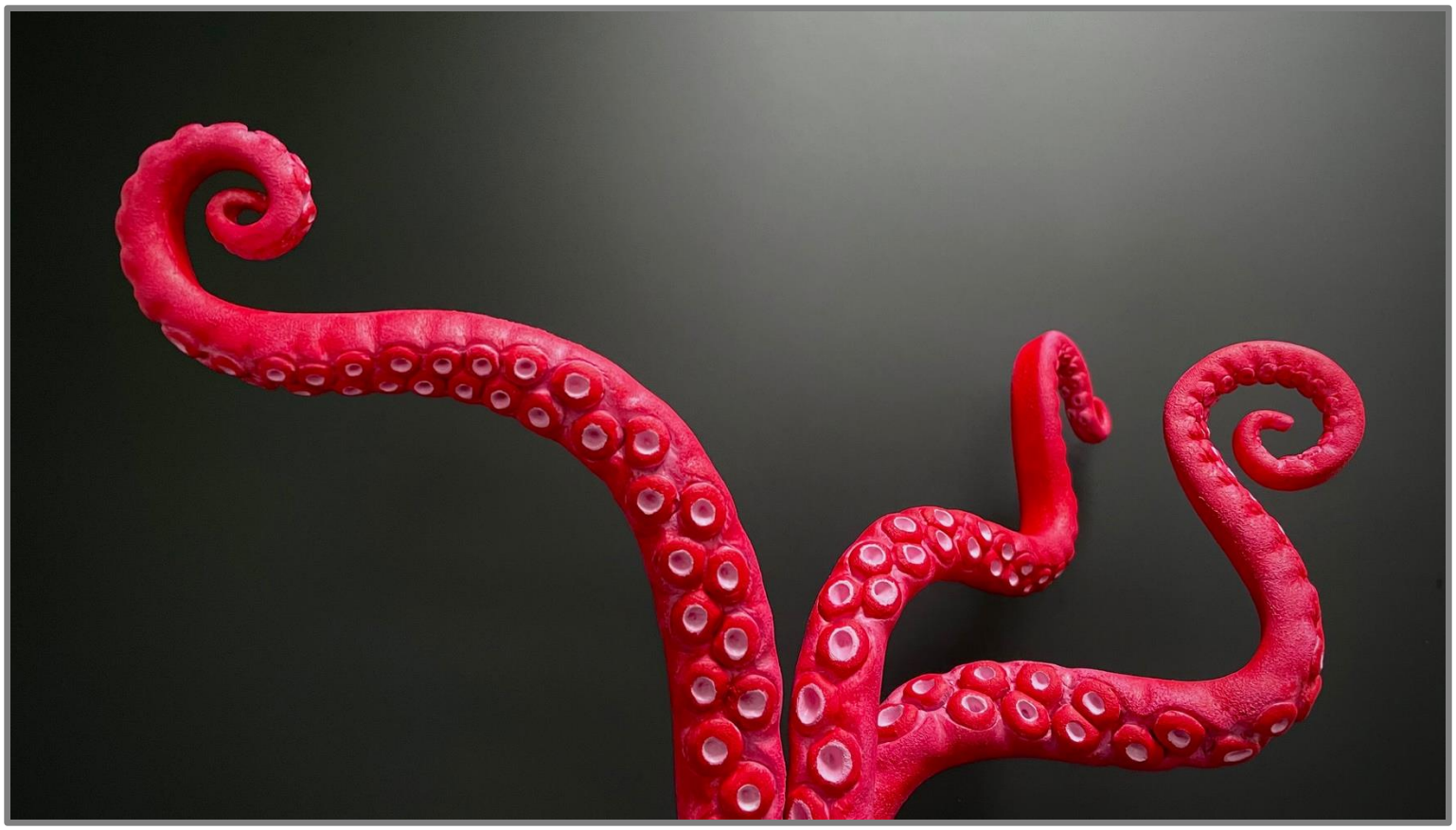


To Appreciate the Potential Impact of Artificial Intelligence, Consider the Direction and Reach of Capital Investments

You cannot read an article today that does not reference Artificial Intelligence (AI) and its emerging influence—and impact—on everything we do in our daily lives. Interestingly, AI has its roots dating back to the 1950s when Alan Turing first developed a way to test a machine's ability to exhibit intelligent behavior and for a person to determine if they were interacting with another person or a machine. A few years later the term "Artificial Intelligence" was coined at a technology conference at Dartmouth College by John McCarthy. Throughout the 1960s, there was continued advancement, with programs focused on problem-solving and symbolic reasoning. I mention these points of reference not to give a history lesson but rather to highlight that we have been living in a world utilizing AI for the past 70 years. With each technological advancement in computing capacity through ever-faster and smaller chips, data storage and transmission speeds, another flywheel is developed ushering in new and exciting products and processes that will have a direct impact on our daily lives.

LEGACY BRIDGE
PRIVATE FAMILY OFFICES®

With the recent advancements in semi-conductor chips, for example, processing significantly more data at faster speeds, has created yet another inflection point in the development of AI. Much like the Eisenhower Interstate (Highway) System, you must envision and then build the road before you can travel on it.

It is projected that capital investments in AI will be between $2 and $3 Trillion over the next three years. To put this into perspective, the total GDP in 2023 for the United States was $27 Trillion, of which $4 Trillion was capital investments. We are looking at a massive increase in spending on AI projects that would be equivalent to three stimulus packages being injected into the economy over the next 3 years. For example, Amazon announced a capital spending budget for 2025 of $100 Billion, Microsoft $80 Billion, Alphabet $75 Billion and Meta $65 Billion. Apple recently announced capital spending on AI of $500 Billion over the next 4 years. All up substantially from 2024 levels and projected to grow more than 19% annually over the next several years.

The Development of AI Over the Next 5 Years

Phase I: Infrastructure Buildout (Currently Underway)

- ***Computing Power Expansion***
  - Massive investments in chips, cooling technologies and energy efficient performance
- ***Data Center Expansion***
  - Hyperscale's Amazon, Microsoft, Meta and Alphabet all building AI optimized data centers portfolios
- ***Foundational AI Models***
  - Companies are bringing their models to market: ChatGPT, GPT-4, Gemini, and Claude
- ***AI-Specific Semiconductors***
  - Custom chip development for specific use

Phase II: Deployment & Integration

- ***AI Driven Business Transformation***
  - Utilizing AI to improve efficiency, increase capacity and calculate massive data
- ***Autonomous Systems***
  - Expansion of Autonomous Driving, Robotics and Factory Automation
- ***Widely Accepted***
  - AI being widely accessible, Consumers, Education and Small Business
- ***Regulation & Governance***
  - Establishment of rules and regulations for safety and ethical concerns

We are well underway in Phase I, which is the focus of capital investment. Companies involved in any phase of the data center buildout will be clear beneficiaries, as will be the investors who are strategic with their allocation of capital.

AI: Paradigm Shift or Business as Usual?

AI continues to be the defining revolution of our time. The first wave, which has dominated the last two years, was infrastructure-focused. GPUs, computing systems, and hardware firms became the backbone of exponential growth, laying the groundwork for AI's meteoric rise. These companies fueled the engine of progress, capturing outsized returns as they built the tools that powered this technological shift. The growth of data centers to house this extensive growth in computing systems has also provided ample opportunity for investment in this phase. These companies go beyond the technology sector and include sectors such as industrials, energy and utilities.

Behind AI's potential lies an underappreciated but critical challenge: the need for clean, scalable, and reliable energy sources to power its growth. To quote the CEO of a regional construction firm, "There are more [dang] data centers falling out of the sky!"

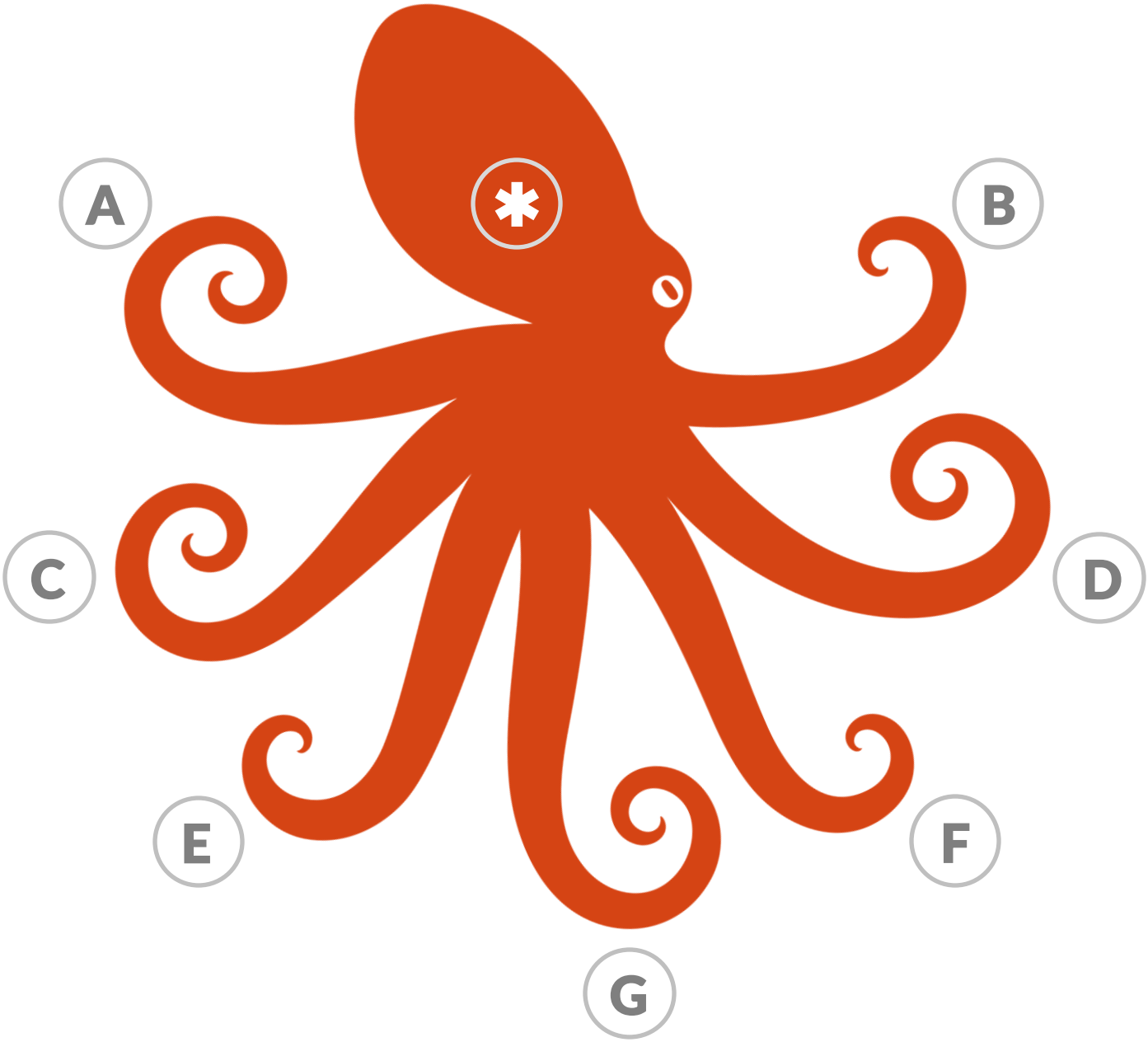
The energy requirements of these data centers can go up to 1 gigawatt. (As a reference, a city the size of Pittsburgh requires roughly 500 megawatts, with 1,000 megawatts = 1 gigawatt.) To power the massive data center buildout, several options can be considered, each with its own set of advantages and considerations. These include solar power, advanced battery systems, natural gas and next-generation nuclear energy. Together, these advancements are orchestrating a new energy ecosystem, converting AI's promise into reality. Solar power stands as the immediate beneficiary of this transformation. Yet, solar power alone cannot shoulder the weight of AI's energy appetite. The Achilles' heel of renewable energy remains its low energy density (a crucial measure of the ability to deliver more energy efficiently) and intermittency, periods of peak generation often fail to align with the 24/7 energy needs of AI infrastructure. Thus, the need for energy storage. Several companies are spearheading advancements in battery technology, enabling surplus energy to be captured during production peaks and deployed during demand surges and ensuring renewables maintain their viability as a consistent energy source for AI's exponential demands.

Natural gas provides a stable and reliable energy source, which is crucial for data centers that require uninterrupted power to avoid data loss or downtime. Gas turbines are more efficient than traditional diesel generators, especially when used in combined cycle configurations where waste heat is utilized for additional power generation or heating. In addition to being used for backup power, natural gas can also be a base load power, offering flexibility in how data centers manage their energy needs. It can be ramped up or down based on demand. Additionally, natural gas is a relatively greener option within the fossil fuel energy source spectrum. This can help in meeting sustainability goals to some extent. Furthermore, natural gas infrastructure can scale to meet the growing power demands of expanding data centers, either through on-site generation or by negotiating favorable power purchase agreements (the purchase of energy from a utility).

Nuclear power offers unmatched reliability and efficiency (energy density), delivering the steady, baseline energy required by AI systems. Next-generation nuclear developers are pioneering small modular reactors (SMRs—think nuclear aircraft carriers) and advanced designs that redefine nuclear technology. With alternative coolants, extended fuel cycles, and compact footprints, these reactors are built to address AI's rising energy needs. The infrastructure supporting nuclear energy is equally pivotal. Large utility companies are modernizing nuclear plants to enhance capacity and align with zero-emission goals. These efforts underscore nuclear power's enduring role as a cornerstone of clean energy transitions, ensuring AI's energy demands are met without compromising sustainability objectives. Fueling these advanced reactors is a network of uranium producers working to meet rising global demand. Their advancements in High-Assay Low-Enriched uranium (HALEU) are especially critical for next-gen reactors. The timing of the nuclear renaissance is uncertain, but the need for alternative energy solutions to power AI-driven data centers is inevitable. Without it, AI can't scale to its full potential.

Energy transformation isn't confined to generation, it extends to distribution and optimization, as well. The evolution of grid optimization technologies ensures AI-driven data centers operate efficiently, minimizing waste and enhancing reliability. By seamlessly integrating advanced power sources, we can provide a resilient power infrastructure capable of sustaining AI's meteoric rise. AI is stretching the limits of what energy systems can achieve. The interplay across different power sources is essential. These form the foundation of a more efficient and sustainable energy future, not only for AI but for the general population, as well. The companies leading these innovations are poised to define the next era of progress.

Direction and Reach of Capital Investments



* Alphabet, NVIDIA, Microsoft, Meta, BROADCOM, amazon

A. Energy B. Robotics C. Data Centers D. Healthcare

E. Software F. Applications G. Next Frontier

Phase II – Moving Toward Real Change

As with all things, evolution is inevitable, and AI is transitioning into its next phase. This second stage shifts the spotlight from infrastructure to applications, software innovations that bring to life the potential of AI. Industries will be reshaped, creativity enhanced, and the way we work and live will be redefined. Unlike the cyclical nature of hardware growth, this phase introduces permanence. It's not just a trend; it's a lasting transformation that offers generational opportunities for those who identify the leaders of this new frontier.

Agent-driven AI (a type of artificial intelligence that creates autonomous entities [agents] that can perceive their environment, make decisions, and take actions to achieve goals) is leading this charge, poised to disrupt traditional software markets in ways that were unimaginable just a few years ago. Businesses are leveraging these agents to create custom solutions, launch new ventures, and dismantle long-standing barriers to entry. The pace of change is staggering—code generation is accelerating at a rate never seen before, boosting demand for cloud infrastructure and data management systems. However, even these markets will face disruption as AI matures, offering tailored solutions that challenge the relevance of legacy platforms. The future will belong to those who adapt, innovate, and embrace the shift.

The acceleration of AI from a decision-support tool to an autonomous force capable of real-time execution and self-optimization is fundamentally reshaping the business landscape. Data, once a passive resource, is now the lifeblood of AI-driven enterprises, fueling intelligent systems that execute financial transactions, automate supply chains, and manage healthcare operations without human intervention. But as AI's role expands, so does its exposure to risk. In a world where algorithms control infrastructure, the integrity of AI is only as strong as the security that protects it.

Enterprises no longer have the luxury of treating cybersecurity as a secondary concern, it has become the non-negotiable foundation of AI scalability, ensuring that automation does not evolve into an ungovernable liability. At the frontline of this battle is the endpoint, the first and most frequent target for attacks. AI-driven systems are no longer contained within corporate firewalls; they extend across a web of devices, applications, and distributed workloads, each creating potential entry points for miscreants looking to exploit vulnerabilities before AI systems can react. The ultimate winners in the AI revolution will not only be those who build the most powerful AI models but will include those who can secure them.

> ***Organizations cannot afford to gamble on security, and investors cannot afford to ignore it. The companies leading this space are not just protecting data—they are protecting the very foundation of the AI-driven economy itself.***

One of the more impactful areas where AI can make a huge difference is in healthcare. The market is recalibrating how it values healthcare, and 2025 could be the year AI-driven medicine takes center stage. Every aspect of the industry, from diagnostics to treatment to drug development, is shifting toward AI-powered efficiency, and companies that are embedding AI into their core operations are being rewarded. AI is now an operational necessity in healthcare, and policy shifts are accelerating its adoption. Volatility will come, but the long-term trajectory is clear. Investors who recognize this transformation early stand to gain the most—while those waiting for "proof" may find themselves chasing what was obvious all along.

The Next Frontier for AI

Artificial intelligence has reshaped industries through software-driven efficiencies, predictive analytics, and automation. But its next frontier, physical AI, will be even bigger. The transition from AI as a digital tool to AI as a physical workforce may be the most profound economic transformation in modern history. This isn't just about automating factory lines or enhancing robotics, it's the fusion of real-time decision-making, machine learning, and autonomous systems to perform complex physical tasks across nearly every sector.

> *The implications are staggering, and for investors, the companies leading this revolution are poised to capture a huge market.*

For decades, AI's potential in robotics was limited by hardware constraints. Now, that bottleneck is gone. Breakthroughs in deep learning, reinforcement models, and sensor fusion have converged with advances in semiconductor efficiency, high-speed networking, and edge computing. The result? AI is no longer confined to the cloud, it's inside machines that perceive, interact, and execute with near-human dexterity. And the world's most ambitious companies are racing to dominate this new landscape.

The true moonshot opportunity, however, lies in humanoid robotics. Nvidia CEO, Jensen Huang, has made it clear: "The ChatGPT moment for general-purpose robotics is just around the corner." If that statement proves true, the economic implications will be historic. With a projected global labor shortage of 90 million jobs by 2030 and an annual labor market valued at ~$40 trillion (McKinsey.com), AI-driven humanoid robots represent a huge total market potential. If AI-powered humanoid robots replace just a fraction of the global workforce, the industry could generate over $34 trillion in annual revenue by 2040 (McKinsey.com). Companies with a strong first-mover advantage, those that combine scalable manufacturing, proprietary AI training data, and seamless software-hardware integration, will dominate this new industrial revolution. What's occurring is a foundational shift in how labor itself is performed. AI is moving from software to the physical world, taking over tasks that were once exclusive to human workers. This transition will create new efficiencies, improve productivity, drive down costs, and open up economic opportunities on a scale never before seen. The companies leading this revolution aren't just launching new products, they're building the backbone of a post-labor economy. And as capital flows into this seismic transformation, investors are beginning to realize the magnitude of what's at stake.

DeepSeek Raises New Questions for AI Spending

In January, the AI community was rocked by claims from Chinese startup DeepSeek that they created an AI large language model (e.g. ChatGPT) at a miniscule cost, and with fewer resources. DeepSeek's claims have basically offered a counter argument that the future of AI will not have to cost huge amounts of capital. Since this announcement, there has been plenty of skepticism as to the ultimate cost. Nevertheless, it begs the question, "Can AI be done at a lower cost?" Possibly.

Large language models (LLMs) aren't the pinnacle of AI. Having the best LLM isn't the goal of these big tech companies, they want more. The US mega caps are focused on the future—Artificial General Intelligence (AGI), which refers to a type of AI that can perform any intellectual task that a human can do, with a broad capacity to learn, reason, and adapt across a wide range of domains and tasks. Unlike narrow AI, which is specialized for specific tasks (like playing chess or

recommending movies), AGI would possess generalized cognitive abilities, enabling it to tackle unfamiliar challenges and transfer knowledge across different fields. It's often considered the next major milestone in AI and considered to be where the huge value is likely to be.

AI infrastructure spending is holding strong, but DeepSeek has introduced a new variable into the equation. While the initial panic suggested a potential shake-up, earnings from the mega-cap tech companies reinforced the reality that AI isn't slowing down, and neither is the demand for high-performance computing.

> *Looking beyond 2025, the companies that figure out how to scale AI while keeping costs in check will be the ones that win the long game.*

DeepSeek isn't a breakthrough in AI capability. Rather, it's an optimization play. But optimizations at scale can change everything. By demonstrating that high-quality AI models can be trained at significantly lower costs using weaker hardware, DeepSeek raises questions about whether the AI arms race is truly a race to spend more, or if the focus should shift toward smarter, leaner approaches. OpenAI's $40 Billion fundraising effort highlights that private markets still believe in the necessity of massive computing power, but investors know that private markets can be slow to react to fundamental shifts. If DeepSeek's methodology proves to be more than just a niche solution, hyperscalers may eventually rethink just how much they need to spend to stay ahead.

For now, AI investment is full speed ahead. DeepSeek may not have sparked an immediate AI spending pullback, but the broader implications are clear: the future of AI will be shaped not just by brute-force spending, but by efficiency breakthroughs that change the economics of computing. Hyperscalers are doubling down, with NVIDIA still in control, and AI remains in acceleration mode.

Conclusion

The AI revolution is no longer a gradual wave of technological enhancement, it is a seismic upheaval, dismantling traditional enterprise structures and reconstructing them around intelligence, automation, and real-time execution. What was once a world dominated by static databases and retrospective analytics has been obliterated by AI systems that do not just analyze but anticipate, adapt, and act autonomously. This is not mere automation, it is Agentic AI, an evolutionary leap where machines do not wait for human prompts but instead execute complex decisions with precision, speed, and scale. Business leaders are no longer debating if AI will drive enterprise strategy—they are racing to implement it before their competitors do. The winners of this technological shift will not be the ones experimenting cautiously, they will be the ones building aggressively, automating relentlessly, and integrating AI at every level of decision-making.

To get ahead of the various AI trends in the market, one needs to invest early. However, the price of being early can often be volatility, investors should embrace it. Volatility is not a bug in the system, it's the price of admission. Disruptive technologies, by their very nature, defy traditional valuation metrics. At first glance, they often seem overhyped, overpriced, or

outright irrational. Yet the question isn't whether they make sense by today's standards, it's whether they'll reshape the playing field over the long-term. Progress in these fields is rarely incremental—instead, it comes in bursts, often following periods of languish. Investing in this disruptive revolution means having conviction in what's to come, not just what's trending.

A key trait when finding companies to invest in is a strong management team with meaningful ownership in the company. Management is important when fundamentals have yet to validate the mission.

To help mitigate risk, it is best to own these companies within a well-diversified portfolio.

About Legacy Bridge Private Family Offices: Protecting and Growing Your Life Worth

Legacy Bridge Private Family Offices exists at the intersection of a family, their enterprise and wealth—the very complex space where the rational and emotional often create ever-evolving dynamics that need to be understood and expertly managed. It is a challenging niche that we are passionate about and find incredibly fulfilling. We could not imagine a greater purpose and are honored to serve the families who view us as being their team.

The firm was founded by Michael T. Zuendel in 2015 with the purpose of challenging the status quo of an institutional corner of the family office industry that was growing increasingly complacent and lazy.

Everything we do is to ensure we provide compelling investment, advisory and family office solutions through the consistent delivery of an exceptional and engaging client experience.

It is our belief that through these efforts, the families we serve, their values and wealth will thrive across the span of generations.

Disclosures

The information presented is the opinion of Legacy Bridge, LLC., and does not reflect the view of any other person or entity. The information provided is believed to be from reliable sources, but no liability is accepted for any inaccuracies. This is for information purposes and should not be construed as an investment recommendation. The opinions expressed are subject to change without notice. Reliance upon information in this material is at the sole discretion of the reader. This information is not intended to be complete or exhaustive and no representations or warranties, either express or implied, are made regarding the accuracy or completeness of the information contained herein. This material may contain estimates and forward-looking statements, which may include forecasts and do not represent a guarantee of future performance. Past performance is no guarantee of future performance. Investing involves risks. Legacy Bridge LLC., is an investment adviser registered with the U.S. Securities and Exchange Commission.

The S&P 500 generally represents performance of 500 large companies listed on exchanges in the U.S. It is one of the most commonly followed equity indices. The MSCI ACWI captures Large and Mid-Cap representation across 23 Developed Markets (DM) and 24 Emerging Markets (EM) countries. With 2,921 constituents, the index covers approximately 85% of the global investable equity opportunity set. FactSet Research System is a financial data and software company that provides research for Wall Street professionals and individual investors.