

ROBO: Investing in Robotics & Automation

Robotics, automation, and artificial intelligence are entering all industries—now is the time to embrace this innovation

From the earliest agricultural machinery to today's high-speed welding robots used in manufacturing, we have been automating dull, dirty, and dangerous work for nearly a century. But the realms robotics have recently entered have far exceeded what humans previously imagined possible. Just as the Internet transformed how we work and communicate, robotics and artificial intelligence (AI) are changing the fundamental structure of sectors across the economy.

Drones are being used to survey the health of crops, surgical robots are conducting over one million procedures each year, and autonomous vehicles are making delivery treks. This is all being made possible due to the convergence of declining technology costs, increasingly reliable performance capabilities, and the availability of massive amounts of data fueling machine learning and intelligence.

For investors, the name of the game is to look toward the growth and disruption potential of the technologies of tomorrow. Since the ROBO Global Robotics & Automation Index was established in 2013, a dozen competing strategies have come to market around the world. ROBO Global is the only company that combines active research with industry experts to take a forward-looking view of the opportunities. Our index provides investors with pure-play exposure to best-in-class robotics and automation companies as well as enabling technologies.

Getting to this moment

When we first launched the ROBO index, many investors were not attuned to the expansive potential of robotics and automation beyond factory applications. Yet, we saw the signs forming and believed that it was just the beginning of a multi-decade transformation that would influence every aspect of how we, and future generations, live and work. The tremendous growth in robotics and automation is occurring due to a few key factors:

1. **Improving technology.** We see exponential advances and declining cost curves of key enabling technologies, from computing power to machine vision to voice recognition and machine learning, significantly expanding the scope of robotics and automation applications. Ongoing advances also create opportunities as previous generations of robots and technology must be upgraded.
2. **Wider deployment.** Robotics and automation are finding applications far beyond manufacturing, bringing greater efficiency to many diverse uses, including automated distribution centers, surgical robots, diagnostics tools, drones, and autonomous vehicles.
3. **Macro and social challenges.** These challenges include aging populations and a shortage of skilled workers, the need for greater crop productivity to feed a growing population, healthcare systems running at full capacity yet not reaching the entire population, slow productivity gains, and more recently automation solutions needed to serve a post-pandemic world.

How COVID-19 has accelerated the demand for robotics

While this technological revolution is still in its infancy, the COVID-19 pandemic has shed an enormous spotlight on the clear need for automation and robotics technology across all sectors of the economy. The turbocharging of digitization, the work-from-home culture, and the surge in demand for rapid e-commerce fulfillment and touchless deliveries have created clear gaps that only technology can fill.

The use of robotics and automation create safer and more efficient workplaces, from factories to hospitals to offices, and has been crucial to companies during the downturn. In these ways, we believe that COVID-19 has both validated and accelerated the investment case for robotics and automation. The ROBO index also has very little exposure to the sectors worst affected by the crisis: energy, travel, hospitality, and traditional retail.

Let's use logistics and supply chains as an example. According to McKinsey, it is now believed that 10 years of e-commerce adoption was compressed into just three months during 2020. This shift in consumer behavior is making it mandatory for retailers to incorporate automation and AI to keep up. In the not-too-distant future, people will be surprised to know that retail shops ever closed (with computer vision, robotics, and touchless payments), or that even highly customized items couldn't be created, shipped, and delivered in a short window.

This transformation also required the introduction of more logistics and warehouse automation for companies to stay above water when it came to order fulfillment. The e-commerce boom is just one of many examples of how robotics can be used in response to a changing world.

The modern corporate tale: Disrupt or be disrupted

Before the COVID-19 pandemic, corporate giants globally had understood this vision of the future, aggressively deploying capital to develop and acquire the technologies needed to take their businesses to the next level. The choice, they knew, was simple: disrupt or be disrupted. As companies rush to leverage and build on all that robotics and automation have to offer, the pace of acquisitions has continued to accelerate.

Capturing the complexities of the robotics revolution

Never have we seen such an explosive mix of exponential technological change, an abundance of disruption, and high levels of mergers and acquisitions. Since the initiation of the ROBO Global Robotics & Automation Index in 2013, 25 of its members have received takeover offers – reflecting the increasingly high value given to robotics, automation, and AI technologies by large companies.

The challenge for investors is how to best invest in this theme, as this is a highly unstructured universe of companies with rapid technological advances suddenly changing the landscape across the many areas of society where we see robotics and automation deployed.

Investors who hope to capture this complexity will seek superior risk-adjusted returns by building

a diversified portfolio of industry leaders across geographies, small and large companies, and technologies and applications. Additionally, they will rely on the guidance of industry experts, academics, and entrepreneurs to select tomorrow's growth leaders and to provide them with the knowledge and insights to more accurately foresee emerging

trends, identify the most promising new technologies, and understand the intricate interactions between technologies and their specific applications.

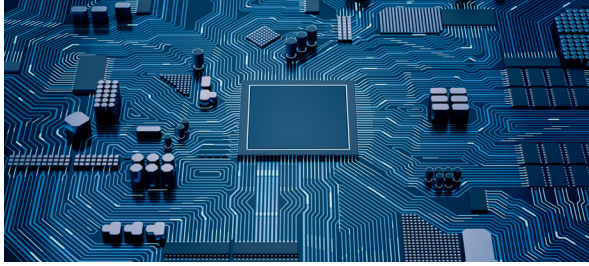


The exponential growth trends across robotics and AI are undeniable:

- AI market (applications and computing) is projected to generate \$410 Billion in revenue by 2025, up from \$70 billion in 2020 – **a CAGR of 43%**
- The industrial automation market value will reach an estimated \$384 billion by 2025, up from **\$158 billion in 2021.***
- The computer vision market's estimated value will be **\$29 billion by 2025**
- The healthcare AI market is projected to be valued at **\$51 billion by 2025**

Source: ROBO Global Research Estimates

*Grand View Research

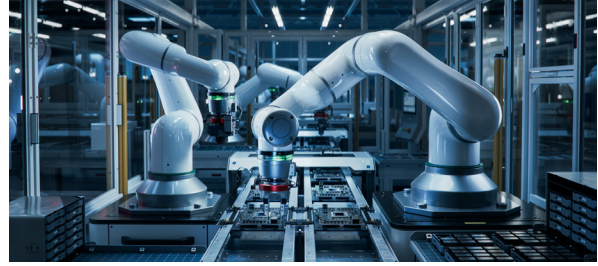


An index approach to investing in robotics & automation

Because robotics and automation cut across traditional industry classifications, we believe active research is essential for identifying best-in-class companies at the forefront of this theme. And because the theme targets rapidly growing areas of the economy, active research is vital in ensuring the index portfolio can evolve with the theme. A static index based solely on backward-looking data and historical business models, in contrast, may not capture the fast-changing dynamics of the markets involved.

Combining this active research with a transparent and rules-based systematic strategy implemented through an index of liquid securities helps to ensure that exposure to the theme is not subject to behavioral biases or unintended risks.

Today, it seems there's an investment product available to tackle nearly every theme and style an investor can dream up, providing more options to choose from than ever before. But understanding precisely what those options offer can be a challenge – even for experienced investors and portfolio managers. To decipher this complexity, it is important to investigate how the underlying index is constructed and how often it is rebalanced, along with the index turnover rate, performance history, and track record.



Not all portfolios are created equally. And that is precisely why those who choose to invest in disruptive technology would be wise to choose their investment vehicle carefully. While each may offer the opportunity to direct the portfolio toward robotics and AI, it's important to recognize that these products may pursue vastly different investment strategies, and some are significantly riskier than others. Certain funds invest in just a handful of large-cap stocks in the sector in the hope that these will be tomorrow's winners. And yet it's very possible – if not highly likely – that in today's dynamic environment, the largest players will change nearly as quickly as the technologies themselves. For that reason, a strategy that includes broad exposure to the global value chain may be a more prudent approach. This broad exposure may include not only large-cap participants, but also providers of both the key enabling technologies (sensing, computing, machine learning, actuation, etc.) and the applications that deliver capabilities in every industry (factory automation, surgical robotics, food and agriculture, 3D printing, logistics automation, and more).

For investors seeking a way to future-proof their portfolio with robotics and AI, these are the details that matter. At ROBO Global, we strive to deliver a research-driven portfolio, focused on providing long-term growth. The time to invest in all that robotics, automation, and AI have to offer is now, and investors would be wise to consider using the ROBO index as a means to gain diversified exposure to this innovation.

Conclusion

In our view there are many reasons to own a diversified collection of stocks in the robotics and automation theme:

- Robotics, automation, and artificial intelligence are going to have an impact on all industries. Now is the ideal time for investors to embrace these innovative technologies.
- The quality of the technology is improving exponentially.
- A combination of the global pandemic, an aging population, and worker shortages have accelerated the demand for robotics.
- Corporations must adapt to new technology or be left behind. AI is projected to see \$410 billion in revenue by 2025. It saw \$70 billion in 2020.
- The explosive mix of exponential technological changes, abundance of disruption, and high levels of mergers and acquisitions are unprecedented.
- ROBO is the index best positioned to capture the robotics & automation revolution.

To learn more about VettaFi Indexing click [here](#)

About VettaFi

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Significant investments and the backing of TMX Group have further strengthened our ability to help our partners by expanding our capability set and geographic reach.

Our combined strength and entrepreneurial spirit empowers us to deliver the specialized insights and services that enable asset managers and investors to achieve growth and success.

VettaFi owns and administers the ROBO Global Index Series. For more information, please visit: www.vettafi.com.

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About the Index. The ROBO Global Artificial Intelligence Index (ticker: THNQ) is an AI stock index constructed with the goal of providing broad investment exposure to a basket of global AI stocks. THNQ includes companies actively developing and leveraging tools and AI-powered engines to capitalize on new market opportunities accelerate their revenue growth. The Index and its trademarked name are the exclusive property of VettaFi.

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