ROBOGLOBAL®
INVESTING IN THE ROBOTICS & AI REVOLUTION

ROBO EARNINGS TRENDS: POWERING AHEAD

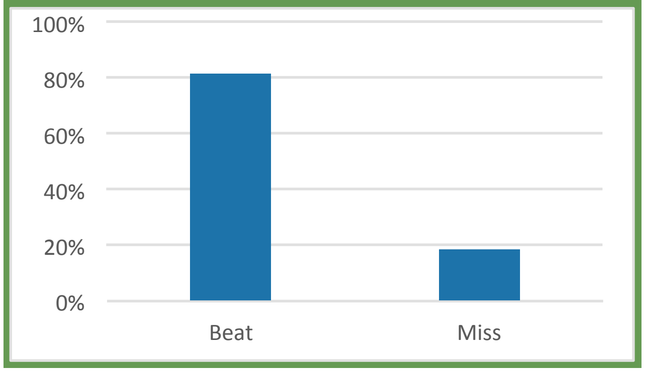
SUMMARY

The ROBO Global Robotics & Automation Index just posted the strongest positive earnings surprise since its inception. This growth was fueled by a universe of Robotics, Automation, and AI companies that continued to power ahead in 4Q17. Median sales growth accelerated to 15% YoY, and consensus earnings estimates for 2018 have increased by 5 percentage points in the past two months. Inside, we discuss key trends that emerged from results of the 87 members of the index, including upgraded outlooks and investments, AI driving demand for semiconductors, industrial robotics strength, and autonomous vehicle technology.

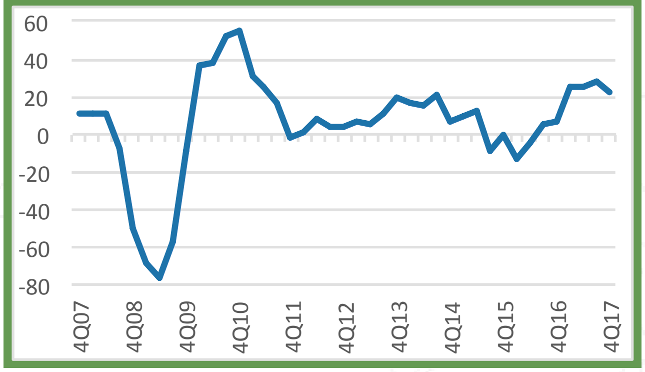
STRONGEST REVENUE GROWTH (+15%) SINCE 2011

The ROBO Index continued to power ahead in 4Q17 as Robotics, Automation, and AI companies reported the strongest positive earnings surprise since the inception of the index, with 88% of index members beating consensus sales estimates[1]. At the median, ROBO Index sales growth accelerated to 15% from 12% in the prior quarter—the strongest growth rate since 2011 when the global economy was recovering from the worst recession in decades. This time, however, this remarkable sales growth is not just the result of low hurdles. Growth in Robotics, Automation, and AI is increasingly broad-based, as reflected in the fact that each and every one of the 12 index subsectors enjoyed double-digit revenue growth. From Actuation (+21%), Food & Agriculture (+19%), and Factory/Industrial Automation (+17%), to Sensing (+15%), Healthcare (+15%), and 3D Printing (+12%), the vast majority of the 87 ROBO index members finished 2017 on a very strong note, with just six companies experiencing revenue declines YoY. The strongest growers in the quarter were Harmonic Drive (+99%), HollySys (+59%), iRobot (+54%), Novanta (+49%), and Fanuc (+41%).

MEDIAN EPS GROWTH (%)



4Q17 EPS vs CONSENSUS



[1] This report discusses median sales and EPS for the 87 index members as of 16 March 2018. The ROBO Global Robotics & Automation Index is a two-tiered equal-weight index.

20%+ OPERATING EPS TRAJECTORY

While median Earnings Per Share (EPS) growth slowed to 23% from 27% in the prior quarter, this was largely due to one-time losses related to the US Tax Cuts and Jobs Act signed into law at the end of 2017. Adjusting for these accounting losses, the ROBO Index remained on a clear 20%+ EPS growth trajectory. In fact, US tax reform is driving another round of upgrades in the earnings outlook across the Robotics, Automation, and AI universe, extending the series of beat and raises to a fifth consecutive quarter. As we approach the end of earnings season, analysts' estimates now point to another year of double-digit topline (+10%) and EPS (+17%) growth. These numbers represent 300bps and 500bps upgrades from two months ago, respectively.

These strong financial results and outlooks continue to support gains in the ROBO Index, which is now up 6% so far in 2018 after a 47% return in 2017. At the median, the Index trades on a forward P/E of 23.6x, a 35% premium to the S&P500's 17.4x.

NOTABLE TRENDS

Upgraded Outlooks

With an increasingly favorable macro backdrop, strong demand growth, and an improved tax environment, many companies have signaled intentions to boost investments in 2018, expand capacity, and accelerate the development of next-generation robotics and automation technologies. A variety of capital investment surveys point to a clear pickup in spending intentions across the global economy, especially in the manufacturing sector, and only a minority of business leaders believe their facilities are flexible enough to meet the challenges facing their businesses. Most of the senior executives of the ROBO Index members we talked to in recent months expect these trends to translate into continued growth in demand for robotics and automation equipment, software, and services.

M&A Acceleration

We also note accelerating activity in M&A. Since 2013, nine ROBO Index members have been acquired, including 4 in the last 18 months. In addition, we have seen another four failed attempts in the past two years, most notably Emerson Electric's $29bn bid for ROBO Index member Rockwell Automation. Index member Qualcomm recently raised its $38bn offer for NXP Semiconductors by $6bn, and Broadcom was forced to withdraw its $117bn bid to buy Qualcomm after President Trump halted the deal due to "national security concerns." Elsewhere in the world of semiconductors, index member Microchip Technology announced a $10bn deal to acquire Microsemi Corporation.

Artificial Intelligence Driving Demand for Semiconductor Chips

The datacenter server market clearly sped up in 2017, with revenue growing 26% in 4Q, driven by an insatiable thirst for more complex applications and a boom in machine learning/AI. Nvidia continues to enjoy tremendous growth on the back of its virtual monopoly position in machine learning chips. Its Data Center business more than doubled in 4Q17 to $606m, $50m above street. This was the 10th consecutive quarter of more than doubling in Data Center revenue, which led to another massive beat and raise. The Volta GPU is ramping at virtually all hyperscale and cloud providers for deep learning. Note that Nvidia's share of the server market remains below 3%, up from 1% in 2016, according to IDC. GPUs are gaining traction in Inference, a very large opportunity that is still untapped, and in high-performance computers—a space Nvidia dominates with 87 of the world's top-500 supercomputers using its semiconductor chips.

Meanwhile, Xilinx recently introduced an adaptive compute acceleration platform (ACAP) to accelerate a broad set of applications in the emerging era of big data and AI. This brand new architecture should allow Xilinx to expand its total addressable market and move the company beyond FPGAs. Specifically, its Everest line of products is expected to achieve 20x performance improvement on deep neural networks compared to current 16nm FPGA solution sets. On the company's 4Q'17 earnings call, Xilinx posted strong margin and revenue performance in the Industrial segment and projected that its Data Center segment should see acceleration in 2H of the year with the introduction of new product lines. Xilinx remains focused on reaching $250-300M in Data Center revenues by 2020.

Industrial Robotics Remains Strong

Demand for industrial robotics remains particularly strong, as reflected in surging revenue at the world's top-three suppliers. Fanuc sales grew 41% YoY and orders expanded 44% YoY, driving earnings 18% above consensus. Management lifted full-year guidance for the third time. Fanuc is now able to meet demand, although lead times are still getting longer for certain robo-machines. At Universal Robots, the global leader in collaborative robots owned by Teradyne, sales grew 61% in 4Q and 72% for the year, accelerating from 62% in 2016 and 58% in 2017. Management continues to expect more than 50% growth in 2018. At Yaskawa, sales grew 14% YoY and Robotics margins exceeded 12%. ABB's Robotics and Motion sales grew just 6%; however, this was largely due to a decline in sales of large motors used in process industries, while demand for robots in China was particularly strong, especially in the electronics assembly markets.

Healthcare Robotics & Automation Continues its Winning Streak

Surgical systems companies such as Intuitive Surgical and Mazor Robotics posted excellent results, with momentum continuing into 4Q. Intuitive Surgical once again delivered strong worldwide procedure growth of ~17% in Q4. Reflecting on full-year procedure growth, 2017 was a very strong year of procedure growth driven by US (+33%) and International (+24%). We believe Intuitive Surgical should be able to grow its top line by double digits as the momentum of robotic surgery in the US and abroad continues its upward swing and a stronger than expected pipeline that will expand its TAM. As previously mentioned, Mazor's 4Q sales rose +36% YoY, driven by ongoing market penetration, Medtronic's distribution agreement, and solid utilization.

Novanta, a recent addition to the ROBO Global Index, is a premier supplier of photonics, precision motion, and optical control solutions with exposure to secular growth trends in multiple end markets, including Healthcare. Novanta finished the year on a strong note, with 4Q revenue growth of +49% YoY and particular strength in growth applications such as DNA sequencing, robotic surgery, endoscopy, advanced laser material processing, and various automation-related markets.

Enterprise Software Rebounded

Software companies such as PTC, Autodesk, and Dassault Systems experienced broad-based strength in 4Q17. PTC saw growth in all segments, including CAD, PLM, and IoT, which drove continued momentum. Excluding a mega-deal in Q4, IoT bookings grew more than 30%. Meanwhile, Autodesk also experienced strength across all key metrics. The company is currently investing aggressively to expand its digital infrastructure, increasing go-to-market and development spend for the construction opportunity which should allow the company to continue its momentum throughout the year. Dassault Systems experienced double digit top-line growth YoY as their solutions help industry leaders and startup companies disrupt their respective industries with its 3D and virtual reality experiences for end users in areas such as retail, smart city, engineering/construction, and life sciences.

Advancement in Autonomous Cars is Accelerating

While we may be a few years away from fully autonomous, self-driving vehicles on the road, the key technologies that will enable this are in rapid development today. Accelerated growth seen by many of our Index members such as Qualcomm, Microchip, Ambarella, Denso, Flir Systems, Keyence, and Nvidia is being driven by technology developments in Sensing, Machine Learning algorithms, and advanced hardware systems and processors. According to Bloomberg's New Energy Finance, 21 states have passed autonomous vehicle legislation, and 19 of these enable testing of autonomous vehicles on public roads.

MOVERS & SHAKERS

3D Systems Up 44% YTD. 3D Systems is a leading provider of 3D printing-centric design-to-manufacturing solutions, including 3D printers and print materials. The company issued revenue and EPS guidance that strongly exceeded consensus expectations and implying sales growth of 6-7% and QoQ growth of 15-16%. The filing of its 10-k was delayed to adjust for warranty revenue and costs as the company adopts a new accounting standard.

Zebra Technologies Up 38% YTD. Zebra is the world's leading provider of solutions to track and trace products and components in supply and distribution chains, including barcode readers, mobile computers, and warehouse management tools. As retail moves online, the requirements for tracking increase exponentially. This demand is driving Zebra's sales of barcode and RFID readers, printers, etc. Zebra reported significantly better than expected sales (+9%) and EBITDA (+14%) for 4Q17, and guided 1Q18 meaningfully above consensus as its Enterprise Asset Intelligence solutions continue to gain traction. In addition, strong cash flow continues to enable rapid deleveraging.

Mazor Robotics Up 33% YTD. The Israel-based company develops revolutionary robotic-based technology for spine surgery, including pre-op analytics and intra-op trajectory guidance for the placement of implants. The stock was already a top performer in 2017 (+135%), resulting from surging orders for the Mazor X system, an extended partnership with Medtronics, and the publication of a clinical study involving more than 10 surgeons and 400 patients demonstrating a 5x reduction in surgical complications and 7x reduction in revision surgeries compared with the free-hand technique. Better than expected orders and financial results in 4Q17 supported another leg up in the share price YTD.

PTC Up 32% YTD. PTC is a leading design software solution provider for the CAD, PLM, and IoT markets. PTC is well positioned in the secular growth trends in the IoT and automation markets with its product leadership and innovative product strategy. PTC posted very solid results and bookings that hit record highs that were above the company's guidance. PTC raised guidance across most metrics, including FCF, reflecting the pattern of accelerating earnings growth as the subscription model matures.

FARO Technologies Up 25% YTD. FARO provides solutions for automated measurement and inspection, including data capturing and 3D visualization. FARO has positioned itself to capture growth this past year and beyond coming from positive fundamentals across their addressable market. Investments in sales and marketing are finally paying off, and new segments of the business such as Construction should continue to drive growth. FARO management believes that Construction is a large addressable market that has not fully embraced technology to maximize efficiently. Revenue from the Construction industry grew 30% YoY in 2017.

Maxar Technologies Down 33%YTD. Maxar is a Canadian-based Satellite, Surveillance, and Intelligence solutions provider for commercial and government sectors. Maxar plays across the entire space value chain, including satellites, owning and operating spacecraft, and delivering imagery, geospatial analytics, and data services. Maxar's 4Q report was weaker than expected due to new accounting segmentation and deceleration in Space System business, which is subject to a consistently lumpy sales cycle. Going forward, Maxar will reinvest in its business with higher OPEX. This lowers the FCF generation, but we believe that it is the right strategy given the growing pipeline of opportunities.

SLM Solutions Down 27% YTD. SLM Solutions is a leading provider of 3D metal printing equipment. The stock got hit as delivery postponement into 1H18 led to lower than expected 4Q sales, and management guided FY18 revenue below consensus. However, orders remain strong. Orders were up 110% in 2017 and more than 200% in 4Q, driven by two major long-term framework agreements with Asian energy and tooling customers. Little more than a year after GE's acquisitions in the metal printing space, the dust is settling, and SLM appears well positioned as a standalone player. We also note the stock surged 47% in 2017 and 71% in 2016.

ROBO GLOBAL YEAR-TO-DATE PERFORMANCE

The ROBO Global Robotics & Automation Index rose 6% year-to-date through March 16, 2018, largely outpacing the MSCI All-Country World Index (2%) and the S&P500 (3%), but underperforming the NASDAQ (8%). The top and bottom performers and returns of each of the 12 Index subsectors are shown in the figures below.

	Year-to-date	Past 12m
Total Return (%)	6	38
Applications	5	35
3D Printing	10	-1
Consumer Products	-9	19
Energy	-13	-19
Food & Agriculture	0	26
Healthcare	19	48
Logistics Automation	11	55
Manufacturing & Industrial	3	42
Security	-22	24
Technologies	6	40
Actuation	7	58
Computing, Processing & AI	10	33
Integration	1	22
Sensing	4	44

Note: As of 16 March 2018