



Rise of The Robots

WHY NO INVESTOR SHOULD IGNORE THE ROBOTICS REVOLUTION

By Jason Conway
BNY Mellon Investment Management

Robotic advances once seen as science fiction pipe dreams are becoming increasingly real.

Global technological advances could signal the dawn of a robot revolution as automated mobile machines move beyond the factory floor into our everyday lives. Here, we assess the financial and social benefits advanced robotics could bring to the global economy.

In November 2014 a European robot space probe, Philae, successfully landed on a comet over 300 million miles from Earth, as part of the ambitious Rosetta space mission. This historic breakthrough afforded a glimpse of what advanced robotics can already achieve and what might be achievable in the future.

Back on Earth the use of robotics has steadily spread from its early use in car manufacturing lines to encompass an ever growing range of applications in healthcare, education, industry and even farming and leisure. In a world where driverless cars are no longer mere fantasy, robotic advances once seen as science fiction pipe dreams are becoming increasingly real.

At the Starwood Hotel in Palo Alto, California robot butlers now bring guests clean towels¹ and robot vacuum cleaners are winning new sales across Europe and the US. Jibo, the latest 'family robot' designed by Massachusetts Institute of Technology (MIT) robotics expert Cynthia Breazeal is designed to act as a household personal assistant. It can even recognise and acknowledge different family members and read stories to children.² At a more prosaic level, heavy duty robots make up an increasingly large part of the global industrial workforce.

¹ Automation is on the rise: will robots soon be commonplace? Forbes. 11.04.14

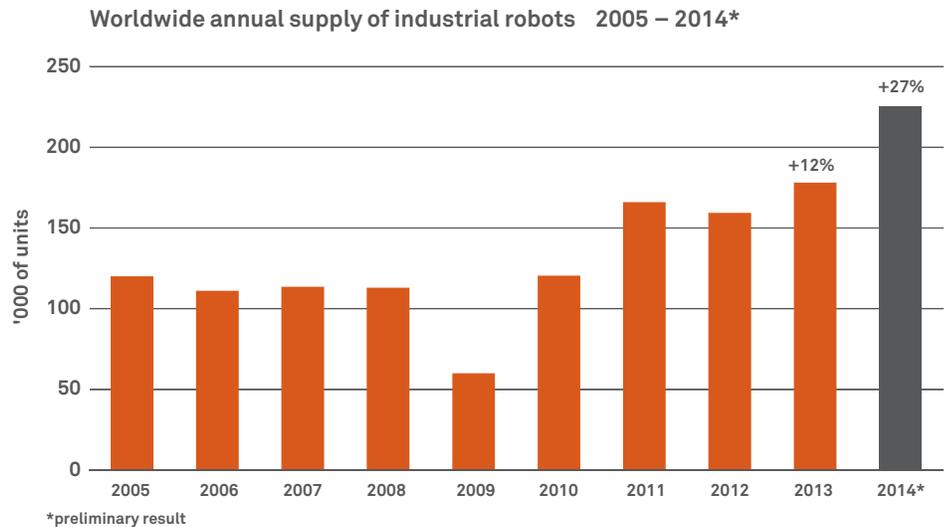
² Jibo Mail Online. 16.07.14



BNY MELLON

Sales of all types of robots for domestic tasks could reach almost 23.9 million units from 2014-17 with an estimated value of \$6.5 billion.

Figure 1: ROBOT SUPPLY, 2014



Source: IFR Statistical Department

BIG BUSINESS

Robotics has become big business. According to industry trade body the International Federation of Robotics (IFR), robot sales reached 178,132 units in 2013 — by far the highest level ever recorded for one year.³ Since then, based on the latest preliminary results of the global statistics on industrial robots, the IFR also estimates that about 225,000 units were sold in 2014, 27% more than in 2013⁴ and the Federation predicts sustained market growth in the next three years. The automotive industry is currently the most important customer of industrial robots with healthcare increasingly considered one of the biggest potential markets for robotics.⁵

The IFR report projects that sales of all types of robots for domestic tasks could reach almost 23.9 million units from 2014-17 with an estimated value of US\$6.5bn. About three million robots for education and research alone are expected to be sold during this period.⁶

In Japan the business of robotics is taken seriously enough for Japanese prime minister Shinzo Abe to pledge to make robots a pillar of the country's growth plan. Earlier this year he announced a new drive to treble the Japanese robot market by 2020, even suggesting the country should organise its own robot Olympics.⁷

On the development front Japanese manufacturers such as Fanuc, Yaskawa, Kawasaki Heavy Industries and the advanced medical service provider Cyberdyne are all major players working to reinforce Japan's reputation as a center of global excellence in commercial and civil robotics.

Abe's faith in the market is based on hard business reality and export potential. China has become the world's biggest buyer of robots — thanks to spiraling wage costs and growing competition from other emerging economies⁸ and represents a huge potential market.

3 World robotics 2014 – industrial robots. IFR. 04.06.14.

4 Global Robotics Survey: Industrial Robot sales go through the roof Exceeding demand from Asia. IFR Press Release. 23.01.15

5, 6 World robotics 2014 – industrial robots. IFR. 04.06.14.

7 Japan aims to turn robotics into profit. FT. 08.10.14.

8 China becomes largest buyer of industrial robots. FT. 01.06.14.

Commenting on Chinese market needs and potential Japanese opportunity Miyuki Kashima, head of Japanese equity investment division at BNY Mellon Asset Management Japan Limited says: “China’s current global role as a major manufacturer creates a potentially huge market for robotics and this is one of the few areas where the Japanese still lead. Japan may have lost some of its market share for finished end products but it still has a strong market share in making the machines that physically manufacture these.”

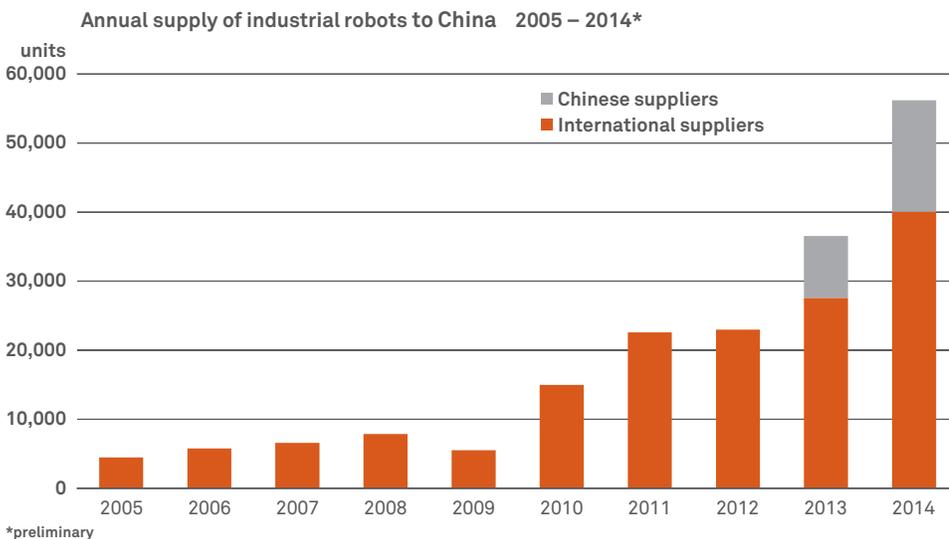
DOMESTIC UPGRADE

According to Kashima there are also some pressing domestic reasons for Japanese industry to invest in robotics. Economic conditions in the so-called lost era of Japanese deflation gave manufacturers little incentive to reinvest in their businesses. She adds that in many cases these companies increasingly rely on ageing, equipment and technology well overdue an update and feels Abe’s latest initiative could go some way to helping address this issue.

“In some ways it is natural the Japanese government wants to boost growth in automation, technology and robotics,” she says, “as from a demographic perspective the working population of Japan peaked a number of years ago and can only decline. Many manufacturers deferred investing in new equipment during the deflationary years so a lot of their infrastructure needs replacing anyway. With deflation ending many companies are starting to think about replacing old equipment or if there is any investment made in new technology considering whether they adopt automated solutions instead of people.”

The rise of the robots could ultimately deliver positive benefits to the investment management community and increase returns for their underlying investors.

FIGURE 2: CHINA 2014: MORE THAN 56,000 NEW ROBOTS



Source: IFR Statistical Department

The rise of the robots could ultimately deliver positive benefits to the investment management community and increase returns for their underlying investors. Commenting, Newton global strategist Peter Hensman points to the potential created by exciting new advances in technology. “Technology is advancing rapidly and some robots are already becoming phenomenally capable and sophisticated,” he says.

“Global Positioning System (GPS) based technologies, advanced sensors and laser guidance systems are helping to make robotic technologies safer and ever more reliable. While we wouldn’t like to put a figure on the economic growth potential for the robotics sector there is no doubt this is a major area of interest for investors.”

Much depends on how the human perception of robots changes as they become more sophisticated and tailored to everyday use.

INVESTMENT ENIGMA

The Boston Company Asset Management (TBCAM) is also keeping a watching brief on developments in this sector. However, TBCAM senior research analyst David Borah, points out the sector is still at a fairly early stage in its development in the US and European markets. He agrees accurately valuing its potential investment opportunities can prove somewhat challenging.

“A problem robotics shares with many new technologies is that the market is so nascent. Some of the new technologies involved can require so much investment their market potential is difficult to assess. While the size of the market and its potential are vast there are uncertainties over how much it will cost companies to enter the sector and be competitive,” says Borah.

Despite these potential drawbacks there is no shortage of practical use for robots in the US. TBCAM’s senior research analyst Brian Duncan adds that the US automotive industry continues to see major automation and the healthcare sector is adopting robots which allow for greater precision surgery in the operating theater.

ACCELERATING TREND

At a global level the IFR says the trend towards automation is accelerating, driven by increased global competitiveness and the need to boost productivity and quality while expanding production lines. While automation can threaten some jobs it argues robots can actually improve the quality of work by taking over dangerous, tedious and dirty jobs that are not possible or safe for humans to perform.⁹

As robots become a more common feature of our work and lives, a potential hurdle is how comfortable people feel interacting with increasingly able bodied, intelligent and responsive machines. In the healthcare sector such machines could offer valuable support and, perhaps, greater independence to frail and elderly people in an increasingly aging developed world, but their application remains a sensitive issue.

According to Hensman, much depends on how the human perception of robots changes as they become more sophisticated and tailored to everyday use. “This is a sensitive area,” he says. “How would people feel if their healthcare assistant was a robot? Perhaps not terribly comfortable. However, attitudes can change. People would once have been very uncomfortable with voice recognition systems but these applications are now commonly used by many without a second thought. A lot depends on perception and comfort with these new concepts.”

While economies must weigh these and other considerations while striving to maintain a healthy balance between automation with human employment, there is little doubt robots are here to stay and can only become more advanced. While the investment potential of this sector is yet to be fully realized, it continues to present some fascinating prospects for future development and further technological progress ahead.

9 World robotics 2014 – industrial robots. IFR. 04.06.14.

BNY Mellon Investment Management is one of the world's leading investment management organizations and one of the top U.S. wealth managers, encompassing BNY Mellon's affiliated investment management firms, wealth management organization and global distribution companies. BNY Mellon is the corporate brand of The Bank of New York Mellon Corporation and may also be used as a generic term to reference the Corporation as a whole or its various subsidiaries generally.

The information in this document is not intended to be investment advice, and it may be deemed a financial promotion in non-U.S. jurisdictions. Accordingly, where this document is used or distributed in any non-U.S. jurisdiction, the information provided is for Professional Clients only. This material is not for onward distribution to, or to be relied upon by, retail investors.

Any statements and opinions expressed in this document are as of the date of the article, are subject to change as economic and market conditions dictate, and do not necessarily represent the views of BNY Mellon or any of its affiliates. The information contained in this document has been provided as a general market commentary only and does not constitute legal, tax, accounting, other professional counsel or investment advice, is not predictive of future performance, and should not be construed as an offer to sell or a solicitation to buy any security or make an offer where otherwise unlawful. The information has been provided without taking into account the investment objective, financial situation or needs of any particular person. BNY Mellon and its affiliates are not responsible for any subsequent investment advice given based on the information supplied. This document is not investment research or a research recommendation for regulatory purposes as it does not constitute substantive research or analysis. To the extent that these materials contain statements about future performance, such statements are forward looking and are subject to a number of risks and uncertainties. Information and opinions presented in this material have been obtained or derived from sources which BNY Mellon believed to be reliable, but BNY Mellon makes no representation to its accuracy and completeness. BNY Mellon accepts no liability for loss arising from use of this material. If nothing is indicated to the contrary, all figures are unaudited.

Any indication of past performance is not a guide to future performance. The value of investments can fall as well as rise, so you may get back less than you originally invested.

This document is not intended for distribution to, or use by, any person or entity in any jurisdiction or country in which such distribution or use would be contrary to local law or regulation. This document may not be distributed or used for the purpose of offers or solicitations in any jurisdiction or in any circumstances in which such offers or solicitations are unlawful or not authorized, or where there would be, by virtue of such distribution, new or additional registration requirements. Persons into whose possession this document comes are required to inform themselves about and to observe any restrictions that apply to the distribution of this document in their jurisdiction. **The investment products and services mentioned here are not insured by the FDIC (or any other state or federal agency), are not deposits of or guaranteed by any bank, and may lose value.**

This document should not be published in hard copy, electronic form, via the web or in any other medium accessible to the public, unless authorized by BNY Mellon Investment Management.

This document is approved for Global distribution and is issued in the following jurisdictions by the named local entities or divisions: **UK and in mainland Europe (excluding Germany):** BNYMIM EMEA, BNY Mellon Centre, 160 Queen Victoria Street, London EC4V 4LA. Registered in England No. 1118580. Authorized and regulated by the Financial Conduct Authority. • **Germany:** Meriten Investment Management GmbH which is regulated by the Bundesanstalt für Finanzdienstleistungsaufsicht. • **Dubai, United Arab Emirates:** Dubai branch of The Bank of New York Mellon, which is regulated by the Dubai Financial Services Authority. This material is intended for Professional Clients only and no other person should act upon it. • **Singapore:** BNY Mellon Investment Management Singapore Pte. Limited Co. Reg. 201230427E. Regulated by the Monetary Authority of Singapore. • **Hong Kong:** BNY Mellon Investment Management Hong Kong Limited. Regulated by the Hong Kong Securities and Futures Commission. • **Japan:** BNY Mellon Asset Management Japan Limited. BNY Mellon Asset Management Japan Limited is a Financial Instruments Business Operator with license no 406 (Kinsho) at the Commissioner of Kanto Local Finance Bureau and is a Member of the Investment Trusts Association, Japan and Japan Securities Investment Advisers Association. • **Australia:** BNY Mellon Investment Management Australia Ltd (ABN 56 102 482 815, AFS License No. 227865). Authorized and regulated by the Australian Securities & Investments Commission. • **United States:** BNY Mellon Investment Management. • **Canada:** Securities are offered through BNY Mellon Asset Management Canada Ltd., registered as a Portfolio Manager and Exempt Market Dealer in all provinces and territories of Canada, and as an Investment Fund Manager and Commodity Trading Manager in Ontario. • **Brazil:** this document is issued by ARX Investimentos Ltda., Av. Borges de Medeiros, 633, 4th floor, Rio de Janeiro, RJ, Brazil, CEP 22430-041. Authorized and regulated by the Brazilian Securities and Exchange Commission (CVM). The issuing entities above are BNY Mellon entities ultimately owned by The Bank of New York Mellon Corporation.

BNY Mellon Cash Investment Strategies is a division of The Dreyfus Corporation. • BNY Mellon Western FMC, Insight Investment Management Limited and Meriten Investment Management GmbH do not offer services in the U.S. This presentation does not constitute an offer to sell, or a solicitation of an offer to purchase, any of the firms' services or funds to any U.S. investor, or where otherwise unlawful. • BNY Mellon Western Fund Management Company Limited is a joint venture between BNY Mellon (49%) and China based Western Securities Company Ltd. (51%). The firm does not offer services outside of the People's Republic of China. • BNY Mellon owns 90% of The Boston Company Asset Management, LLC and the remainder is owned by employees of the firm. • The Newton Group ("Newton") is comprised of the following affiliated companies: Newton Investment Management Limited, Newton Capital Management Limited (NCM Ltd), Newton Capital Management LLC (NCM LLC), Newton International Investment Management Limited and Newton Fund Managers (C.I.) Limited. NCM LLC personnel are supervised persons of NCM Ltd and NCM LLC does not provide investment advice, all of which is conducted by NCM Ltd. Only NCM LLC and NCM Ltd offer services in the U.S. • BNY Mellon owns a 20% interest in Siguler Guff & Company, LP and certain related entities (including Siguler Guff Advisers LLC).

The Alcentra Group
ARX Investimentos Ltda
BNY Mellon Cash Investment Strategies
BNY Mellon Western Fund Management
Company Limited
The Boston Company Asset Management, LLC
CenterSquare Investment Management, Inc.
CenterSquare Investment Management Holdings, Inc.
The Dreyfus Corporation
EACM Advisors LLC
Insight Investment
Mellon Capital Management Corporation
Meriten Investment Management
The Newton Group
Siguler Guff & Company LP
Standish Mellon Asset Management Company LLC
Walter Scott & Partners Limited



BNY MELLON