



A robotic future: investing in robotics, automation and AI

Robotics is more than a futuristic concept, it's a theme playing out in our daily lives right now. With improving technology and a range of drivers, such as skill shortages and the aging population, we are only likely to see robotics become more integral to daily life. Investment in this sphere not only provides exposure to newer technology but some of the major trends influencing our future.

What is robotics?

The traditional face of robotics tends to be associated with systems like Boston Dynamics' Atlas the Robot or Hanson Robotics' Sophia, the world's first robot citizen, but there is more to the industry than humanoid robots.

ROBO Global, a provider of research, advice and investment indices in this field, define this industry as extending across robotics, automation and artificial intelligence (RAAI). ROBO Global is also the index provider of the ETFs ROBO Global Robotics and Automation ETF (ASX Code: **ROBO**).

Each aspect is classified as follows:

Robotics: the design, construction, operation and use of robots. Examples include iRobot's (NASDAQ: IRBT) Roomba or Intuitive Surgical's (NASDAQ: ISRG) da Vinci robotic surgery technology.

Automation: the operation or control of a process through electric devices with minimal human intervention. Examples include the industrial robots used by Toyota (TYO: 6201) since the 1970s as part of the manufacturing process covering welding, painting and assembly lines or more recently, the technology offered by Ocado (LON: OCDO) to companies like Coles (ASX: COL) to automate online grocery order fulfilment.

Artificial intelligence: the simulation of intelligence in machines, enabling them to 'think and learn'. A basic example is a system like Google Home or Amazon Alexa. Where it becomes interesting, is a system like Varian Medical Systems (NYSE: VAR) which uses artificial intelligence in the treatment of cancer and other medical

treatments.

There is a vast supply chain supporting this industry as well. For example, chip processors and computer vision are key to ongoing improvements in robotic technology and companies that specialise in this. Companies like Nvidia (NASDAQ: NVDA) and Ambarella (NASDAQ: AMBA), are likely to benefit from continued growth of this industry, even though it is not their sole source of revenue.

Drivers and trends for RAAI

The ongoing growth in the RAAI industry is fuelled by some of the major trends of our time, along with opportunities created by new and improving technology. Some of these growth drivers are outlined below.

New and improving technology and uses for technology

Constant tech advances are supporting increased use of and development of RAAI. For example, evolving sensing and graphic technology (along with the growing demand for big data) has allowed companies like Nvidia to create more sophisticated systems for use in artificial intelligence, allowing the ability to identify patterns, learn and even make decisions in a more human way (or in some cases, better). Another example is how sensing and precision technology has allowed for robotic surgery, such as the pioneering da Vinci technology.

While some of the advances are specific to the RAAI world, others, like fifth generation wireless (5G) are not, but they are still facilitating enormous growth and change in this industry. 5G is a technology infrastructure system allowing communications and data access on-the-go, much in the same way that previous generations including the currently used 4G offered.

5G means a range of things from an RAAI perspective. Superfast wireless connectivity could allow for smart city applications like cloud-based traffic control, completely automated warehouse systems, autonomous vehicles with the ability to make split-second data-based decisions, or even provide surgeons the potential

to operate on patients in another country. In fact, the last example was recently trialled in Italy with a surgeon testing 5G and robotic surgery on a cadaver patient 15km away¹.

From a supply chain perspective, 5G could provide enhanced ability to online grocery and shopping services for customers, with more employees operating remotely rather than within the warehouses. This particular ability became a focus across the COVID-19 pandemic to facilitate social distancing requirements (and lockdowns) and is becoming an expectation rather than a bonus for millions of customers now used to the convenience of online shopping and delivery.

Population aging

The number of people aged more than 60 years is projected to double by 2050 to nearly 2.1 billion people². What makes this significant is that this segment of the global population is growing at a faster rate than the younger age groups required to replace them in the workforce, as well as having implications for care requirements or even what industries and sectors become more prevalent in coming years.

RAAI forms part of the solution to managing the concerns of an aging population. For example, they can be used to support care activities ranging from social interaction needs to food and hygiene requirements. A simple example of this is the iRobot Roomba which could allow an elderly person to continue to have their home cleaned when they are unable to do so themselves. More advanced options might be 'nursebots' able to offer social interaction as well as personal care. There are early social interaction robots like Paro, Pearl or Pepper able to offer interaction for elderly patients³.

Skilled worker shortages and the need for increased efficiency and productivity

Skilled worker shortages are more than an issue caused by aging populations – it also relates to overall population growth (and in turn, increased demand for certain products and services) along with changing expectations for time, cost and quality. The human race is on a constant quest for better, faster and cheaper ways of life.

RAAI has long been part of industrial production. The ways we use that technology is becoming increasingly sophisticated and in demand. In 2021 alone, ROBO Global estimate the installed base of factory robots to exceed 3.2 million units⁴. RAAI is used both as an automation force in factories without humans, and in collaborative ways. For example, Amazon (NASDAQ: AMZN) uses Kiva robots to automatically pick and pack warehouse orders. From a collaborative perspective, Teradyne's (NASDAQ: TER) 'cobots' can take over repetitive, high precision tasks, allowing human workers to focus on more flexible activities or those requiring sophisticated thinking. Cobots are expected to represent 29% of the industrial robot workforce by 2030, compared to 5% in 2019⁵. Another example is the use of drones for inventory checks in warehouses; or for seeding and fertilising processes in commercial farms – not only a time consuming and monotonous task but also one with some risks for human workers in some settings who may be required to use machinery and safety equipment to scale heights.

While productivity and efficiency are drivers behind the use of cobots and industrial robots discussed above, they are also supportive of the growth in 3D printing technology allowing for cost-effective mass production of a range of goods. Companies like 3D Systems (NYSE: DDD), Stratasys (NASDAQ: SSYS) and Materialise (NASDAQ: MTL) were able to shift to support mass production of face shields and ventilators during the COVID-19 pandemic, but also have applications for industries from construction to agriculture.

Why invest in RAAI?

RAAI is one of the megatrends of our time and is becoming increasingly integrated and essential to our lives. Supported by increasingly sophisticated technology, this industry is expected to see significant growth in coming years. Some statistics around this follow:



The global artificial intelligence market is expected to reach US\$733.7bn by 2027⁶.



The global industrial automation market size is projected to reach US\$352bn by 2024⁷.



China is anticipated to be a major market for industrial robots in coming years, anticipated to be 45% of all industrial robot shipments in 2021⁸. Its robot density was 187 robots per 10,000 human employees in 2019, compared to Singapore at 918 or South Korea at 868⁹, offering enormous penetration potential.



Merger and acquisition activity has accelerated in recent years indicating increased value, scale and interest in this industry. In 2020, there were 107 deals totalling over US\$62bn compared to 97 deals valued at over US\$17bn in 2019¹⁰.

Interestingly, the COVID-19 pandemic has accelerated some of the existing RAAI trends, such as warehousing automation, and increased investment in this space.

RAAI is not highly represented in the Australian market, so Australian investors may find it valuable as an international growth exposure in their portfolios.

Using RAAI in a portfolio

RAAI is often viewed as a thematic investment, that is, an investment accessing major themes of the day. It can be used in a range of ways in a portfolio.

From a thematic perspective, investors may choose investments in RAAI to express both long-term strategic or short-term tactical views on the growing trend towards integrating robotics, automation and artificial intelligence into industry and daily life.

Alternatively, it could also be used as a core exposure to complement existing technology sector allocations with tech-aligned companies.

Investors could also view it as a portfolio diversifier to emerging industries that are largely absent from the Australian market.

Ways to invest in RAAI

There are a range of ways to access the RAAI industry.

Investors could consider direct shares in RAAI companies (such as Materialise) or in companies with RAAI exposure (such as Toyota Industries). Direct shares can be complicated to access in some jurisdictions and require in-depth research and analysis. Risks can also be high, and it is difficult to pick a 'winner' in an emerging and complex space.

As a unique industry falling across sectors, investors may find a managed investment, be it an actively managed fund or a passive option like an ETF, can assist in alleviating some of these challenges - managing the research and analysis to identify relevant companies, providing diversification across companies to reduce company specific risks and providing on-going portfolio maintenance. ETFS ROBO Global Robotics and Automation ETF (ASX Code: **ROBO**) offers investors exposure to robotics, automation and artificial intelligence in areas such as manufacturing, 3D printing, logistics and security along with access to the expertise and research of ROBO Global, which works with a strategic advisory board of industry experts from leading universities and pioneering RAAI companies.

For more information on ETFS ROBO Global Robotis and Automation ETF (ASX Code: **ROBO), please speak to ETF Securities.**

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