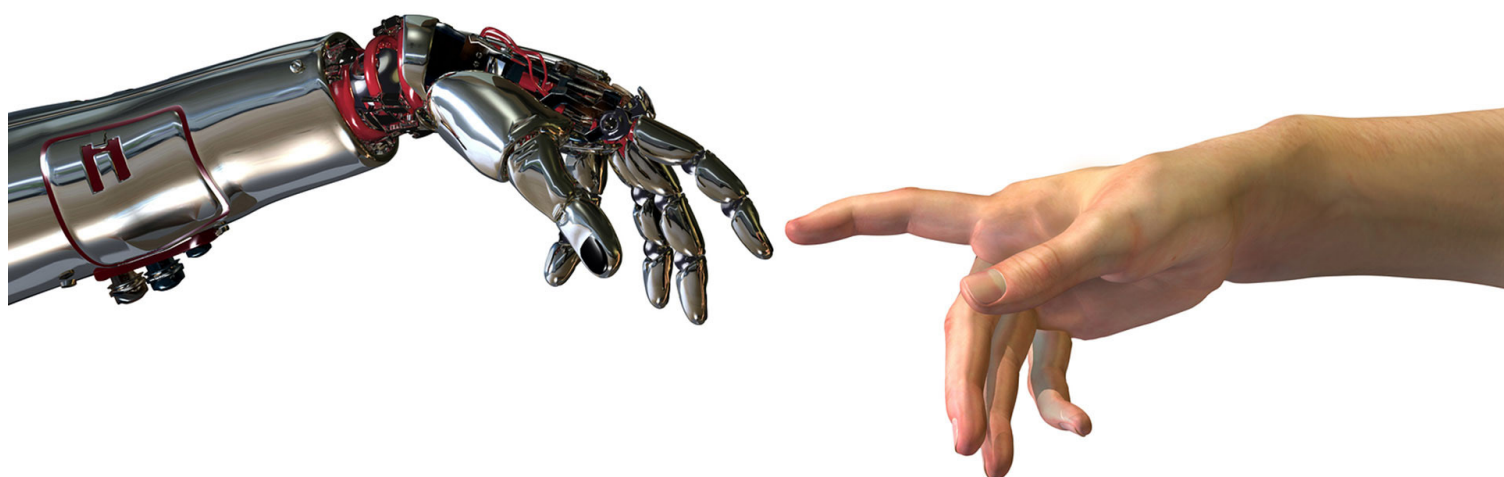


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No. 31/2016

Pekka Neittaanmäki, Anthony Ogbechie

Industrial and Service Robots



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ABOUT THE PROJECT

The definition of a service robot as proposed by the International Federation of Robotics (IFR) states that a service robot is one which operates semi- or fully autonomously to perform services useful to the well-being of humans. Service robots may be classified into industrial, domestic or scientific. Service robots in today's world of disruptive technologies are at an inflection point, thus the service and industrial robot phenomena hold capabilities that could open new contexts for productivity potentials. In this brief presentation, we delve into a generic overview of the industrial and service robot phenomena. The aim of this presentation is to spark interest on the ongoing trends and developments within the industrial and service robot field of study.

This report was conducted under the Platform Value Now project funded by Finland's Strategic Research Council. Platform Value Now will focus on understanding the fast emerging platform ecosystems, their value creation dynamics and requirements of the supportive institutional environment. We will analyze ecosystems with systems tools and develop new methods for platform-centric ecosystems management. Data collection is based on active scanning of global technology and platform ecosystems and fast solution oriented case experiments with Finnish corporations and policy planners. The aim of the project is to operationalize the collected understanding into a Platform Profile framework that will enable more efficient method and tool development for ecosystem management.

Rise In Industrial And Service Robots

- The market for Industrial and service robotics is growing. Service robots have been employed in industrial settings for many years, with a steep increase in recent years. Service robots for domestic use are still under development, but they are catching up.



CLASSIFICATIONS

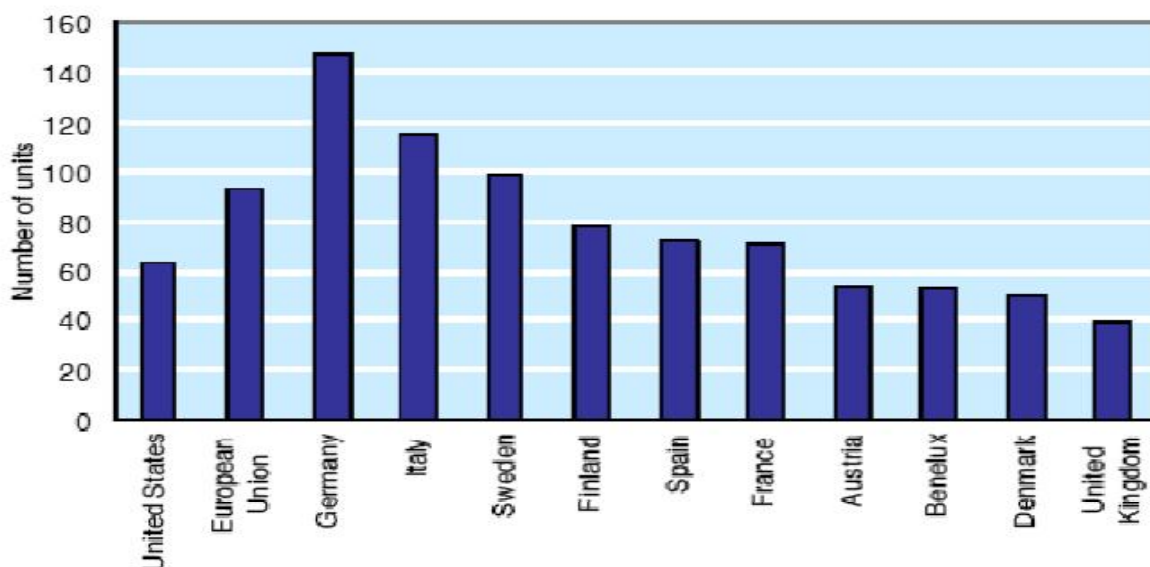
- According to the Robotic Industries Association, an *industrial robot* is an automatically controlled, reprogrammable, multipurpose manipulator programmable in three or more axes which may be either fixed in place or mobile for use in industrial automation applications. The first industrial robot, manufactured by Unimate, was installed by General Motors in 1961. Thus industrial robots have been around for over four decades.
- According to the International Federation of Robotics, another professional organization, a *service robot* is a robot which operates semi or fully autonomously to perform services useful to the well being of humans and equipment, excluding manufacturing operations.
- *Personal robots* are service robots that educate, assist, or entertain at home. These include domestic robots that may perform daily chores, assistive robots (for people with disabilities), and robots that can serve as companions or pets for entertainment.

Significance Of This Area Of Study

- As our population ages and the number of wage earners becomes a smaller fraction of our population, it is clear that robots have to fill the void in society. Industrial, and to a greater extent, service robots have the potential to fill this void in the coming years (Vijay Kumar, George Bekey, Yuan Zheng, 2008)



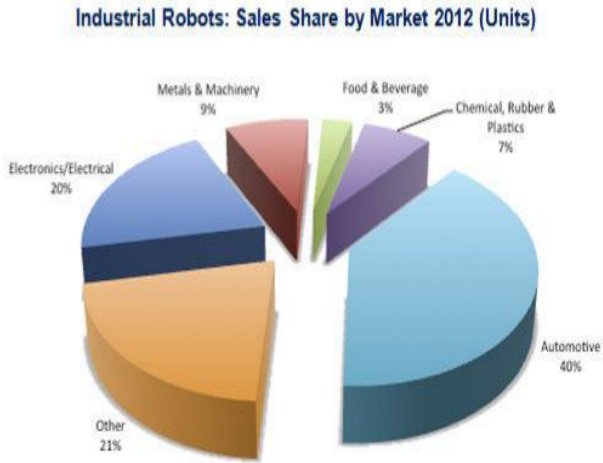
Global Key Figures



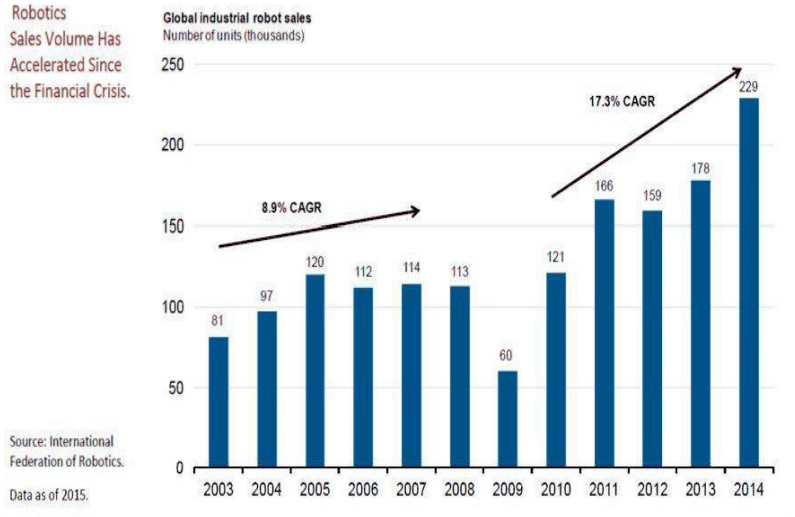
- Number of Industrial Robots for every 10,000 human worker by Country (Vijay Kumar, George Bekey, Yuan Zheng, 2008)

Sales Trends (Industrial Robots)

Industrial Robot Sales (2012)

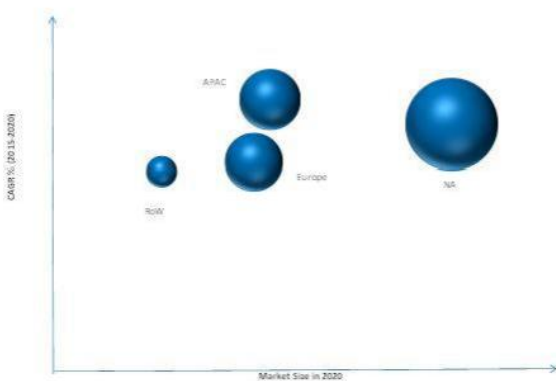


Trends in Robot Price and Performance

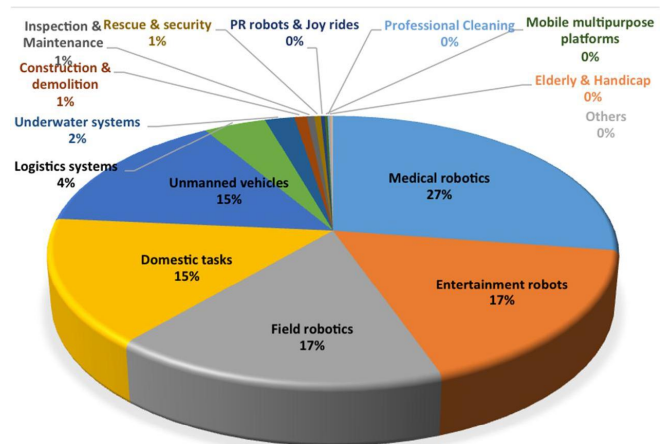


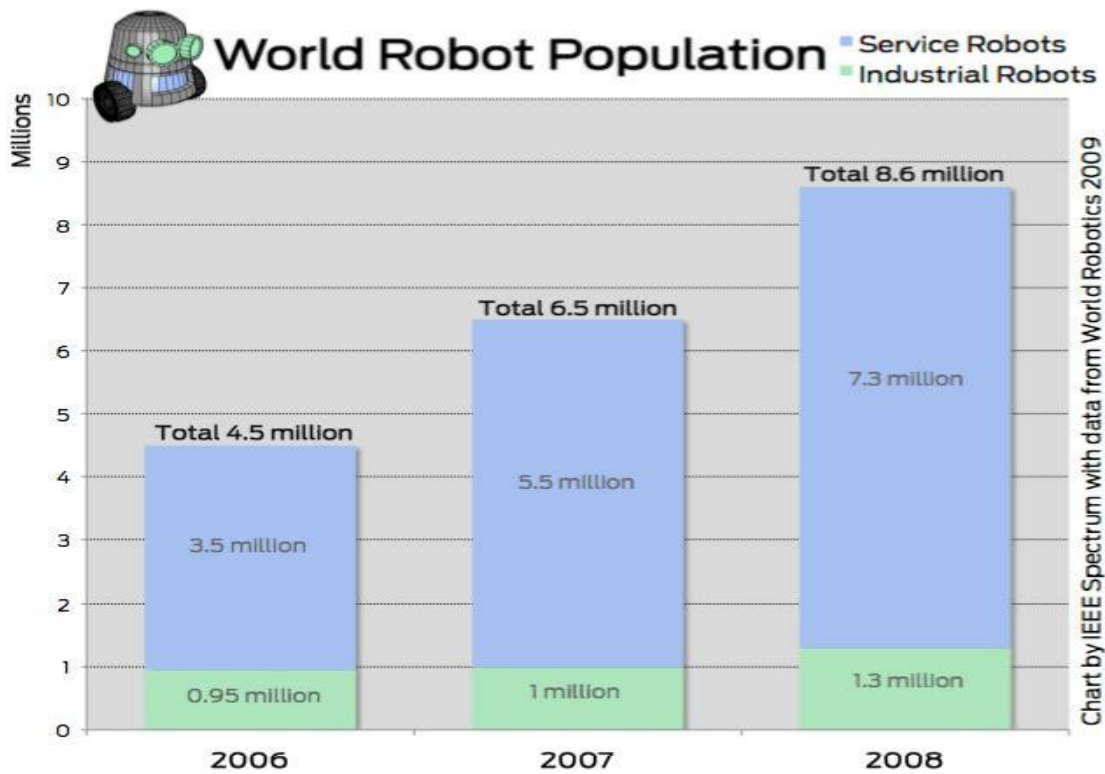
Market Trends (Service Robotics)

Service Robotics Market, 2014

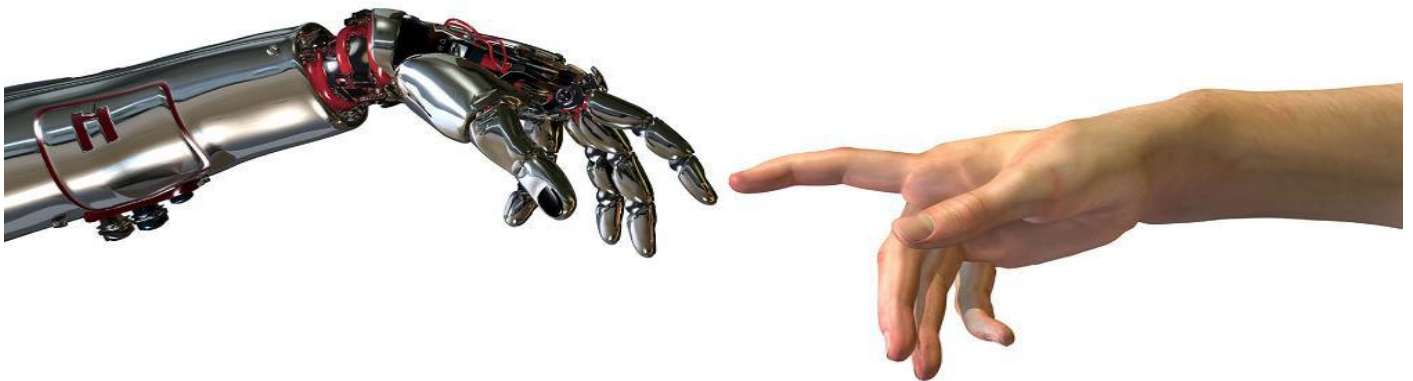


Source: MarketsandMarkets Analysis





Service Robot Case Studies in Silicon Valley



- Read Article: <https://svrobo.org/wp-content/uploads/2015/05/Service-Robotics-Case-Studies.pdf>

Trends And Relevant Articles

Advances in robotics and proliferation of IoT devices are expanding the contexts in which people work with machines

Robotic Surgery:
Da Vinci enables a surgeon to operate with enhanced vision, precision and control.

Retail Service Bot:
OSHbot can answer simple customer questions, identify items, search inventory, act as a guide, and even summon hardware experts for a video chat.

Robot Butler:
 The robotic butler at Aloft hotel delivers amenities to guest rooms.

AI Kiosk:
 The *Furo-S Smart Service Robot* can interact with Furo-S to help people buy tickets, ask for directions, and even sit through annoying advertisements.

2015-2018 Robot Sales Forecast

Professional Service Robots:

- 152,400 units
- \$19.6 billion

Personal Service Robots:

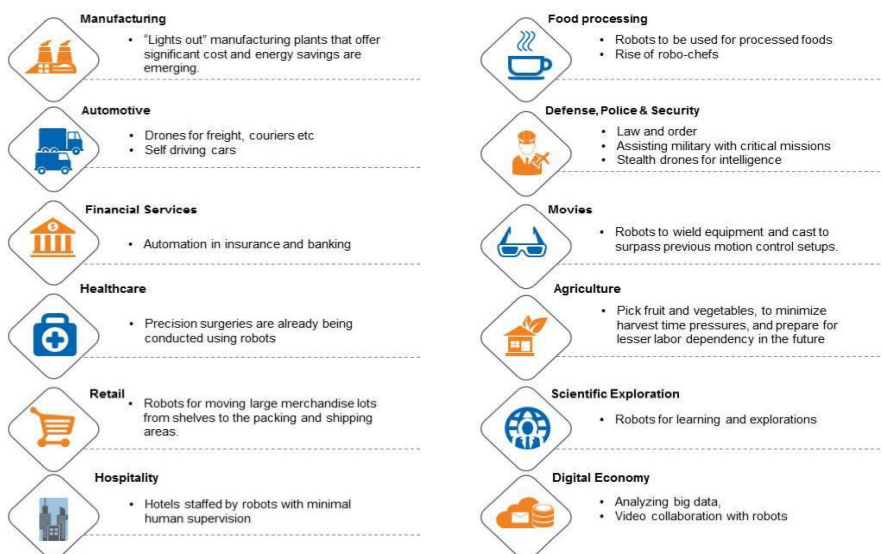
- 35 million units
- \$12.2 billion

(*Service Robot Statistics*, International Federation of Robotics, 2015)

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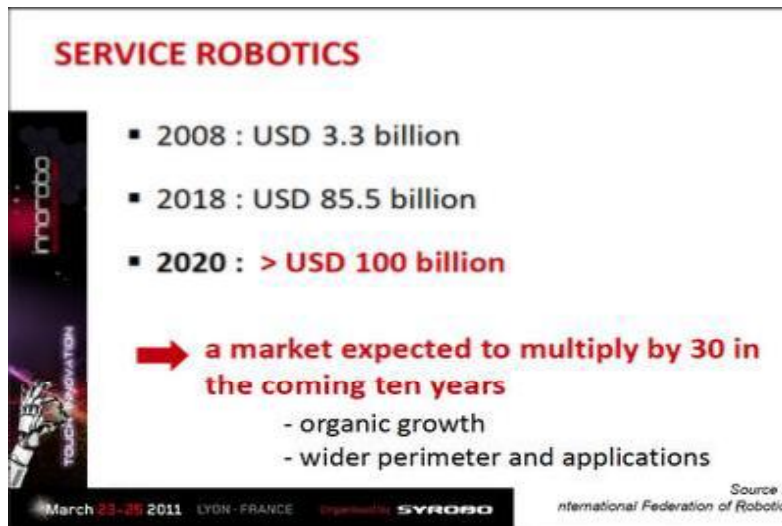
- See Presentation: <http://www.slideshare.net/AccentureTechnology/intelligent-automation-tech-vision-2016-trend-1>

Robots & Human - Peaceful Co-existence



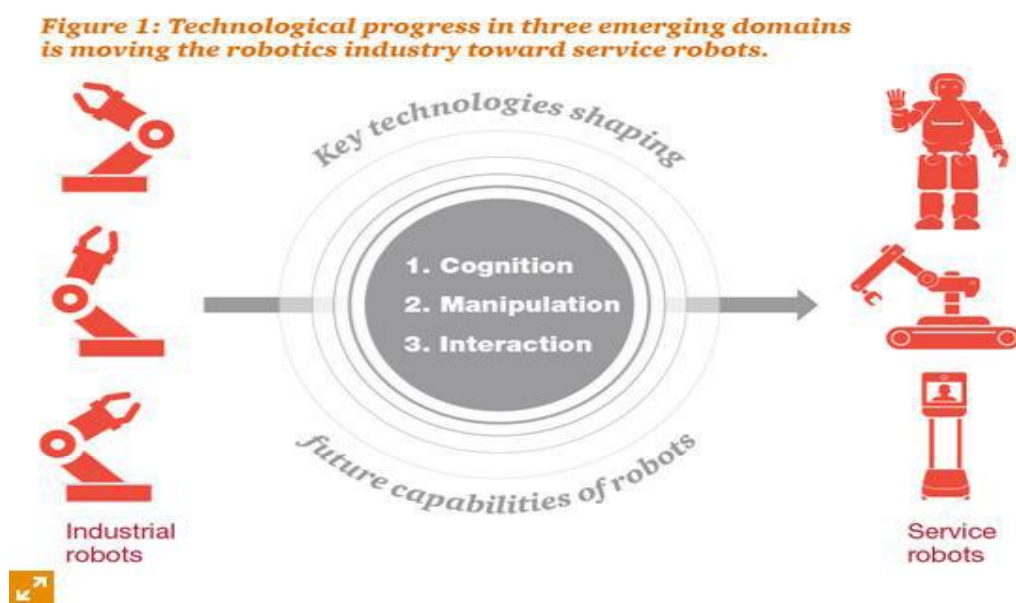
- Read Article: <http://www.hcltech.com/blogs/idea-blogs/robots-human-peaceful-co-existence>

Dissecting The Controversy About The Robotics Industry



- Read Article: <http://www.everything-robotic.com/2011/04/dissecting-controversy-about-robotics.html>

Service robots: The next big productivity platform



- Read Article: <http://www.pwc.com/us/en/technology-forecast/2015/robotics/features/service-robots-big-productivity-platform.html>

Robots will replace customer service agents – thank god for that



- Read article: <http://www.telegraph.co.uk/technology/2016/04/15/robots-will-replace-customer-service-agents--thank-god-for-that/>

Rise of the service robots; comparison to industrial robots



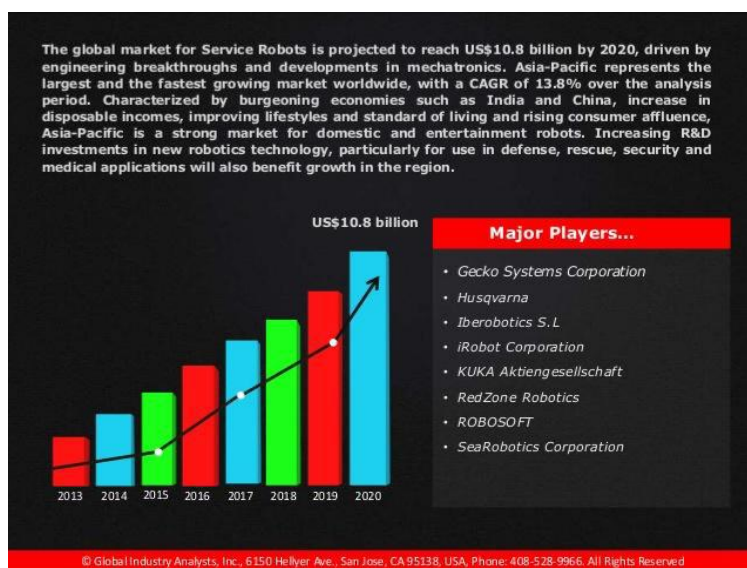
- Read Article: <http://www.controleng.com/single-article/rise-of-the-service-robots-comparison-to-industrial-robots/3d4bc6e965ae1f67cca413215334edc7.html>

Business service robots: The invisible unarmed



- Read article: <http://www.economist.com/news/special-report/21599526-best-robot-technology-unseen-invisible-unarmed>

Service Robotics- A Global Strategic Business Report

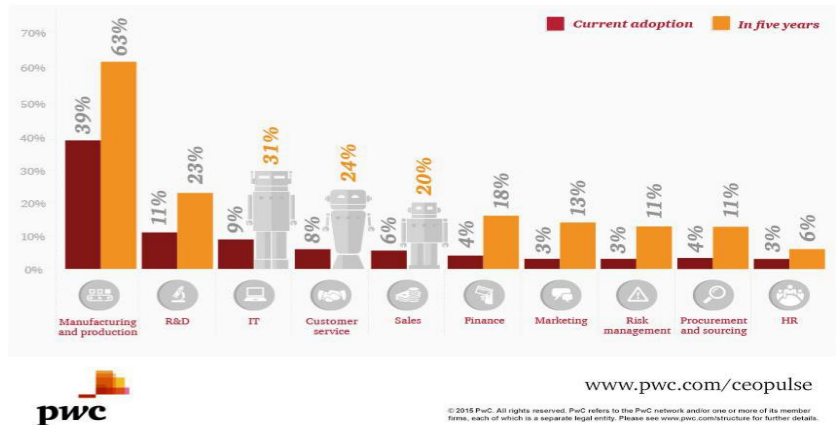


- See Presentation: <http://www.slideshare.net/GlobalIndustryAnalystsInc/service-robotics-a-global-strategic-business-report>

Pulse on robotics

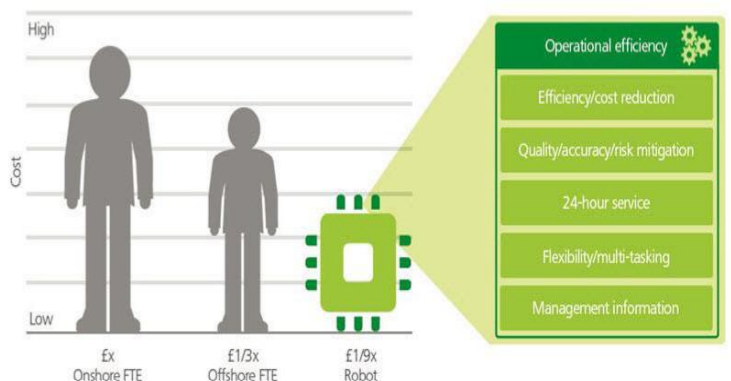
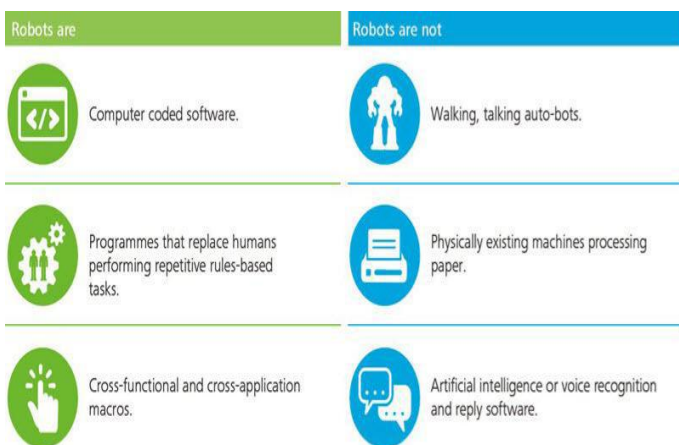


Role of robotics in IT, customer service and sales to grow significantly



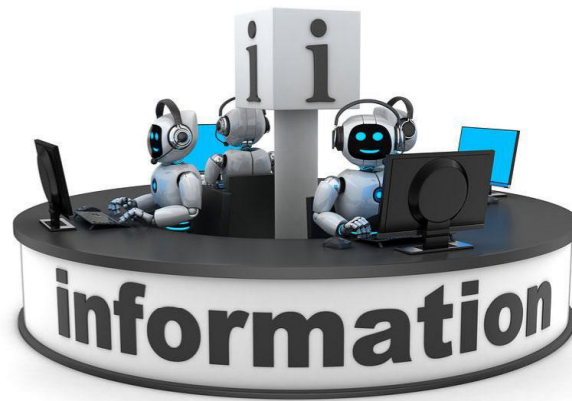
- Read Article: <http://www.pwc.com/gx/en/ceo-agenda/pulse/robotics.html>

The robots are coming Moving beyond traditional methods of automation



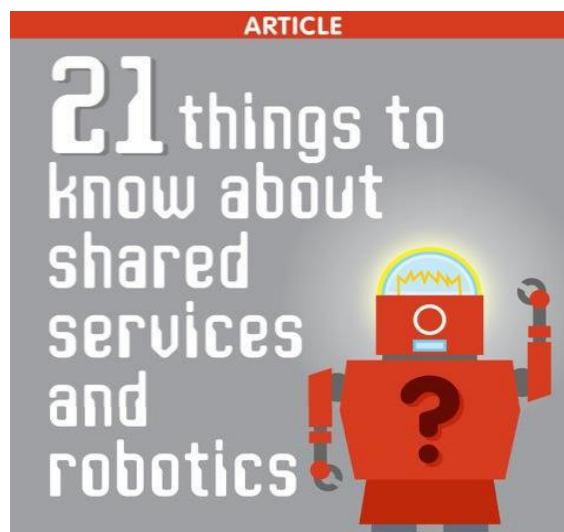
- Read Article: <http://www2.deloitte.com/uk/en/pages/finance/articles/robots-coming-global-business-services.html>

How robotics is changing the face of Business Process Outsourcing



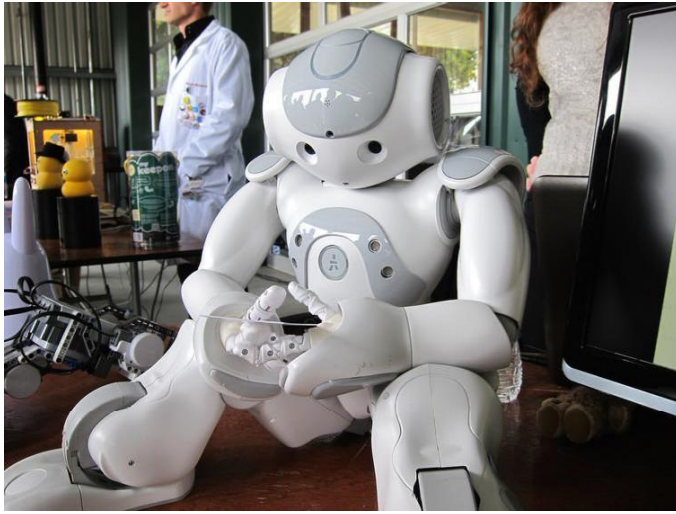
- Read Article: <http://robohub.org/how-robotics-is-changing-the-face-of-business-process-outsourcing/>

21 things to know about shared services and robotics



- Read Article: <http://www.sharedserviceslink.com/article/21-things-to-know-about-shared-services-and-robots>

Job survival in the age of robots and intelligent machines



- Read Article: <http://theconversation.com/job-survival-in-the-age-of-robots-and-intelligent-machines-33906>

Will Robots Take Over Field Service?



- Read Article: <https://www.coresystems.net/en/blog/will-robots-take-over-field-service>

Robots mean business



- Read Article: <http://newventurist.com/2012/10/robots-mean-business/>

Acknowledgement

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