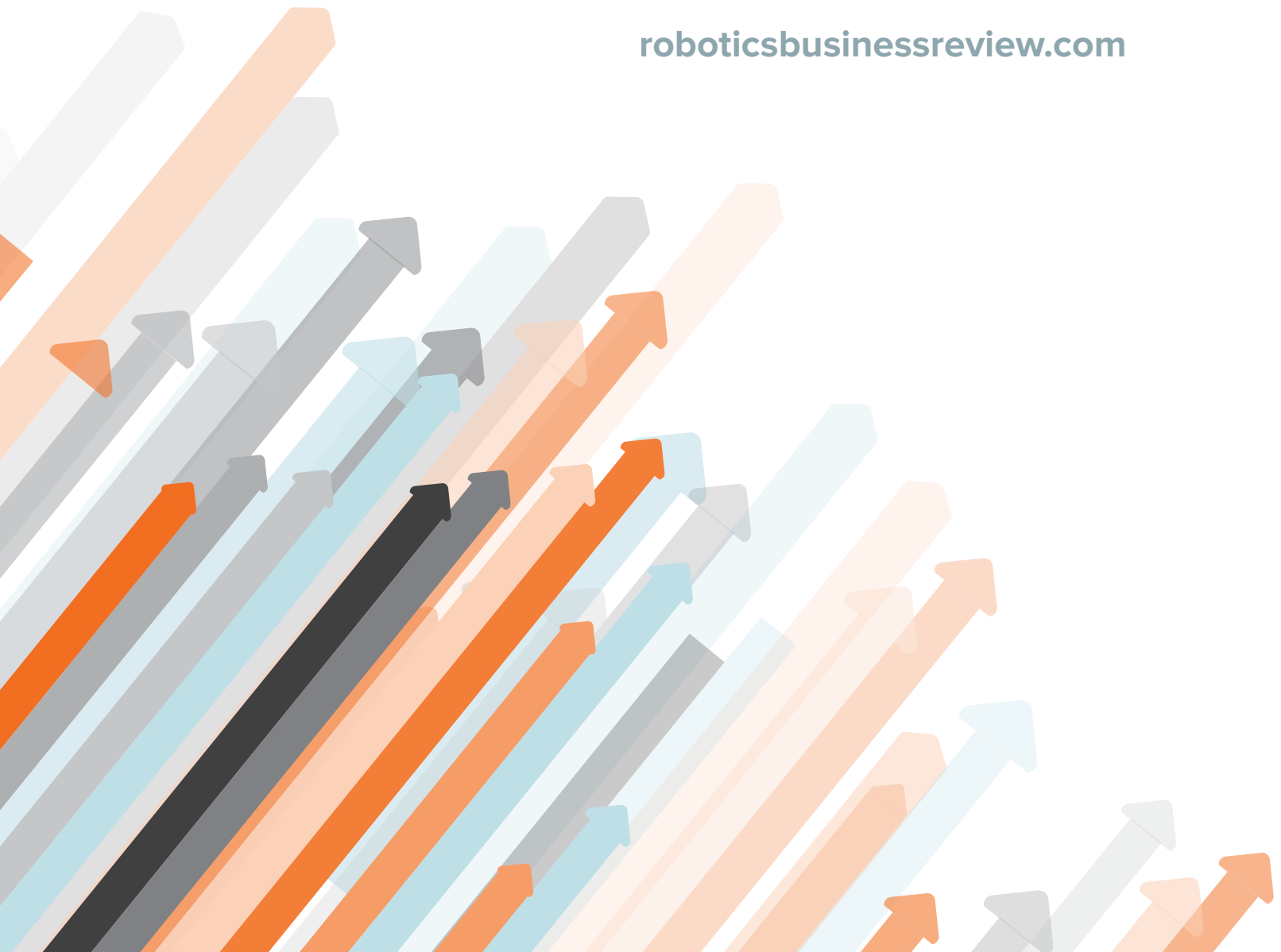


FIRST QUARTER
**TRANSACTIONS
REPORT 2018**

roboticsbusinessreview.com





Are You Still Manually Sorting and Packing Orders?

Sure Sort is a highly scalable, configurable and cost effective small item sorting system with excellent ROI. Sure Sort can be designed to support up to 670 sort locations in a small footprint, and requires significantly less staffing compared to traditional put walls. Sure Sort installs in a week or less.

Sure Sort is ideal for small businesses looking for a cost effective entry into warehouse automation as well as large fulfillment operations looking to streamline their process. Call us today to learn more!



The Old Way

The New Way

Up to
670
sort
locations

Applications

- E-commerce Order Fulfillment
- Return Center Processing
- Pre-Sorting Inventory
- Kit Building
- Direct Store Delivery (DSD)
- Transshipment/Cross Docking
- Last Mile Delivery

Up to
2,400
items
per hour

OPEX[®]
CORPORATION

305 Commerce Drive, Moorestown, NJ 08057
opex.com | 856.727.1100



Robotics Mergers and Acquisitions Slow in Q1 2018

By Jim Nash

The first quarter of 2018 was unexpectedly weak in terms of robotics investments, especially when looking at a key segment: the largest mergers and acquisitions.

There were relatively few deals of a strategic size -- more than \$500 million -- during the first quarter. They included the \$3 billion Altra Industrial Motion Corp. purchase of Fortive Corp. and the \$2.2 billion Leonard Green & Partners LP buy of ProMach Inc.

Both of these were far below the \$6.9 billion average for strategic deals notched since the first quarter of last year. And both were dwarfed by SoftBank Group's \$31 billion [acquisition](#) of chip-designer ARM Holdings last September.

TRANSACTIONS REPORT 2018 FIRST QUARTER

Large financings other than M&A, including direct investments, internal expansion, spending on campus development, and an initial public offering, amounted to a solitary deal.

In February, a group led by investment firm Hillhouse Capital Management Ltd. made a \$2.5 billion [placement](#) in automation-heavy e-commerce player JD.com Inc., both based in China.

This dynamic could change in the coming quarters, of course, but there are indications that robotics investors might play their cards close to the vest for some time.

BILLION-DOLLAR DEALS OF THE PAST YEAR			
1Q 2018:			
3/21	Altra/Fortive	\$3B	M&A
2/14	Hillhouse et. al./J.D. Logistics	\$2.5B	investment
1/28	Leonard Green (PE)/Pro Mach	\$2.2B	M&A
4Q 2017:			
11/13	SB et. al./Uber	\$9B	investment
11/13	SB/Uber	\$1.25B (direct investment)	
10/19	Alphabet et. al./Lyft	\$1B	investment
3Q 2017:			
9/5	SB/ARM Holdings	\$31B	M&A
9/18	Northrup Grumman/Orbital ATK	\$7.8B	M&A
9/5	United Technologies/Rockwell	\$3B	M&A
9/22	ABB/GE Solutions	\$2.6B	M&A
9/21	Google/HTC	\$1.1B	M&A
9/26	Alibaba/Cainiao	\$844M	investment
2Q 2017:			
5/10	SB/Didi	\$5B	investment
5/24	SB/Nvidia	\$4B	investment
5/15	Saisun	\$3.5B (invest in land devt)	
4/4	ABB/Bernecker & Rainer	\$2B	M&A
4/3	Hyundai Heavy Industries	\$1.8B	internal investment
5/12	SB/Improbable	\$502M	investment
1Q 2017:			
3/13	Intel/Mobileye	\$15.3B	M&A
3/1	Dyson	\$2.5B (invest in land devt)	
2/10	Ford/Argo AI	\$1B	M&A
3/7	X-Fab	\$530M (IPO for expansion)	

TRANSACTIONS REPORT 2018 FIRST QUARTER

For one thing, acquisitive Japanese conglomerate SoftBank was all but absent from our larger list of noteworthy deals. It had signed six strategic-sized investment contracts in the last three quarters of 2017, totaling \$50.75 billion. Indeed, there were no major firms making large robotics investments during the first quarter of this year.

POLITICS HINDERS GLOBAL AUTOMATION INVESTMENT

Then there is the continuing uncertainty around policies coming out of Washington, D.C. Fluctuations in large investments over the past year have mirrored the moods in the U.S. capital.

The second and third quarters of last year saw a relative glut of deals because of hopes of corporate tax cuts and regulatory rollbacks. They were followed by quieter quarters.



International trade policies are likely to have a direct effect on robotics investments.

At deadline, the latest tempest is the threat of trade wars between the U.S., China, and the rest of the world. A large fraction of robotics deals of all sizes involves Chinese investors.

BIGGER IS BETTER

An extended period of caution could mean weaker combined companies, according to Accenture Strategy research.

TRANSACTIONS REPORT 2018 FIRST QUARTER

Looking specifically at M&A deals globally and across industries over 10 years, the authors found three factors critical to creating value -- and one of them is transaction size.

“Large acquisitions have a more than fair chance of creating value for the acquirer’s shareholders,” said “[Sizing Up M&A Value Now](#),” the report by Accenture’s Tom Herd and Matt McClelland.

Accenture analyzed the 500 largest acquisitions completed by publicly traded companies from 2004 to 2014. It found that 55% of the companies displaying the trio of factors had created value two years after the announcement of a deal.

The research indicated that deals of between \$20 billion and \$25 billion were more successful than were those in other brackets, with returns of 20% added value.

Deals above that level were bled by regulatory approvals, integration headaches, complexity, and other factors. Financings below that level could not provide greater returns because they were too small and did not take full advantage of the buyer’s strengths.

Only SoftBank’s acquisition of U.K.-based ARM last year even approached the pricing sweet spot identified by Accenture.

The other two factors were digital disruption and the macroeconomic cycle. Accenture explained that digital disruption connotes industries in which companies are trying to quickly attain needed digital capabilities by acquiring tech-forward targets.

AUTOMOTIVE INNOVATION

A good example of digital transformation can be found among automakers, which are major users of robotics and developers of AI. Vehicle makers covet

TRANSACTIONS REPORT 2018 FIRST QUARTER

the skilled teams behind driverless technologies.

The industry is being fed by innovators at transportation-as-a-service startups -- most notably Uber and Lyft -- as well as a vast list of computer and software suppliers.

The [Altra purchase](#) of Fortive's automation business mentioned above is an example of innovation through acquisition. Altra makes brakes, clutches, and power transmission equipment. Fortive's Automation & Specialty unit supplies robots to the manufacturing, medical, and food-and-beverage industries.

MACROECONOMIC HESITATION

Then there is the macroeconomy, the tide that lifts all boats.

As a rule, governments cannot just create a good economy, but they can hurt one. That might be one reason for an [underperforming M&A](#) sector.

U.S. corporations were heartened by [tax reform](#) that included provisions making capital repatriation more attractive, but they now worry about aggravated trade disputes and long-term uncertainty.



"A lot of positive energy" among expansion minded corporations has faded in the past six months, said Elizabeth Lim, research editor for the Americas at market-intelligence firm Acuris. Private equity firm [BC Partners](#) owns Acuris.

"Caution has actually gotten worse" since the fourth quarter, she said.

TRANSACTIONS REPORT 2018 FIRST QUARTER

As the first quarter closed, some investors were fixated on the [frustrated plans](#) of Singapore chip maker Broadcom Inc. to buy U.S.-based communications chip maker Qualcomm Inc. In addition to providing venture funding to startups, Qualcomm has been active with hardware [production related to IoT and robotics](#).

President Donald Trump, citing concerns about companies in and around China controlling U.S. manufacturers, [blocked the purchase](#) in March.

“This has led to worries in the market: ‘Is this a one-off?’” Lim said.

More to the point, she added, investors need to know if a formal, rigorous process for cross-border M&A has become passé.

“Will it be, ‘Hey, I’m going to block this deal,’ instead of studying the issue and bringing everyone in to see what’s the best way to proceed?” she asked.

It is not clear, but businesses might be acting already. According to Acuris research, first-quarter announcements of cross-border investments are down significantly compared with a year ago.

On the upside, there has been a noticeable uptick in private-equity (PE) firm buyouts, Lim said.

These firms see an imminent end to conditions favorable to their industry, and they are acting. Borrowing costs are rising, which will put a dent in their deal flow, Lim said. The business cycle appears primed to change, and not in PE’s favor.

It could be coincidental, but one of the three big deals in the first quarter was the [buyout of ProMach](#), maker of increasingly autonomous packaging machinery, by PE firm Leonard Green.



Top 10 Reasons Why Robotics Startups Fail

By Adam Shayevitz, president, [Strategic Sourcing Dynamics LLC](#)

I recently attended a spirited debate by a panel of robotics industry executives discussing the drivers and impediments to robotic startup success. The one thing they managed to agree on was that the failure rate is 99% for robotics startups. That's a staggering percentage, even though it was the panel's opinion and not a formal statistic.

Hardware is hard, and if there is a difficulty spectrum, robotics would be in the diamond hardness range. Robot development requires expertise and synergy across software, mechanical, electromechanical, electronics, and complex assembly. Fight the Startup Robocalypse by avoiding the following top 10 devastating operational missteps.

1. BUILD IT, AND THEY WILL COME

This clichéd business strategy often discredited yet still in use is even more destructive when applied to robotics. A robot design and marketing plan based solely on generalities like cost, safety, and user-friendliness is doomed. For a robot to be successful, it must be designed around a specific market need, perform specific tasks reliably and consistently, and have a total cost of ownership making it economically viable.

The value proposition, return on investment, and payback time should be so strong and well-documented that the decision to adopt the technology becomes a no-brainer strategic imperative. A chicken with its head cut off runs around but certainly doesn't know where it's going.

2. DFI INSTEAD OF DFM

Designing for investors (DFI) instead of designing for manufacturability (DFM) is a surefire and common startup killer. When the pressure is on to develop a working model, engineering teams focus on prototype production processes, frantically search the Web for parts, and use samples from unqualified suppliers. Selecting the optimal manufacturing partners takes a back seat to DFI, as if the two are mutually exclusive.

The result is a functioning demonstration model that is not manufacturable at projected volumes or targeted cost. In this scenario, stop-the-presses manufacturing problems are often not discovered until the production ramp deadlines loom. What a way to decelerate product commercialization!

3. CONTRACT MANUFACTURER SELECTION

Conventional wisdom whispers to robotics startups that top-tier contract manufacturers (CMs) provide unmatched purchasing power, engineering capability, and a halo of credibility. Substituting conventional wisdom for actual wisdom when selecting a CM is a recipe for disaster. It's also not about being a big fish in a small pond.

TRANSACTIONS REPORT 2018 FIRST QUARTER

Think Goldilocks' not too hot, not too cold. A successful contract manufacturer selection process prioritizes alignment with the startups' markets, technology, timelines, and production volumes.

What is the contractor's executive commitment to the startup's long-term potential, its belief in your business plan, and specific core competencies to support product realization?

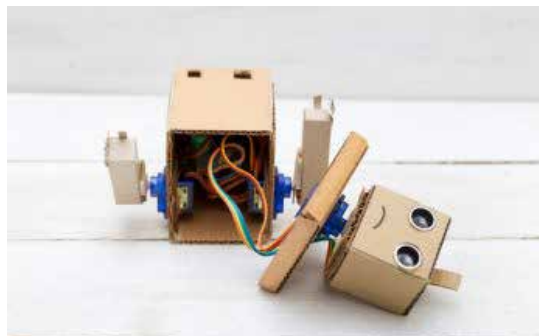
Contract manufacturers will fire customers not meeting revenue targets in the expected time frame. What keeps you up at night? Scrambling to find a new CM production partner while vital early adopter customers are expecting deliveries should be on the list. There's no checkbox on the unemployment insurance application for "fired by my contract manufacturer."

4. ENGINEERING ATTENTION SURPLUS DISORDER

All robotics startups developing leading-edge technologies push the boundaries of process capabilities. The slow-motion methodology for resolving gating manufacturability issues is to focus on one possible solution at a time. This seems to make sense on the surface. Don't spread the engineering team too thin, do one thing at a time, multi-tasking causes multi-inefficiencies, etc.

In the meantime, competitors are catching up and obsolescing your new technology. The opportunity for first-mover advantage withers on the vine.

To speedily solve the unsolvable requires following parallel-path solution development until the unsolvable is solved. Try saying that ten times quickly! In this race, the hare, not the tortoise, wins.



It's better to solve a business problem than to force engineers to multi-task.

5. THE CHINA SYNDROME

There is a pervasive assumption among hardware startups that China is the lowest-cost sourcing market. Add this to the fact that startups' engineering teams are often choosing suppliers without a total cost of ownership analysis and proper supplier qualification. Un-strategic sourcing leads to disastrous outcomes every time.

Add up the freight, duty, insurance, shipping lead-time, quality problems, travel, language, and time-zone challenges. Then consider unenforceable intellectual property protection putting at risk a startups' most valuable asset.

The FOB (free on board) China cost typically needs to be at least 30% less just to break even. Under the parental blocking controls, can you add Asia sourcing websites?

6. BUILDING TEAMS FROM THE TOP DOWN

The theory goes that experienced vice presidents are experts who know how to design their organizations and choose the right job candidates. With each functional VP (marketing, engineering, supply chain, etc.) building his or her department, the startup will accelerate organizational development.

Problems occur when the VPs are expecting to manage teams and not perform day-to-day tasks. This can lead to politicking, pushing for resources to add unnecessary headcount, and stacking the deck with former associates who may not be the best match for the startup.

If the startup needs some big, experienced guns, hire consultants. Prematurely adding an executive buffering layer also disconnects founders from their organizations. Top-heavy designs capsize ships.

7. DESIGN FOR PERFECTION

Design for perfection (DFP) is the deadliest rung in the ladder towards product

TRANSACTIONS REPORT 2018 FIRST QUARTER

launch delays and epic failures. Common ingredients in DFP toxic stews include the following:

- Engineering teams hyper-focusing exclusively on the exact specifications needed for +/- 0 tolerance
- Custom part designs pushing the limits of manufacturability
- Ignorance of the need to collaborate early with suppliers regarding process capabilities
- No design of experiments to understand acceptable tolerance ranges. This mirror image and evil twin of DFM will drive a stake through the heart of product realization.

8. BURN RATE, BABY BURN

When more attention is paid to the capital burn rate than how money is spent and for what results, the startup is going to be immolated quickly. Robotics startups that are starved for engineering resources, but seem to have the funds to hire abundant administrative assistants and rent fancy offices, are headed for a fall.



At the other extreme, raising gobs of money and throwing it at a problem by reactively hiring a boatload of additional employees and rushing tooling for production without a design freeze is just as damaging. If the startup doesn't have a high ratio of engineers to administrative assistants, it is going to be a bonfire of the vanities once the investor gravy train stops.

9. 'UBERIZING' SUPPLIER DEVELOPMENT

Contract manufacturers, broad-line sales reps, design engineering firms, importers with offshore buying offices, and the proverbial friend of a friend's uncle will all

TRANSACTIONS REPORT 2018 FIRST QUARTER

offer budding robotics startups their one-stop shopping, all-inclusive, we-do-it-all global sourcing services. Identifying, qualifying, and selecting optimal suppliers is highly complex and a critical factor for success or failure.

Abdicate strategic sourcing, and the startup loses independence, control, transparency, cost savings, an opportunity to build relationships, sourcing markets knowledge, and valuable learnings from DFM supplier partnering.

Like it or not, supplier selection and relationship management are core to every [hardware startup's failure](#) or success. Outsourcing sourcing is just one more leak in the dam holding back the flood of failure.

10. BOARD MEMBER FIRE DRILLS

Board members who view their role as judges at an inquisition can cause resource-eating distractions. “Why aren’t you talking to Big Cheese Contract Manufacturer?” Fire alarm pulled. “Why haven’t you implemented an ERP system yet?” Fire Alarm pulled. “Your production costs are too high.” Fire alarm pulled. “Why aren’t you sourcing from China and Mexico?” Fire alarm pulled. “Why did you only send RFQ’s to 5 sources instead of 10?” Fire alarm pulled.

On and on and on, round and round goes the wheel, and where it stops, nobody knows. Each line of questioning requires pulling resources from developing a successful product. Too bad the laws about false alarms don’t apply to startup boards.

FAILURE IS NOT INEVITABLE FOR ROBOTICS STARTUPS

The high failure rate of robotics startups is not inevitable, nor are the challenges insurmountable. Leave Groundhog Day to the groundhogs, and stop the insanity by avoiding the top 10 common failure drivers.

Robotics startup founders who know what they don’t know and selectively turn a deaf ear to conventional wisdom are the most likely to succeed.

TRANSACTIONS REPORT 2018 FIRST QUARTER

Robotics Transactions, Q1 2018

Company	Investor, partner, acquirer	Amount (millions \$)	Transaction Type	Date	Technology/software?	Industry
ABB Ltd.	First Republic Investment Management Inc.	6.5	investment	1/1/2018		industrial automation
Inwatec ApS	Jensen-Group		investment	1/1/2018	laundry automation, AI	healthcare, hospitality
Iron Ox	Eniac Ventures, Amplify Partners	3	investment	1/3/2018		agriculture
Rubikloud	Intel Capital	37	investment	1/3/2018	AI, IoT	consumer, retail
Doerfer Corp.	JR Automation		M&A	1/3/2018		manufacturing
Almotive	B Capital Group, Prime Ventures	38	investment	1/4/2018	self-driving cars, sensors, AI	transportation
ActiveScaler	Denso		investment	1/5/2018	AI	transportation
Restoration Robotics Inc.	Interwest Venture Management Co.	0.919	investment	1/5/2018		healthcare
Praxis Aerospace Concepts International Ltd.	Praxis Aerospace Concepts International Ltd.		M&A	1/7/2018	drones, software	infrastructure, security
Intuition Robotics	Samsung NEXT, SPARX Group and Glory Ventures	6	investment	1/8/2018	elder-care robot	consumer
Maidbot Inc.	Bissell Inc.		investment	1/8/2018	housekeeping robot	consumer
Carbon 3D	Johnson & Johnson Innovation	200	investment	1/9/2018	3D printing	manufacturing
Connexient	Riverside Acceleration Capital		investment	1/9/2018	AI	transportation
SkySpecs	Statkraft Ventures, Capital Midwest, UL Ventures	8	investment	1/9/2018	drones	infrastructure
elinfochips	Arrow Electronics Inc.		M&A	1/9/2018	IoT	supply chain
Diligent Robotics	True Ventures	2.1	investment	1/10/2018	hospital robots	healthcare
TNB Aura Fund	Aura Group, TNB Ventures	22.5	investment	1/10/2018	AI and IoT	manufacturing
AMO	Heidenhain		M&A	1/10/2018	controls	industrial automation
Media Wing LLC	American Rail Engineers Corp.		M&A	1/10/2018	drones	infrastructure
Cognitiv	OurCrowd	100	investment	1/11/2018	AI and IoT	agriculture, manufacturing, healthcare
Huazhi IMT	Banyan Capital, Ying Capital	15	investment	1/11/2018		manufacturing
Voyage	InMotion Ventures, Amino Capital, CRV, Initialized Capital, Khosla Ventures, SV Angel	15	investment	1/11/2018	self-driving cars	transportation
CalmCar Vehicle Vision	Shenzhen Guozhong Venture Capital Management	4.6	investment	1/12/2018	machine vision	transportation
Robotis Dynamixel	LG Electronics	8.5	investment	1/13/2018	components, controllers	manufacturing
Linamar Corp.	Canada, Ontario governments	100	investment	1/15/2018	AI, cobots	manufacturing
Magpie Education	British Robotics Seed Fund	0.413	investment	1/15/2018		educational
Pony.ai	Morningside Venture Capital, Legend Capital	112	investment	1/15/2018	self-driving cars	transportation
Epson Electronics America Inc.	Epson America Inc.		M&A	1/15/2018	robotics, wearables	manufacturing, consumer

TRANSACTIONS REPORT 2018 FIRST QUARTER

Robotics Transactions, Q4 2017

Company	Investor, partner, acquirer	Amount (millions \$)	Transaction Type	Date	Technology/software?	Industry
Understand.ai	LEA Partners	2.8	investment	1/16/2018	machine vision	healthcare, transportation
Elistair	Starquest Capital	2.45	investment	1/17/2018	drones	security
CMC Industrial Electronics, Junge Control Inc.	Ag Growth International Inc.	19	M&A	1/17/2018	materials handling, sensors	agriculture
Beijing Aqiu Technology Co.	Baidu Ventures, DCM Capital, Long Capital	8	investment	1/18/2018	industrial automation	manufacturing
Indico	Osage Venture Partners	4	investment	1/18/2018	AI	business data analysis
Iris Automation	Bessemer Ventures	8	investment	1/18/2018	drones	transportation
Mall Parking	Holdfound Group	12.5	investment	1/18/2018	self-driving cars	transportation
Prioria Robotics	Condor Aerial	1.3	failure	1/19/2018	drones	security
EasyMile	Alstom		investment	1/19/2018	autonomous vehicles	transportation
Rokid	Temasek Holdings	100	investment	1/19/2018	AI	
SBI AI & Blockchain Fund	SBI Investment	451.5	investment	1/20/2018	AI	
Vention	White Star Capital	2.84	investment	1/21/2018	cobots	
Knightscope	SeedInvest	25	investment	1/23/2018	mobile robots	security
Occipital	Foundry Group	15	investment	1/23/2018	machine vision	
Doxel	Andreessen Horowitz	4.5	investment	1/24/2018	AI	infrastructure
PrecisionHawk	Third Point Ventures	75	investment	1/24/2018	drones	agriculture, infrastructure
Allure Security	Glasswing Ventures	5.3	investment	1/25/2018	AI	security
American Robotics		2	investment	1/25/2018	drones	agriculture
Converge Industries	Samsung NEXT, Techstars Ventures, Kima Ventures	0.75	investment	1/25/2018	AI, drones	infrastructure
Autonomic, TransLoc	Ford Motor Corp.		M&A	1/25/2018	self-driving cars	transportation
Key Technology Inc.	Duravant LLC	175	M&A	1/25/2018	industrial automation	supply chain
Pro Mach Group Inc.	Leonard Green & Partners LP	2200	M&A	1/28/2018		supply chain
InfiniteMD		1.5		1/29/2018	healthcare	AI
AI Fund	NEA, Sequoia, Greylock Partners, SoftBank Group	175	investment	1/30/2018	AI	
Invert Robotics		4.69	investment	1/30/2018	mobile robots	infrastructure
Nuro	Banyan Capital, Greylock Partners	92	investment	1/30/2018	autonomous vehicles	supply chain, retail
Sabrewing Aircraft Co.	The Drone Fund, Integro LTD Co.	1	investment	1/30/2018	drones	transportation
	Nikko Asset Management	9170	investment	1/30/2018	industrial automation	
Altitude Angel	Seraphim Space Fund	4.5	investment	1/31/2018	drones	transportation
SkyWatch	F2 Capital, Verizon Ventures, Kaedan Capital	2	investment	1/31/2018	drones	consumer, commercial
Takeoff Technologies		12.5	investment	1/31/2018	AI, robotics	retail
Unmanned Life		14.25	investment	1/31/2018	drones	integration

TRANSACTIONS REPORT 2018 FIRST QUARTER

Robotics Transactions, Q4 2017

Company	Investor, partner, acquirer	Amount (millions \$)	Transaction Type	Date	Technology/software?	Industry
Afore Oy	AEM Holdings		M&A	1/31/2018	IoT, industrial automation, vehicles	manufacturing
Lightelligence	Baidu Ventures	10	investment	2/2/2018	AI	manufacturing
SwarmFarm Robotics	PWC	14	investment	2/2/2018	autonomous vehicles	agriculture
Infarm	Balderton Capital	25	investment	2/5/2018		agriculture
Lightmatter	Matrix Partners, Spark Capital	11	investment	2/5/2018	AI	manufacturing
Paige.AI	Breyer Capital	25	investment	2/5/2018	AI	healthcare
	U.S. Department of Energy	35	investment	2/5/2018		manufacturing
iDAvatars			failure	2/6/2018	AI	healthcare, manufacturing
NextStep Robotics	Maryland Momentum Fund	0.75	grant	2/6/2018	assistive	healthcare
Open Source Robotics Foundation	Toyota Research Institute	1	grant	2/6/2018	software	
Bye Aerospace	Galileo Global Securities, Ashanti Capital	5	investment	2/6/2018	drones	telecom
Genrobotic Innovations Pvt. Ltd.	Unicorn India Ventures		investment	2/6/2018	exoskeletons	healthcare, supply chain
GreenSight Agromics	The Toro Co.		investment	2/6/2018	AI	agriculture
Humatics Corp.		7.2	investment	2/6/2018	mobile robots	
MachineMetrics			investment	2/6/2018	IoT	manufacturing
	Battery Ventures	1250	investment	2/6/2018	batteries	
Dollins Tool	Mold & Robotics Group		M&A	2/6/2018	industrial automation	manufacturing
Aperio Systems	Energias de Portugal	4.5	investment	2/7/2018	AI, industrial automation	infrastructure, security
Ionic Materials Inc.	Renault, Nissan, Mitsubishi	65	investment	2/7/2018	batteries	transportation
Altech	FIMI Opportunity Funds	30	M&A	2/7/2018	AI	aerospace, security
Alphitan	Capzantine		investment	2/8/2018	industrial automation	
Rani Therapeutics	GeneScience Pharmaceuticals Co. Ltd., Shire plc, Bossa Ventures, Cathay Venture Inc.	53	investment	2/8/2018	industrial automation	healthcare
Droners.io, AirVid	PrecisionHawk		M&A	2/8/2018	drones	infrastructure
MassRobotics	MassWorks Infrastructure Program	2.5	investment	2/9/2018		
Life Robotics	FANUC	94	M&A	2/9/2018	cobots	manufacturing
Global X Management Co.	Mirae Asset Global Investments		M&A	2/12/2018		
VJ Robotics	Onsite		M&A	2/12/2018		education
BioXcel Therapeutics		69	investment	2/13/2018	AI	healthcare
inVia Robotics	Upfront Ventures, Embark Ventures	9	investment	2/13/2018	mobile robots	supply chain
Miso Robotics	Acacia Research Corp.	10	investment	2/13/2018	AI, robotics	service

TRANSACTIONS REPORT 2018 FIRST QUARTER

Robotics Transactions, Q4 2017

Company	Investor, partner, acquirer	Amount (millions \$)	Transaction Type	Date	Technology/software?	Industry
Creationline Inc.	Denso Corp.		investment	2/14/2018	software	industrial automation
JD Logistics	Hillhouse Capital, Sequoia China, China Development Bank	2500	investment	2/14/2018	drones, robotics	supply chain
FarmShots Inc.	Syngenta		M&A	2/14/2018	drones, data	agriculture
FarmShots Inc.	Syngenta		M&A	2/14/2018	machine vision, software	agriculture
CommonSense Robotics	Playground Global	20	investment	2/15/2018	AI, robotics	supply chain
DroneBase		12	investment	2/15/2018	drones	infrastructure
Micronotes Inc.		3	investment	2/15/2018	AI	
Skydio	Nvidia	42	investment	2/15/2018	drones	
Xively	Google	50	M&A	2/15/2018	IoT	
Singularity University	Boeing HorizonX Ventures		investment	2/16/2018	robotics, AI	education
VUES BRNO SRO	Moog Inc.	65	M&A	2/16/2018	motors	industrial automation
Griff Aviation	Research Council of Norway	2	investment	2/17/2018	unmanned systems	maritime
New Matter			failure	2/18/2018	3D printing	manufacturing
Dash Robotics	Ironfire Ventures	2.7	investment	2/19/2018	robotics	consumer, education
John Wood Group	Department for Business, Energy and Industrial Strategy, Nuclear Decommissioning Authority, Innovate UK	2.1	investment	2/19/2018	integration, materials handling	energy
Kidaptive Inc.	Formation 8, Woongjin Think-Big	19.1	investment	2/20/2018	AI, machine learning	consumer, education
Orthotaxy	Johnson & Johnson Medical Devices Cos.		M&A	2/20/2018	surgical	healthcare
Accel Robotics Corp.		0.9	investment	2/21/2018	AI	service
Mabl	Amplify Partners, CRV	10	investment	2/21/2018	AI, machine learning	
PROCEPT BioRobotics Inc.	Viking Global Investors LP, Perceptiv Advisors, CPMG Inc.	118	investment	2/21/2018	surgical	healthcare
SAALG Geomechanics	CEMEX Ventures		investment	2/21/2018	AI, machine learning	infrastructure, construction
DecaWave	Atlantic Bridge Ventures, China Ireland Growth Technology Fund, ACT Venture Capital, ZZ Ventures	30	investment	2/22/2018	factory logistics, semi-conductors	
Feature Labs	Flybridge Capital Partners	1.5	investment	2/22/2018	AI	
Solinftec	AgFunder	0	investment	2/22/2018	IoT	agriculture
Alvey Group	Scott Technology	14.88	M&A	2/22/2018		supply chain
Global X Robotics & AI ETF	Wedbush Securities Inc.	0.302	investment	2/24/2018		finance
Flexicell Inc.	Pearson Packaging Systems		M&A	2/24/2018	industrial automation	supply chain
Avishkaar Box	Auxano Deals	0.772	investment	2/26/2018	educational kits	consumer
Kraken Robotics Inc.		1.19	investment	2/26/2018	unmanned systems	maritime

TRANSACTIONS REPORT 2018 FIRST QUARTER

Robotics Transactions, Q4 2017

Company	Investor, partner, acquirer	Amount (millions \$)	Transaction Type	Date	Technology/software?	Industry
May Mobility	BMW i Ventures, Toyota AI Ventures	11.5	investment	2/26/2018	autonomous vehicles	transportation
Planys Technologies	Pratithi Investment Trust, MEMG Family Office	2.19	investment	2/26/2018	unmanned systems	infrastructure
Zededa	Wild West Capital	3.06	investment	2/26/2018	IoT	self-driving cars, industrial automation
Citadel Defense Co.	Lightspeed Venture Partners	12	investment	2/27/2018	unmanned systems	security
Magazino	Korber Group	24.8	investment	2/27/2018	mobile robots	supply chain
5D Robotics	Humatics Corp.		M&A	2/27/2018	self-driving cars	transportation
Aurora	Greylock Partners, Index Ventures	90	investment	2/28/2018	self-driving cars	transportation
Dorabot	Yunfeng Capital		investment	2/28/2018	AI, materials handling	supply chain
Edgybees	Motorola Solutions Venture Capital, Verizon Ventures	5.5	investment	2/28/2018	AR/VR, controls	supply chain
Fourier Intelligence	Prosperico Venture, IDG Capital, Qianhai Fund of Funds, Volcanics Venture	4.8	investment	2/28/2018	exoskeleton	healthcare
Project Alexandria	Paul Allen	125	investment	2/28/2018	AI	
Virtualitics	Centricus, Venture Reality Fund	7	investment	2/28/2018	AI	healthcare, energy
Finch Therapeutics Group Inc.	Shumway Capital, Willett Advisors, Morgan Noble, Avenir Growth Capital	36	investment	3/1/2018	AI	healthcare
Mazor Robotics Ltd.	Biondo Investment Advisors LLC	2.12	investment	3/1/2018	healthcare, surgical	
Restoration Robotics Inc.	Clarus Ventures LLC	16.42	investment	3/1/2018	healthcare, surgical	
Ecosse Subsea Ltd.	Oceaneering	69	M&A	3/1/2018	marine	infrastructure
Wuhan Haoxiaozi Robot Technology Co.	Tarena International Inc.		M&A	3/1/2018		education
Toyota Research Institute-Advanced Development	Toyota Motor Corp., Denso Corp., Aisin Seiki Co.	2800	investment	3/2/2018	self-driving cars	transportation
Hummingbird Technologies		4.1	investment	3/5/2018	drones	agriculture
Luminoso	SD Porter Holdings, Raptor Holdco	12.6	investment	3/5/2018	AI	service
ThoughtWire	Yaletown Partners, BDC Capital, Round13 Capital, Epic Capital, Comerica	20	investment	3/5/2018	IoT	infrastructure, healthcare
EnsoData	Colle Capital	1.5	investment	3/6/2018	AI	healthcare
UiPath	Accel	153	investment	3/6/2018	AI	
Kensho Technologies Inc.	S&P Global	550	M&A	3/6/2018	AI	finance
Klingel Joining Technologies	Atlas Copco	0	M&A	3/6/2018	industrial automation	manufacturing

TRANSACTIONS REPORT 2018 FIRST QUARTER

Robotics Transactions, Q4 2017

Company	Investor, partner, acquirer	Amount (millions \$)	Transaction Type	Date	Technology/software?	Industry
Atomwise	Monsanto Growth Ventures, DCVC, B Capital Group	45	investment	3/7/2018	AI	healthcare
Ocient		10	investment	3/7/2018	AI, big data	
Mojio	Iris Capital and TELUS Ventures	0	investment	3/8/2018		transportation
ReWalk Robotics Ltd.	Timwell Corporation Ltd.	20	investment	3/8/2018	exoskeleton	healthcare
Starsky Robotics	Shasta Ventures	16.5	investment	3/8/2018	self-driving cars	transportation
Fortive Corp.	Altra Industrial Motion Corp.	3,000	M&A	3/8/2018	components	industrial automation
Grab Inc.	Uber Technologies Inc.		M&A	3/8/2018		transportation
QC Industries	Duravant LLC	0	M&A	3/8/2018	manufacturing	supply chain
Prisma Group	Eisvogel Group	0	M&A	3/9/2018	control systems	manufacturing
Formlabs Inc.		30	investment	3/13/2018	3D printing	manufacturing
Moogsoft	Goldman Sachs Growth Equity	40	investment	3/13/2018	AI	
Robotic Vision Technologies Inc.	Edelman Financial Services	10.5	investment	3/13/2018	machine vision	industrial automation
Spensa Technologies	DTN	0	M&A	3/13/2018	machine vision	agriculture
Airspace Systems Inc.	Singtel Innov8	20	investment	3/14/2018	drones	security
Avaamo Inc.	Wipro Ventures	2.02	investment	3/14/2018	AI	
Tao Data	Fosun International	15.8	investment	3/14/2018	AI	
	Victoria, Australia	11.7	investment	3/14/2018	IoT, drones	agriculture
Octopus Robots		32.8	IPO	3/14/2018	mobile robot	agriculture
Blue Vision Labs	Google Ventures	14.5	investment	3/15/2018	machine vision, AR	
Fortem Technologies Inc.	DCVC, Boeing	15	investment	3/15/2018	drones	
Lyft	Magna	200	investment	3/15/2018	self-driving cars	transportation
Built Robotics Inc.		15	investment	3/19/2018		infrastructure, construction
Desktop Metal	Ford, Future Fund	65	investment	3/19/2018	3D printing	manufacturing
Infervision	Sequoia Capital China, Qiming Venture Partners, Genesis Capital, Xianghe Capital, Advantech Capital	47	investment	3/19/2018	AI	
Skycision	AgLaunch Accelerator, Innova Memphis, Scurich Berry Farms	11	investment	3/19/2018	drones	agriculture
twoXAR	SoftBank Ventures	10	investment	3/19/2018	AI	healthcare
Blackmore Sensors and Analytics Inc.	BMW i Ventures, Toyota AI Ventures, Millennium Technology Value Partners, Next Frontier Capital	18	investment	3/20/2018	sensors, lidar for self-driving cars	transportation
Corindus Vascular Robotics Inc.	Hudson Executive Capital Inc.		investment	3/20/2018	surgical	healthcare
Laifual Drive	Northern Light Venture Capital	15	investment	3/20/2018	components	
Mythic	SoftBank, Lockheed Venture Arms	40	investment	3/20/2018	AI	manufacturing
DJI Innovation		500	investment	3/21/2018	drones	consumer

TRANSACTIONS REPORT 2018 FIRST QUARTER

Robotics Transactions, Q4 2017

Company	Investor, partner, acquirer	Amount (millions \$)	Transaction Type	Date	Technology/software?	Industry
Sift Science	Stripes Group	53	investment	3/21/2018	AI	finance
Behold.AI	Simon Rasalingham		M&A	3/21/2018	AI	healthcare
Agility Robotics	Playground Global, Sony Innovation Fund, Robotics Hub	8	investment	3/22/2018	movement	walking, running robots
Bestmile	Road Ventures SA	11	investment	3/22/2018	software	self-driving
Samsara	Andreessen Horowitz, General Catalyst	50	investment	3/22/2018	IoT	supply chain
Neuralmagic Inc.		5	investment	3/23/2018	AI	
Robotics Plus	Yamaha Motor Ventures & Laboratory		investment	3/23/2018	mobile manipulation	agriculture
Robot Union		9.9	investment	3/24/2018		International
Ascent Robotics	SBI Investments	10	investment	3/26/2018	AI	transportation
Arraiy	Lux Capital, SoftBank Ventures	10	investment	3/27/2018	AI	entertainment
Circular Wave Drive	Ikove Venture Partners	2	investment	3/27/2018	engineering	industrial automation
Opentrons	Khosla Ventures	10	investment	3/27/2018		science, pharmaceuticals
RedBear	Particle		M&A	3/27/2018	IoT	manufacturing
Ve.Ma.C	The Middleby Corp.		M&A	3/27/2018		manufacturing
Franklin Robotics		1	investment	3/28/2018	mobile robot	consumer
Scotty Labs	Gradient Ventures	6	investment	3/29/2018	self-driving cars	transportation
Energid	Teradyne		M&A	3/29/2018	control software	
Oxford Robotics Ltd.			investment	3/31/2018	autonomous vehicles	agriculture