

## Investing in robotics

*Eric Siegloff and Xander Wheen*

Visions of the future often depict a world full of robots that help us around the house, that drive us autonomously and that run entire production lines. For some time now, those visions have been realised in factories around the world where advanced mechanization has revolutionised the production line as a natural evolution towards greater efficiency and productivity. Robotics has become a familiar investment theme, both in specialised funds or an asset in more diversified funds such as the Nanuk New World Fund which is exposed to a broad theme of environmental sustainability and resource efficiency. At a portfolio level, robotics fits within the industrial efficiency sector.

We think of robots as machines which are programmed to perform a complex series of actions. They can vary dramatically in size and application, they typically operate in an autonomous manner with limited human guidance and they are often housed in cages for safety reasons. We have seen the rise of the collaborative robot, or 'cobot', which is designed to perform specific tasks in physical interaction with humans in a shared workspace. They are typically smaller in size, having built-in sensors which enable them to safely work alongside humans and receive human instruction.

### **A virtuous cycle of economies of scale**

Robot adoption is underpinned by faster business cycles, more flexible business and service models and more rapid response to customer needs. New generation robots are more connected, more flexible and more precise. Key to this is the development of artificial intelligence and machine vision, which is allowing machines to navigate physical space and adapt to non-standard objects. This pushes robots from being limited to a production line and a repeatable action – for instance, attaching a bottle cap – to moving around a warehouse, for example.

In late 2017 the International Federation of Robotics forecast that 1.3 million industrial robots will be installed in factories around the world in the 3 years spanning 2018 to 2020. This would bring the worldwide stock of industrial robots to 3 million units by 2020. Notably, robot adoption across small and medium enterprises is seen as a developing trend.

While strong growth in robotics is evident, the cost of components of a robot are rapidly declining, such as the massive drop in the cost of computing power and related core components. Since 2010, the average robotics sensor cost has dropped by 50% and the cost of lithium-ion batteries has fallen 75%.

Emerging applications such as cobots are growing at double digit figures. For example, Teradyne, a company that makes automatic test equipment, has seen cobot revenue grow 6.5 times over the last four years. This growth has been driven by cost competitiveness in manufacturing hubs, particularly in China. As cobots become cheaper, they're gaining market share and this enables a virtuous cycle of increased economies of scale.

### **Where does robotics fit as an investment?**

At the industry level, there are three broad themes for consideration:

1. Robotics is experiencing strong structural growth, a prospective good source of investment opportunity.
2. The focus is both narrow (traditional industrial robots) and wide (new technologies such as cobots, coupled with a larger range of emerging applications growing even faster).
3. These emerging applications are having a more direct impact on people's everyday lives, moving beyond the factory and into the home.

A great example of a robotics application beyond production lines is in the area of logistics, where their deployment has been critical to the rise of ecommerce, allowing denser, more efficient warehousing and expedited order fulfilment. Amazon, for instance, now only requires one minute of employee time per order it ships. Amazon and Dematic have bought logistics robot companies over the last few years. Extending the concept further is Ocado, the online supermarket that runs giant automated warehouses that can support \$A2 billion in sales. Ocado's most advanced, large warehouse operation contains a 3-dimensional grid around which 1000 robots, all controlled by a sophisticated algorithm, select and place items into customers' shopping baskets. As warehouses become more automated, the idea of a 'dark warehouse', where there is no need for lighting because the only workers are robots, comes to mind.

Medical robotics is another key application seeing tremendous growth. Intuitive Surgical is a US company that pioneered medical robotics in 1995 for minimally invasive surgery. Its main product, the 'da Vinci' Surgical System, has been utilised in a variety of surgeries including urology and gynaecology for over three million patients already. The product has been amazingly successful in improving patient outcomes and its market share in its core applications is up to 90%. Although the industry is still quite nascent, new players are joining the medical robotics market such as the joint venture Verb Surgical, a collaboration between Google and Johnson & Johnson.

Finally, robot applications are reaching and becoming more common in the consumer market. IRobot's Roomba robotic vacuum cleaner was once seen as a gimmick for the 'tech-obsessed', but you can now find the cleaner in 11 million US households. The robotic vacuum market is growing by 18% per annum, while traditional vacuums are growing at just 5%. Vacuum is far from the only household task amenable to automation: robotic lawnmowers are already available and development on further applications is well underway.

### **The broad investment opportunity**

We're seeing robots move from industrial applications to consumer applications in our homes. We're seeing strong trend growth at a global level for both these end markets. We're seeing greater sophistication and application of technologies. And we're seeing sharp declines in the cost of making robots, leading to rising affordability and a prospective virtuous circle of demand and production.

Robots are becoming cheaper, faster, safer, smarter, more applicable and nimble day by day. This is attractive to us as fundamental investors. The investment challenge is to find the right companies in the right area at the right time, and to benefit from the robotics thematic as it plays its part in the global transition towards a 'new world' of more environmentally sustainable and resource efficient activities in the decades to come.

*Eric Siegloff is CEO and Xander Wheen is an Investment Analyst at [Nanuk Asset Management](#).*

*Disclosure: The Nanuk New World Fund is invested in companies mentioned in this paper.*

*Feb 2018*



*Eric Siegloff, CEO*



*Xander Wheen, Analyst*