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AI²: How radical innovations are revolutionizing tech and health care

From the Field

Key Insights

- The twin "AIs" of artificial intelligence (AI) and artificial incretins (GLP-1s) have transformed the investment landscape over the past few years.
- We believe AI will be the biggest productivity enhancer for the global economy since electricity and that GLP-1s herald the start of a new golden age in health care.
- We regard both AI and GLP-1s as multiyear developments with investment potential far beyond their initial uses.

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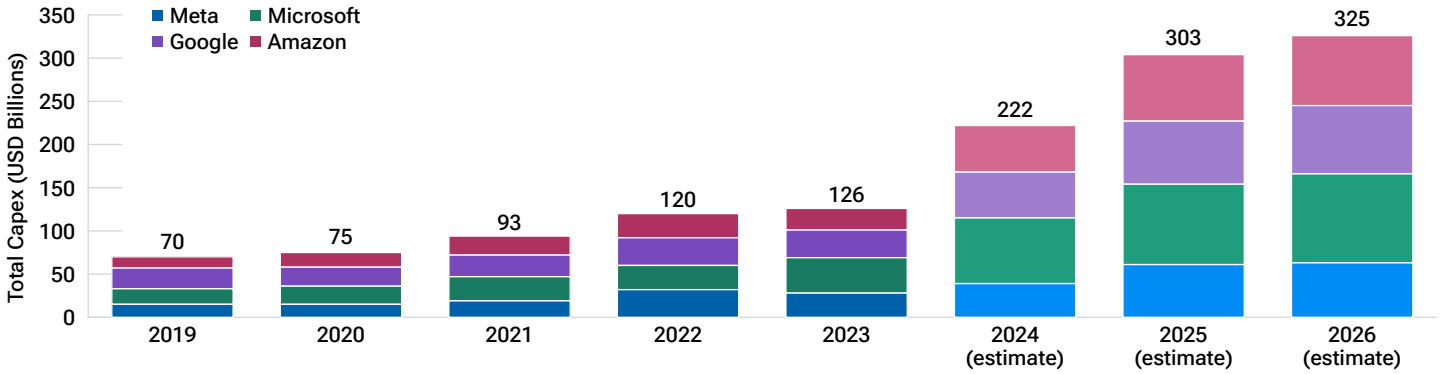
This is a period of extraordinary innovation. The world is undergoing transition at a pace and scale rarely seen before—and nowhere is this better demonstrated than through the twin "AIs" of artificial intelligence (AI) and artificial incretins (otherwise known as GLP-1 receptor agonists). Together, these two developments have changed the investment landscape over the past few years—and because they share similar underlying dynamics as well as the same acronym, we refer to them collectively as "AI²."

Innovations with the potential to transform the world are rare; for two to occur at the same time is remarkable. Yet we believe that AI will prove to be the biggest productivity enhancer for the global economy since electricity and that GLP-1s are establishing the conditions for a new golden age in health care. Crucially, the rise of AI and GLP-1s is being driven by highly profitable companies, suggesting a more sustainable investment landscape than some debt-driven investment booms of the past.

Below, we discuss each in turn, focusing on the profound impact they have already had on the technology and health care sectors and on their future investment potential. To avoid confusion, we will refer to artificial intelligence as AI and artificial incretins as GLP-1s.

The AI boom has been driven by large tech investment

(Fig. 1) Amazon, Microsoft, Google, and Meta have committed billions in capex



As of February 28, 2025.
Actual outcomes may differ materially from forward estimates. Estimates are subject to change.
Source: Data is based on company filings. Estimates are based on T. Rowe Price analysis of company guidance.

How ChatGPT changed the world

The current surge of interest in AI was sparked by the launch of ChatGPT (generative pre-trained transformer) in November 2022. Owned by U.S. research firm Open AI, ChatGPT is a generative AI chatbot based upon a large language model (LLM)—a type of machine learning model that processes vast amounts of data to generate natural language and other content. Users interact with ChatGPT by providing prompts, to which it responds with human-like text based on patterns learned during its training process.

ChatGPT quickly became a global phenomenon with millions of users. Its launch sparked a boom in AI technology, unleashing a slew of investment into firms involved in developing these tools (Figure 1). The chief beneficiary of this was chipmaker NVIDIA, whose stock price surged sevenfold over the next two years. Originally known for making the type of chips that process graphics in computer games, NVIDIA manufactures the graphics processing units (GPUs) that form the backbone of the ChatGPT infrastructure. GPUs are vital to running and training transformers (the "T" in ChatGPT) efficiently and have spurred a capital expenditure (capex) arms race as major tech firms seek to acquire and deploy the technology.

It is not just the mega-cap tech companies that are developing their own LLMs, however. Many other firms are developing customized LLMs to enhance communications, automate complex tasks, and create efficiencies. In-house LLMs are likely to be particularly useful for firms that need to process complex data, extract information from extensive records, and meet strict industry regulatory requirements. The number of companies developing proprietary LLMs is likely to mushroom in the years ahead, driving further demand for the hardware produced by NVIDIA and other chipmakers.

Innovative linchpin firms offer strongest growth prospects

The first phase of the AI investment cycle, which centered on firms providing infrastructure and those with the most direct AI use cases, is decelerating: While investment in absolute terms continues to grow, incremental capital expenditure is slowing. The key to successfully navigating the next phase of the cycle will likely be the ability to identify the linchpin companies that are innovating within new secular growth markets. Improving fundamentals are crucial here—firms with accelerating revenues, increasing operating margins, and improving free cash flows are worth looking at particularly closely.

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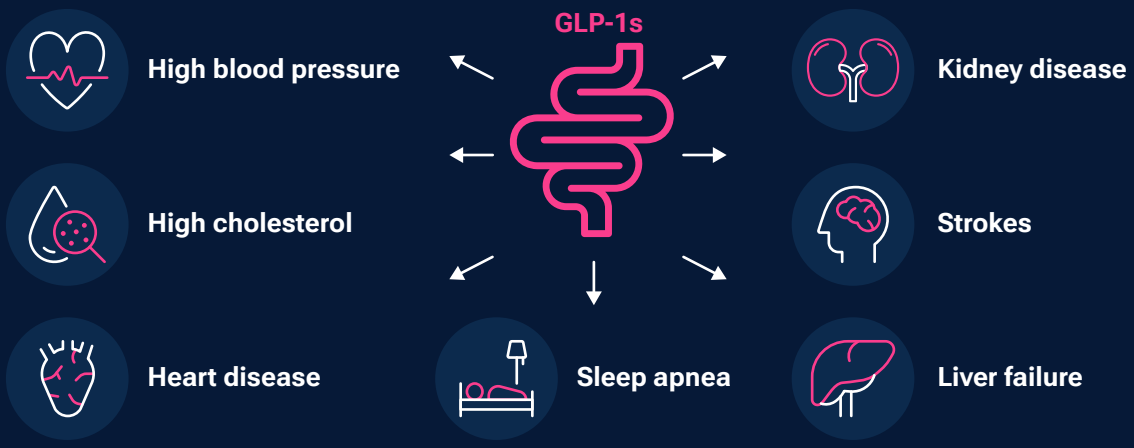
The potential health benefits of GLP-1s are vast

(Fig. 2) The drugs could be used to treat many conditions



As of February 28, 2025.
For illustrative purposes only.
Source: Analysis by T. Rowe Price.

When considering AI's impact on the wider global technology field, investors should include the semiconductor industry, where new kinds of semiconductors such as custom application-specific integrated circuts (ASICs) are being designed for AI applications. Among software firms, data infrastructure companies, vertical application vendors, and cybersecurity firms are well placed to capitalize on advancements in AI. In financial technology (fintech), generative AI is being used to improve customer experience in areas such as personalized banking, fraud detection, and credit risk assessment.

As spending on AI infrastructure increases, we also anticipate further innovation across AI applications. The emergence of AI agents is particularly interesting in this regard. These advanced AI systems can operate autonomously by planning and executing tasks, similar to a guiding beacon. Unlike basic chatbots that are copiloted by humans, these agents function as virtual employees that can autonomously handle tasks such as gathering data, making decisions, and executing operations. Other AI applications with growth potential include hearing aids with AI chips, self-driving cars, and AI-powered payment platforms.

As these developments take shape, the early part of 2025 has already proved to be a highly eventful period for the AI industry. First, newly inaugurated U.S. President Donald Trump announced Stargate, a private joint venture that could have a major impact on AI innovation in the U.S. Although the details of the project remain unclear, Stargate intends to build up to 20 large AI data centers in the U.S., with an initial investment of USD 100 billion and plans for up to USD 500 billion by 2029.

Then, the release of China's new DeepSeek AI-powered app rattled financial markets, causing NVIDIA to lose almost USD 600 billion of its market value in one day—a new U.S. stock market record. The launch of DeepSeek, which claims its models can match or surpass Western AI at a fraction of the cost, has sparked a debate over how much capex is required to develop efficient AI infrastructure. The cost of LLM "inference" (the process through which an LLM generates outputs) is already falling, and the launch of DeepSeek is only likely to accelerate that trajectory. There is also skepticism over the willingness of AI hyperscalers to continue ramping up their spending given the risk of being a "first mover" only to find that later entrants distill their technology at low cost and develop more refined products.

GLP-1s are already transforming health care

The impact of GLP-1s has been just as dramatic. The emergence of these drugs targeted at obesity and diabetes has been a seismic development that has already begun to revolutionize the health care industry, with investment implications stretching far into the future.

GLP-1s have been around for over a decade, but more potent and longer-lasting versions (sold under brand names including Ozempic, Wegovy, Mounjaro, and Zepbound) have come to market in the past few years. Originally developed to help people with Type 2 diabetes by promoting insulin production, GLP-1s regulate the body's response to eating and create a sense of fullness that suppresses appetite. Patients who take them have achieved dramatic results in weight loss and controlling diabetes.

The potential reach of GLP-1s is enormous—more than 2.7 billion people globally are obese or overweight, according to the World Obesity Federation, while figures from the International Diabetes Federation suggest that 537 million people live with the condition. Because injections must be taken weekly rather than just once, demand for the drugs will surge as more people take them. As such, the investment implications of GLP-1s are huge, not just for the earnings potential of drug developers, but across every part of the health care ecosystem, including biotechnology, pharmaceuticals, medical devices, and health care insurance.

Barriers to entry are high in the GLP-1 space for these injectable drugs. The leading manufacturers of the drugs, Novo Nordisk and Eli Lilly, have gained a competitive advantage by amassing huge amounts of clinical data and building production capacity, and they are developing next-generation drugs that are likely to be better than those currently available. These firms are spending billions of dollars on capital expenditure and on research and development to maintain their dominance.

Potential impacts of GLP-1s extend far beyond obesity and diabetes

Due to capacity constraints, there will never be enough injectable drugs to reach those who need them, which means that GLP-1s in pill form are needed to adequately address the global market in obesity treatments. Eli Lilly is expected to begin announcing clinical trial results from a broad phase three program of its oral GLP-1s in April—a move that could lead to a global launch of the drugs in 2026.

Beyond pharmaceuticals, increased penetration of GLP-1s could have major implications for other health care segments, particularly once pricing comes down with the availability of oral products. As the downstream savings in other health care costs associated with diabetes and obesity begin to materialize, governments and private insurers will have increased incentives to broaden coverage. A GLP-1 prescription could save insurers from other health care costs, such as treatments for high blood pressure, high cholesterol, heart failure, sleep apnea, and kidney disease—let alone other significant costs such as strokes or liver failure.

The second- and third-order effects of GLP-1s will also be important considerations for investors. Some companies are already starting to see an impact as diabetes patients continue to shift from other medications to newer GLP-1 drugs and more people with obesity initiate therapy. Several companies have already noted reduced demand for bariatric surgery.

Profiting from these profound changes as investors will require looking beyond balance sheets and gaining a deep understanding of the science and technology behind their promise. We believe we were early in understanding the promise of GLP-1s and that the opportunity set will remain a rich one for many years to come.

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Long live the AI² revolution

The twin innovations of AI and GLP-1s have reshaped the investment landscape over the past two years. And while these innovations are appreciated by the market, we regard them as multiyear developments with investment potential far beyond their initial uses. In AI, increasing numbers of firms are likely to develop their own LLMs, while AI-powered advances in other areas of technology are in their infancy. In artificial incretins, the availability of GLP-1s in pill form has global implications, while the downstream effects of the drugs in other areas will bring huge growth potential.

As such, our outlook for both AI and GLP-1s remains a positive one. Both areas continue to serve as significant catalysts for growth across a range of subsectors and are well suited to active managers who can keep track of the opportunities that arise as the pace of innovation continues. The AI² revolution has some way to run—and is set to bring about some of the biggest social and economic changes seen in generations.

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