

Can Robots Complement the Workforce?

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A continually tight labour market has seen staffing costs increase and assume a larger portion of business costs. This has placed additional pressure on companies to pass rising wage costs to consumers especially in the service industries such as hospitality, healthcare, and food and beverage (F&B).

Singapore's Consumer Price Index (CPI) shows that core inflation has risen to 2% in March from 1.6% in February 2014.¹ Food and recreation costs, which accounted for 38% of the CPI basket, had risen to 2.9% and 2.5%, from 2.3% and 1.5%, respectively, in February 2014. Healthcare costs also grew by 3.4% while tuition and other fees rose by 3.4%.²

Speaking at a lunch dialogue with European business leaders, Trade and Industry Minister Lim Hng Kiang said: "We have to acknowledge that, over time, Singapore cannot be a first world economy with third world costs."³ He added that Singapore, which is in the midst of economic restructuring, would move towards higher value-added activities and at the same time develop greater innovative capabilities.⁴

In this context, how could manpower costs be reduced as we strive towards a knowledge-based economy underpinned by innovation and efficiency? Could the use of robots — devices that automatically perform complicated but repetitive tasks — play a bigger role in the Singapore economy because of the need to reduce the inflow of foreign labour and human capital?

To date, robots have mainly been used in manufacturing assembly plants, especially the automotive industry. But the science of robotics has come a long way. In increasingly service-oriented economies such as Singapore, robots could have critical uses such as staffing for unpopular shift timings in the hospitality and retail industry. Service robots could also be useful in reducing dangers to human health for jobs, which have significant exposure to hazards and risks.

1. Wong Wei Han, "Core inflation set to rise further as manpower costs increase", *Today*, 24 April 2014.

2. Ibid.

3. Alvin Foo, "S'pore can't have first world economy, third world costs", *The Straits Times*, 6 May 2014.

4. Ibid.

Advancement in Robotics

Since its founding in the 1960s, the field of artificial intelligence from which academic robotics is developed has progressed a good distance. However, while computers that form the main part of artificial intelligence can easily undertake tasks that most humans find difficult, such as playing chess — generalised intelligence such as seeing, understanding and planning which humans do daily is most difficult to achieve.⁵ Research and development in the advancement of robotics is costly and initiatives to spur creativity and advancement in the field, such as the annual Robotic Challenge by the Defense Advanced Research Projects Agency (DARPA), a Pentagon research agency, are useful.

Robot makers have benefited from improvements in technology, especially in computing power and sensor technology. For example, the Kinect sensor developed at Microsoft for the Xbox games console released in 2010 has been used to create robots that can map and navigate their surroundings. A shopping mall in Osaka, Japan, has been wired up with sensors set up by Japan's Advanced Telecommunications Research Institute International to instruct robots on spotting shoppers, and giving these shoppers leaflets and directions.⁶

There is good traction for robotics as a global industry. In 2002, a company iRobot developed two products called Packbot to help soldiers deal with improvised explosive devices and the Roomba to clean floors. The company sold more than eight million of these units and the Roomba comprised 88% of the total sales volume for the company.⁷ Over the last few years, more robotics companies have been publicly listed and in 2012, Amazon bought over Kiva systems, a company which produces robots for warehouses. In addition, Google has shown a great interest in robotics and the company's expertise in dealing with huge amounts of data is an advantage. For example, by drawing on the computing power of its cloud-based systems, its robots and others should be able to undertake more tasks.

How will Robots Affect Employment?

Some analysts estimated that by the end of this century, automation through robots would replace 70% of current occupations by the end of this century.⁸ This could displace workers in countries that have a significant low-cost workforce, such as China.⁹ However, in maturing western economies and countries with relatively higher wages like Singapore, the low cost of robot workers could enhance their attraction due to better infrastructure for high tech production.¹⁰

⁵. Oliver Morton, "Immigrants from the future", Special Report Robots, *The Economist*, 29 March 2014.

⁶. Ibid.

⁷. Ibid, p.8.

⁸. Kevin Kelly, "Better Than Human: Why Robots Will – And Must –Take Our Jobs", *WIRED*, 24 December 2012.

⁹. Alex Knapp, "What Happens When Robots Replace Cheap Labor", *Forbes*, 15 August 2011.

¹⁰. Ibid.

It is worthwhile to consider if robots could be the answer to or at least, an option for low cost labour in Singapore's tight labour market. Small and medium enterprises (SMEs) in Singapore have complained about the shortage of and higher costs of employing foreign labour.¹¹ Could the use of robots alleviate their manpower crunch, bring jobs back from lower manpower cost countries and help launch a manufacturing renaissance locally?

In a study by a consultancy company called Metra Martech,¹² SMEs are 20 to 100 times less likely to use robots than large companies.¹³ Therefore, the SME market could be an important one if the right type of robots and government incentives were offered, which in turn could increase efficiency and productivity. The cost of a robot for SMEs — even those in the service sector — is relatively cheap at less than S\$40,000. For example, Baxter is a two-armed quasi-humanoid type robot sold by Rethink for around S\$33,000, and can be easily adapted to several packaging and assembly tasks. In addition, Baxter can also be reprogrammed by its owner to make a cup of coffee using a kitchen coffee-maker without having to use a key board.¹⁴

In addition, NASA the space agency in its partnership with General Motors (GM) has produced Robonaut2 that is equipped with “an array of sensors and dexterous five-fingered hands” to initially handle “menial jobs such as cleaning the space station and assisting humans in space operations”.¹⁵ These robots could be adapted to fulfil tasks such as rubbish collection, cleaning buildings, roads and pathways as well as maintaining gardens and pruning trees.

Conclusion

In order to incentivise Singapore businesses to look seriously towards the use of robots, the enhanced Productivity and Innovation Credit (PIC) Scheme could be used for this purpose. The PIC scheme is meant to encourage companies to invest in innovation and productivity improvement. One of the six qualifying activities under the PIC is for the purchase or lease of automation equipment. Under the SME-specific incentives programme that is managed by SPRING, the Innovation and Capability Voucher (ICV) and Technology Innovation Programme (TIP) could be used to introduce the use of robots to SMEs. One of the purposes of the ICV is to assist SMEs to upgrade their business in terms of innovation; and the TIP is used to co-fund technology projects that could lead to new products or processes.

¹¹. “A mighty contest: Job destruction by robots could outweigh creation”, *The Economist*, 29 March 2014.

¹². Metra Martech is a specialist marketing and market research consultancy. Based in London, the company has been established for over 50 years. The company is the result of a management buy-out in 1989 from the SEMA/SOFRES Group.

¹³. Peter Gorle and Andrew Clive, “Positive Impact of Industrial Robots on Employment”, IFR International Federation of Robotics, Metra Martech, 21 February 2001, pp.39–41.

¹⁴. “A mighty contest: Job destruction by robots could outweigh creation”, *The Economist*, 29 March 2014.

¹⁵. Judith Aquino, “Nine jobs that humans may lose to robots”, *Business Insider*, n.d.

Under the ICV, the use of robots as part of SMEs' overall business strategy shows a commitment to technology innovation.

If robots are allowed to play a key role in helping to increase productivity and efficiency among SMEs through innovative means, this could be a life-saver in reducing business costs for SMEs, especially micro SMEs. The use of robots especially in the service sector would also spur local creativity and more innovation because these robots need to be serviced and maintained and perhaps adapted to the Singapore surroundings. Constant adaption and innovation in robotics will also have a spill-over effect in other areas such as computing, transportation and healthcare, and could increase the momentum in Singapore for restructuring into a knowledge-based economy.

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