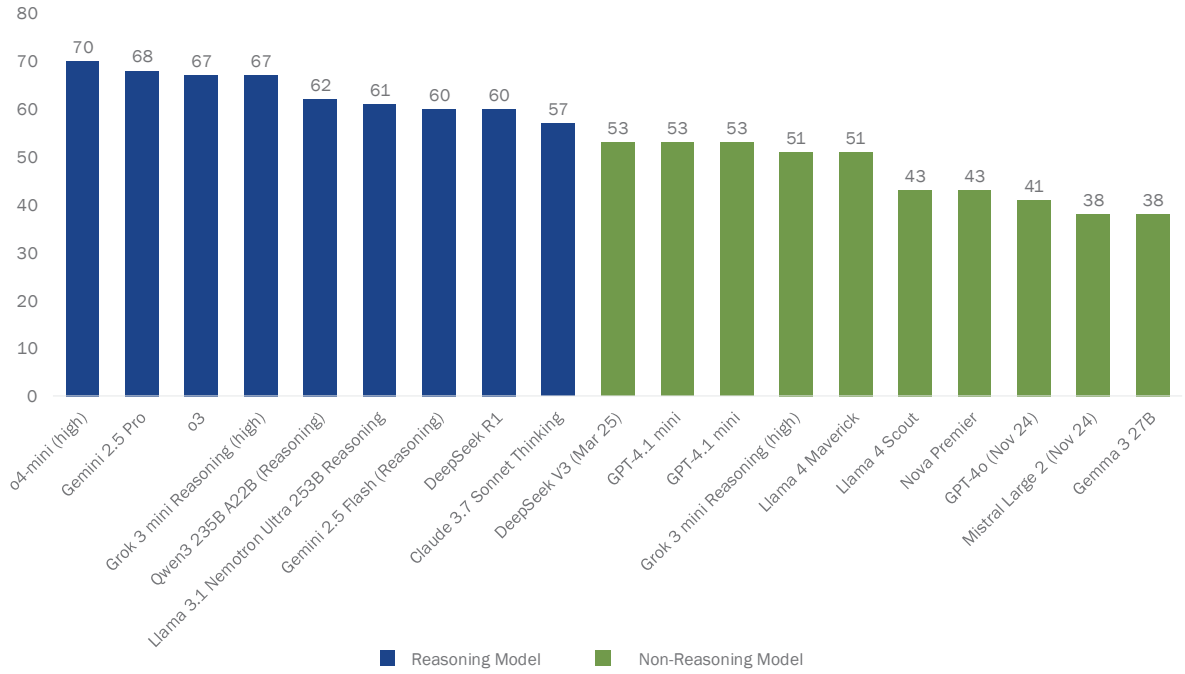
Since OpenAI launched ChatGPT in November 2022, investors have focused on the underlying large language models (LLMs). LLMs are created, or "pre-trained," through exposure to massive amounts of text data, from which the model "learns" syntax and semantics. This process requires significant time, resources, and expertise. Once the LLM is launched, the costs of "inference"—or applying the model to answer queries from users in a "single pass"—are relatively low compared to the cost of training.

Recently, however, a more advanced class of AI models has emerged. These models leverage LLMs but take significantly more processing time during inference, actively "thinking through" responses. This advanced process, known as inference-time scaling, involves breaking down complex problems into multiple internal reasoning steps. Such models have the capability to reflect, reassess, and even revise their initial conclusions, ultimately identifying the most effective solution. As a result, inference-time scaling models are substantially more sophisticated and versatile than traditional single-pass models, capable of addressing a broader array of complex, real-world tasks (Exhibit 2).

Importantly, inference-time scaling models (also called reasoning models) typically require more compute resources than single-pass models because they spend more time "thinking," which equates to more inference compute cycles. Because of the significantly enhanced capabilities of reasoning models, we believe inference-time scaling models will increasingly become the standard models through which individuals and enterprises interact with AI. This trend in model architecture will also drive demand for power and AI infrastructure, since AI reasoning consumes far more energy and compute power on average to answer a query.

Exhibit 2: Reasoning Models Offer Greater Capabilities

Artificial Analysis Intelligence Index[a] by Model Type



[a] Intelligence Index incorporates seven evaluations: MMLU-Pro, GPQA Diamond, Humanity's Last Exam, LiveCodeBench, SciCode, AIME, MATH-500

Source: Artificial Analysis

Maintaining AI Scaling Laws

AI scaling laws predict improvements in models with more training and data. We believe inference time scaling is a new dimension for these scaling laws. As computational resources continue to expand rapidly, available text-based training data no longer increases at a comparable pace, limiting improvements achievable through traditional pre-training alone. Fortunately, there is still a significant amount of multimodal data (e.g., video and images) that has not yet been used in training, and there is still a large set of data that sits outside of the public internet within private enterprises. Furthermore, recent advancements in synthetic data generation offer promising pathways to sustain pre-training scaling trends. Although it's still uncertain whether synthetic data can fully replicate the benefits derived from natural data, initial results have been encouraging. We anticipate continued incremental gains from traditional pre-training methods, but we expect that scaling laws from other stages of the AI model lifecycle will play an increasingly critical role. Specifically, inference-time scaling, post-training, and related efficiency enhancing techniques such as Mixture of Experts (MoE), are likely to become key drivers of future improvements in model capability, helping to sustain AI scaling trajectories beyond traditional pre-training constraints.

AI in Daily Life

The development of reasoning models illustrates how AI is moving beyond infrastructure and model training to enterprises and individuals.

Agents

Reasoning models are at the heart of AI agents, which represent the next frontier of AI applications. An AI agent is software designed to perform complex tasks autonomously or semi-autonomously. Unlike non-agentic systems (which typically attempt to solve tasks in a single pass) AI agents dynamically create and revise action plans, identify when external tools or resources are necessary, interact conversationally with users to gather additional context, collaborate with other AI agents, leverage external systems (e.g., websites and databases), and proactively initiate sequential tasks based on evolving insights. For example, when writing an essay, a non-agentic system generates text in one attempt without review or revision, whereas an AI agent might systematically outline, research using the internet, draft, critically assess its own output, revise based on reflections, conduct further research, and then finalize the content. Although still in its early stages, this approach has immense potential to broaden the applications of AI, influencing virtually every industry.

AI agents create entirely new categories of products and services capable of tackling problems previously addressed by human expertise. For example, OpenAI's o3 agent can autonomously generate basic software applications from start to finish, representing a step beyond existing code generation tools and closer to automated software creation. Human developers will remain essential to this process, but their roles will shift fundamentally. They will likely spend less time writing code and more time planning, designing, and managing complex systems.

Innovation and Potential: Separating the Reality from the Noise

Earlier in the year, the launch of a new generative AI model upended assumptions about the competitiveness of Chinese firms in AI. DeepSeek, a Chinese AI startup, announced that its R1 model could achieve comparable performance to leading US models while operating efficiently on less powerful hardware, significantly reducing inference costs. In effect, DeepSeek R1 demonstrated improvements in AI model cost efficiency through the use of several novel techniques, and the announcement triggered a market-wide reassessment of technological infrastructure spending.

While DeepSeek's performance relative to its cost is impressive, the company's claimed training cost advantages can be misleading, as they are not directly comparable to those of models developed by leading US companies. Nevertheless, DeepSeek's launch highlights an important industry-wide trend—declining costs associated with AI models. Lower costs improve affordability and accessibility for users, ultimately driving increased adoption and broader AI use. We view this trend as broadly beneficial for consumers, enterprises, and the tech industry overall.

DeepSeek has raised issues around the geopolitical rivalry between the United States and China. However, this is not a new concern. China has had significant ambitions within technology for some time and has been investing meaningfully to improve its standing in the AI ecosystem. However, the United States remains the epicenter of AI innovation, and we are confident that US firms will continue to effectively develop and distribute their technology. Ultimately, the DeepSeek news was an example that AI innovation is not limited to US technology firms with resources and expertise, especially as the AI revolution moves from the capex phase to applications development.

Growing Power Needs

The development and operation of AI models have and will continue to drive significant increases in power demand, which has required utilities to consider a range of energy sources. Meta, for example, has asked nuclear power developers for proposals to generate electricity for its planned data centers, and Constellation Energy and Microsoft have agreed to restart a unit of the Three Mile Island nuclear plant in Pennsylvania. In addition, the US government-supported Project Stargate will potentially invest $500 billion in AI infrastructure.

We believe the power needs of tech companies will be met, as utilities are coordinating their capital investments with AI demand. Energy plants are being constructed alongside data centers, and latent sources of power (e.g., greater capacity at night) are being tapped. We note that the breadth and depth of the electricity demand has drawn in not just large power companies, but a host of companies of varying sizes and capabilities.

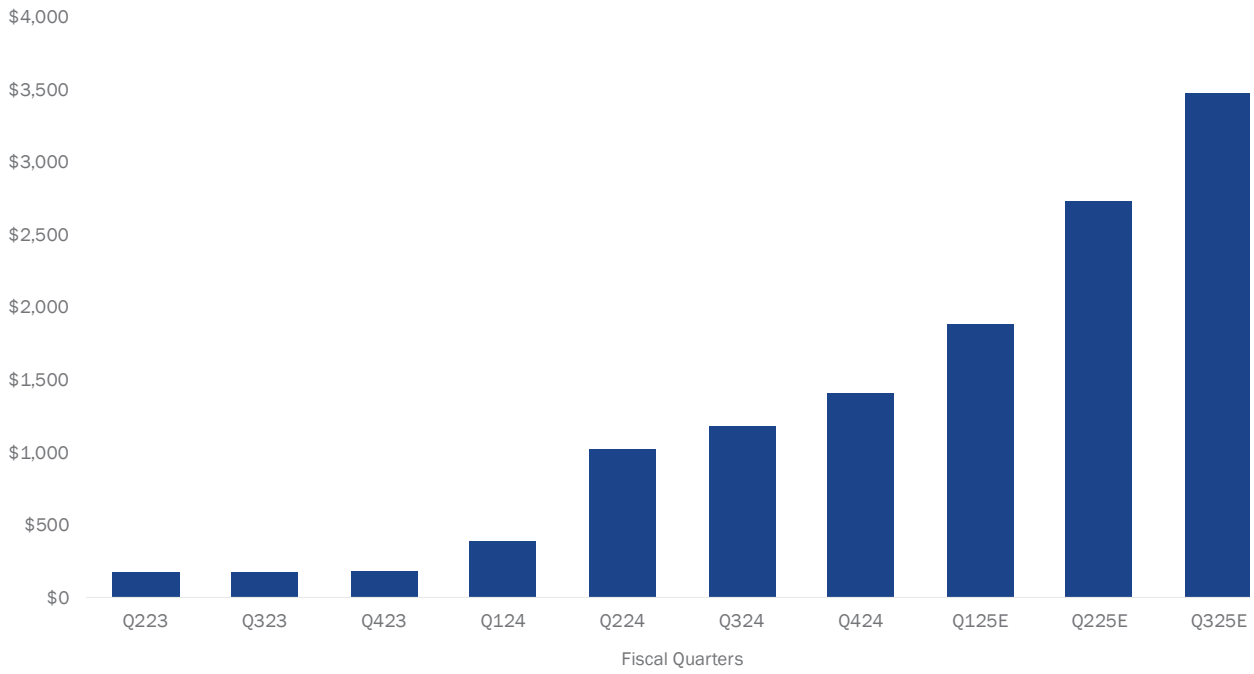
AI: Beyond Reason?

We believe advances in AI, which have been significant over the past two years alone, will soon be evident in sectors across the economy. Recent AI models can comprehend text, identify objects in live video streams, and understand spoken language at much higher levels of sophistication than previous models. Driverless robotaxis are already carrying passengers in several US cities. We expect further advances in industrial areas, including the potential use of humanoid robots equipped with multimodal AI. While still early, the possibility of breakthroughs in healthcare—notably in drug discovery—could be revolutionary. As more companies invest in AI, we believe AI-driven growth will become more visible. In fact, AI-derived revenue is already becoming a significant factor in select technology companies' earnings reports (Exhibit 3).

Exhibit 3: AI Is Already a Driver in Company Revenue Growth

Microsoft Azure AI-Derived Revenue

(USD Millions)



Source: Jennison

Ultimately, we continue to believe that companies need to incorporate AI into their businesses to be successful in the future, especially as AI "haves and have nots" emerge. These companies may offer compelling long-term investment opportunities, and we believe that investors with the resources, experience, expertise, and a disciplined approach are best positioned to exploit them.

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As of June 2025

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