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Northwestern | Retail Analytics Council

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Robot Supply Will Not Keep Pace With Robot Demand

By Andra Keay, Managing Director, Silicon Valley Robotics

“It is the best of times, it is the worst of times” for robotics and retail, to paraphrase Charles Dickens. Right now, robotics is becoming the buzzword in many industries. Only a few years ago, retailers had the pick of the crop of emerging robotics companies. Very few in the retail industry were ready to seize the advantage. We



(Left-right) Tally from Simbe Robotics, BossaNova's robot, and Fetch Robotics at Trax

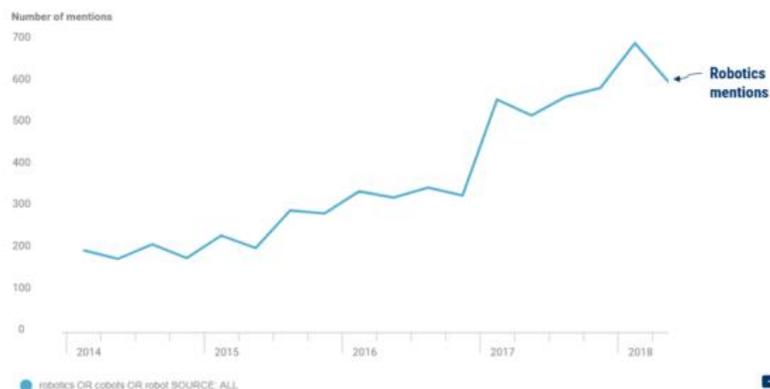
are all familiar with some of those case studies, via early adopters Amazon, Walmart, Kroger, Target, and Lowe's, who have all showcased trial deployments of various robots in retail.

In Silicon Valley, we are seeing a number of new robotics companies in the retail industry, but also a number who are looking at other industries like construction, health, hospitality, food, and agriculture. This is not a purely

Silicon Valley phenomenon. The robotics market has moved very rapidly as shown on the chart below. This is a graph of keyword mentions from the quarterly earnings calls of Fortune 500 CEOs, shared by CBInsights.

Bots on the mind: C-suites are showing interest

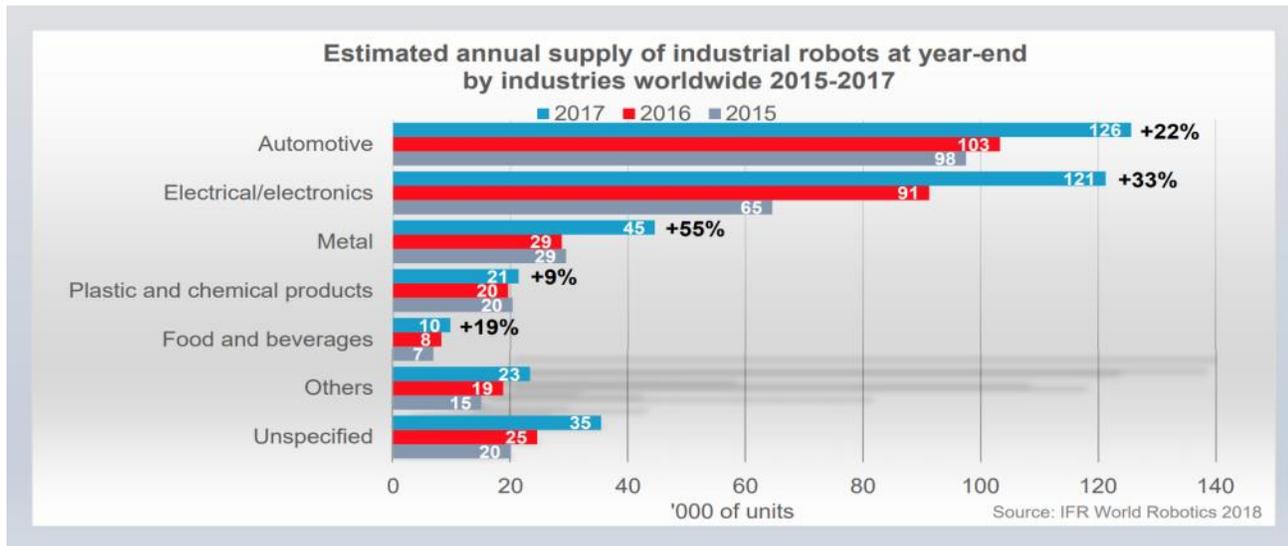
Mentions of robotics keywords on quarterly earnings calls. Q1'14 - Q2'18



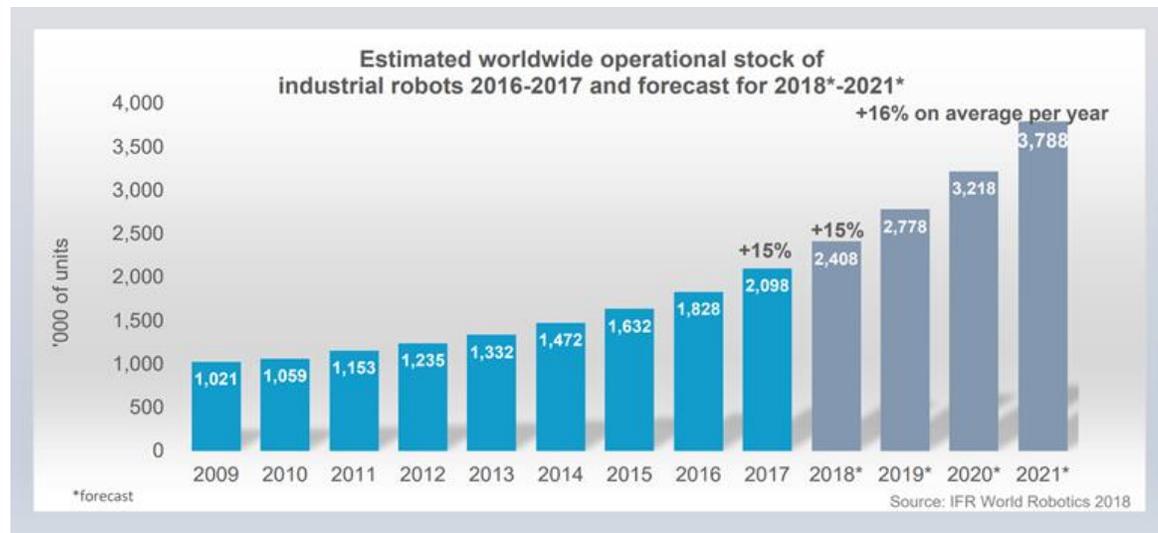
This is where the problem for most retailers will really start. There is a limited sup-

ply of all of the components of the retail robotics industry, whether we are talking about front-of-house, customer-facing robots, warehouse and logistics automation, or kiosk-style robots. There are simply not enough robots, including: robotics startups; robotics talent to work in these startups as they scale up; and robots produced by these startups.

For the last 50 years, the Robotics 1.0 industry that manufactures “dumb” robot arms has been dominant. The majority of these companies are now Japanese or Chinese, with very few based in the U.S. or Europe. These robots have to be kept separate from human operators and require extensive and expensive reprogramming whenever their tasks change. There are approximately 2 million of these robots deployed internationally and they are largely in the automotive industry, followed by metals, machining, plastics, and the food industry.



According to the major robotics statistical body, the International Federation of Robotics (IFR), while the supply of robots is increasing rapidly, it is certainly not rapidly enough to have met Foxconn Technology chairman Terry Gou’s pledge to “have 1 million robots in Foxconn factories by 2014.” By the end of 2014, the total global supply of robots was less than 1.5 million and Foxconn was producing only 30,000 robots per year. In 2018, Foxconn’s robot production figures are starting to come closer to 300,000 robots per year. The IFR predicts that the worldwide stock of industrial robots will increase to 3.8 million robots in the world’s factories by 2021, a significant increase.



But what about the robots we see doing e-commerce logistics and store inventory? Robotics 2.0 describes a qualitatively different kind of robot that is smarter, safer, sensor-based, and capable of limited social interactions, i.e. navigating safely around people. The best Robotics 2.0 robots are also simple, doing one task or with one physical focus. The majority of Robotics 2.0 companies are new companies, between one and 10 years old, building self-driving vehicles for logistics, hospitality and retail robots, and the miscellaneous other things required for retail.

We must not underestimate the difficulty of building all these new robots or the difficulty retailers will face finding those emerging startups or small companies working at the forefront of deploying these new technologies. There has been a tipping point in the available technology stack (cheaper computing power, cheaper and more ubiquitous sensor deployment, greater connectivity, etc.), but to expect the venture capital industry to find, fund, and scale startups in the best interests of the retail industry is overly optimistic.

Fellow Robots is a great example of the best and the worst of times. They were one of the first movers in the retail space and as such, they over-equipped their robot. Most of the features that seemed so important on the hardware have been either written off the product development roadmap (i.e., scanning customers' samples) or have been subsumed into the development of software that integrates with store management systems.

That means that instead of the Fellow robot replacing a store associate physically, it now accompanies store associates or provides raw data so that store associates and managers can take actions. Fellow's robots are becoming more highly specialized now in their physical functions, but the interlocking array of software is far more powerful, supporting stock replenishment, inventory management, or actionable smart data.

Real robots for retail do ONE SIMPLE THING!



Robots for social interaction

Catalia Health, Samsung, Sanbot, SoftBank Robotics, Bots&Us, MetraLabs, Furhat Robotics

Increased and targeted consumer engagement is possible with robots

Automation inside the box

Amazon Go, Alibaba, JD.com, Hema Supermarket, Café X, Creator, Blendid, Chowbotics, Bear Robotics, Spyce Kitchens, Zume Pizza, Zoom Systems

Many building blocks in automation technologies can be reapplied in house to create custom solutions

Arms and grippers

Kindred, Kinema Systems, Fetch Robotics, Right Hand Robotics, SoftRobotics, Modbot, Hebi Robotics, IAM Robotics, Universal, ABB, Kuka etc.

These are exceptions to Robotics 1.0 – Collaborative arms are safe around people.

Wheels (not feet yet)

Fetch Robotics, Fellow Robots, Simbe, BossaNova, Canvas, DHL, Otto, Quiet Logistics, Grey Orange Robotics, Clearpath, LG, Starship Technologies, Nuro, Marble, Kiwi Campus, Kiva Systems, Avidbots, Postmates, BrainCorp, LG Cloi, Five Elements, Badger, Savioke

Autonomous delivery on roadways is still very limited. Navigation inside is most developed (depending on wifi connectivity)

*not an exhaustive list

“Customers don’t want ‘Robots as a Service.’ They really want ‘Data as a Service,’” says Tessa Lau, founder of Dusty Robotics and previously CTO of Savioke. The first mover in hospitality robots, Savioke has now extended its offerings into office deliveries, while Lau has moved on to found Dusty Robotics, which provides actionable data for the construction industry by way of a robot.

You could also describe what we are seeing as the emergence of the “hands-free power tool,” rather than “robots.” These are devices that perform a task alongside the worker but that are much more accurate and don’t require hands-on operation. This frees up skilled human hands and brains to do much more valuable and enjoyable tasks.

If there is one single takeaway from this piece it should be that while the retailers are ready, and so are the robots, the scale of the demand is enormous compared to the production cycles for complex physical products.

Robot supply will not keep up with robot demand, in spite of the massive capacity change happening right now in the robotics industry. Retailers must be proactive and move rapidly to secure partnerships with robotics startups to ensure that internal innovation systems are agile. An “A team” of roboticists internally can help retailers deploy available technological building blocks into a sensible overall automation, robotics, and AI strategy.