ROBOGLOBAL®
INVESTING IN INNOVATION

SECOND QUARTER IN REVIEW: ROBO GLOBAL INNOVATION INDICES

ROBO, HTEC, and THNQ

SUMMARY

The ROBO Global innovation indices had their strongest-ever quarterly returns in Q2, largely recouping their Q1 losses and leaving them significantly ahead of global equities halfway through 2020. The Robotics & Automation Index (ROBO) returned 29%, while the Artificial Intelligence Index (THNQ) jumped 44%, and the Healthcare Technology & Innovation Index (HTEC) rose 31% in Q2. The Covid-19 crisis has triggered an acceleration of the digitalization of the economy. With strong balance sheets and a small-mid-cap tilt, the ROBO Global index portfolios are well positioned to continue to outperform. In this report, we discuss key sector trends and big movers.

PERFORMANCE 2Q2020 (%)

Robo Global Indices		2Q2020	YTD	1-year	3-year	5-year
ROBO	Robotics & Automation	29.12%	3.43%	10.12%	9.26%	11.70%
THNQ	Artificial Intelligence	43.82%	22.61%	29.56%	32.50%	28.89%
HTEC	Healthcare Technology & Innovation	31.11%	16.65%	24.87%	28.00%	25.76%
Global Equities						
ACWI	AC World Equities	19.22%	-6.25%	2.11%	6.13%	6.45%

Prior to 30 April 2019, HTEC data is based on simulated back-casted data. Prior to 21 August 2018, THNQ data is based on simulated back-casted data.

Market Commentary

Global equities bounced hard off their March lows to gain 19% in Q2 as the coronavirus pandemic receded in Asia and Europe and US stocks had their best quarter in 20 years, led by technology stocks. Against this backdrop, the ROBO Global indices continued to outperform global equities in Q2, with the Robotics & Automation Index (ROBO) rising 29.1%, the Healthcare Technology & Innovation Index (HTEC) up 31.1%, and the Artificial Intelligence Index (THNQ) up 43.8%. As shown in the above table, the three research-driven index strategies have largely outperformed the MSCI All-Country World Index year-to-date and over the past one, three, and five years.

As we discussed in our report three months ago, history tells us that bear markets don't start with recession—they end with recession. Multiple factors now point to the fact that the global recession triggered by the decision to lock down economies has now passed its nadir. Technology has proven critical to support distributed work environments and businesses are discovering new ways to operate safely amid the pandemic. While there is concern that the pandemic is not yet under control in the Americas, it is now realized that the impact of lockdowns on people's general livelihood is a bigger negative than Covid-19 itself. As such, we expect the re-opening dynamic to remain firmly in place and to continue to drive expectations for a V-shaped economic recovery, supported by pent-up demand for goods and services that were unavailable during the lockdown, as well as low oil prices. Investor sentiment has turned broadly bullish, and risk now appears to have shifted to an overheating of the financial markets thanks, in part, to governments' likely reluctance to prematurely remove the greatest monetary and fiscal stimulus ever enacted, equaling well over 20% of global GDP.

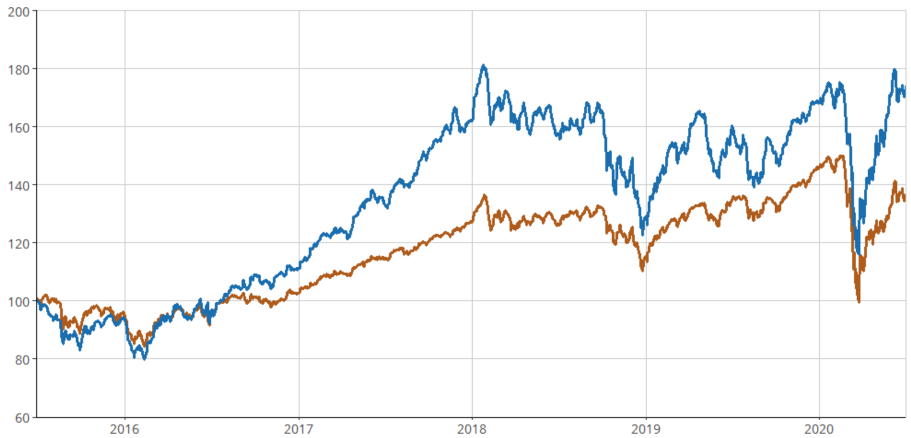
In the current environment, we believe our portfolios are well positioned to continue to outperform. Our strategies are focused on technology disruptors that are likely to gain share as the digitalization of the economy accelerates, especially in the areas of artificial intelligence, factory and logistics automation, enterprise software, and healthcare technologies. Our strategies have high exposure to some of the key near-term beneficiaries, such as healthcare, factory automation, and e-commerce, which have led the equity rally and propelled THNQ up 23% so far this year. Our index portfolios also have very strong balance sheets, providing the cash necessary to weather the storm. The ROBO portfolio had a weighted average net debt of 0 at the end of Q2, with 62% of its members holding a net cash position, compared with just 15% of S&P 500 index members and 22% of MSCI ACWI index members. Similarly, HTEC and THNQ had 56% and 69% of their members holding a net cash position.

The ROBO and HTEC indices are positioned to outperform as the re-opening dynamic continues. After big sell offs, small-caps, mid-caps, and early cyclicals tend to do best, as they did in Q2. However, small-caps remain laggards so far this year. Both indices are strongly tilted toward small- and mid-cap companies, at 69% and 60% respectively, and typically have less than 3% overlap with stocks in most growth oriented portfolios. We note that ROBO is composed mostly of international stocks (55%), with 13 countries represented and a significant overweight in Asia (32%), including Japan (20%). In fact, Asia accounts for 39% of index revenue—an important consideration given that China appears to be positioned to be the first country to emerge from the pandemic and get back to business as usual.

ROBO: ROBO GLOBAL ROBOTICS & AUTOMATION INDEX

Robotics, automation, and AI stocks continued to outperform global equities in Q2, with the ROBO Global Robotics & Automation Index (ROBO) returning a total 29.1% in the quarter—the strongest quarterly performance since inception in 2013. This was 9.1 percentage points more than the MSCI AC World Index return of 19.2%. All 12 sectors recorded gains, led by Consumer (+105%), Logistics Automation (+40%), and Actuation (+33%), while 3D Printing (+5%), Healthcare (+18%), and Food & Ag (+22%) lagged. By region, the US (+32%) led Europe (+30%) and Asia (+24%), which was dragged down by Japan (+23%) and China (+14%). As of 30 June 2020, over 62% of ROBO index members held a net cash position, and at the portfolio level, the net debt to EBITDA for the portfolio stood at 0.

ROBO Global® Index Performance

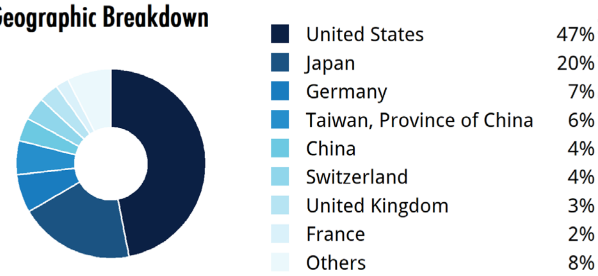


	Last Qtr	YTD	1 Year	5 Year
ROBO GLOBAL® ROBOTICS AND AUTOMATION INDEX	29.12%	3.43%	10.12%	74.00%
GLOBAL EQUITY INDEX	19.22%	-6.25%	2.11%	36.72%

Rebased 100 on June 30, 2015; Total Return through June 30, 2020

ROBO Sub-Sector (Total Return)	Last Quarter	Last 12 Months
Consumer Products	105.1%	-8.4%
Logistics Automation	39.7%	18.4%
Actuation	32.9%	18.3%
Manufacturing & Industrial Automation	32.2%	8.4%
Security	30.6%	42.5%
Computing, Processing, & AI	30.0%	20.0%
Sensing	26.5%	14.9%
Integration	23.6%	-5.1%
Food & Agriculture	21.9%	-15.9%
Healthcare	17.7%	-0.2%
3D Printing	4.7%	-20.3%
Energy	—	-32.4%
INDEX TOTAL	**29.1%**	**10.1%**

Geographic Breakdown



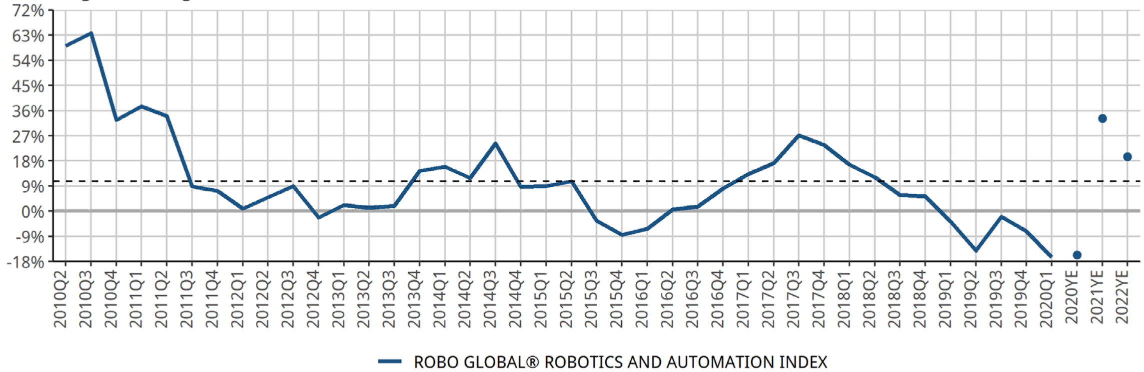
As a direct result of the pandemic, we anticipate nearly 80% of ROBO index members to report a drop in sales for Q2, with some of the worst declines in surgical robotics and factory automation. On a more positive note, the remaining 20% either remain on a strong growth trajectory, such as AI chip and software providers, or have already returned to growth, such as the vast majority of Chinese automation companies, which were hit by COVID-related disruptions in Q1. We expect that a majority of ROBO index members will emerge from this crisis on a stronger footing. For example, Logistics & Warehouse Automation (which accounts for 11% of the ROBO index by weight) is benefiting from the enormous strain currently put on e-commerce, and Factory Automation (~35%) is also bound to accelerate. Healthcare Automation (12%) will be in high demand as the pandemic recedes, while Computing, Processing & AI (22%) has proven to be the backbone that is enabling many aspects of remote working.

Investors should note that ROBO is significantly overweight in small-caps and mid-caps, which together account for over 60% of the index by weight. While small- and mid-cap companies have historically shown outperformance in market recoveries, as they did in Q2, they remain behind large-caps so far this year. Many of the ROBO factory automation plays (~35% of the index by weight) remain way off their earlier highs. This is particularly true in Japan and China, where many of the leading providers of factory automation solutions are headquartered. With China seemingly emerging from the COVID-19 crisis first, these stocks were conspicuous laggards in Q2.

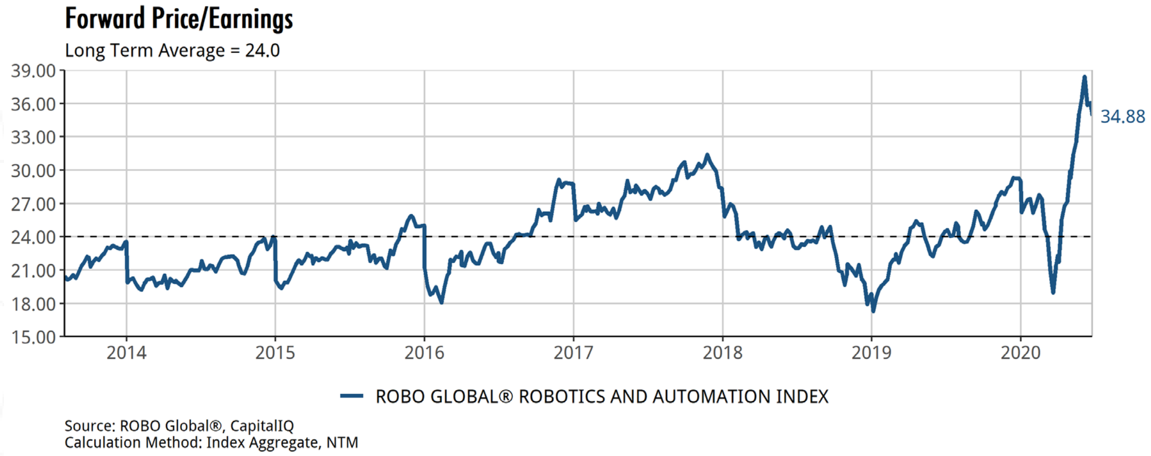
We believe this set-up remains attractive for robotics, AI, and automation stocks. Equities of best-in-class automation stocks from around the world are now trading on a trailing P/E of 28x, a 14% premium to the long-term average of 24x and the 2018 high of 35x. We expect 2020 EPS to decline by 15% at the median, and we believe that after bottoming in Q2, earnings are set to improve sequentially from Q3 onward. Current consensus estimates point to 33% median EPS growth for 2021.

Median EPS Growth

Long Term Average = 10.8%



Source: ROBO Global®, CapitalIQ
Growth rates of current index members as of 2020-06-30



MOVERS & SHAKERS

iRobot (+105%) was the best performer in the quarter. The leading home automation company and creator of the Roomba robotic vacuum cleaner, iRobot raised its expectations for second quarter revenue by nearly 40%—and for profits to return—after experiencing strong orders for premium Roomba robot vacuums and Braava robot mops. After seeing significant margin pressure in 2019 due to the weight of China import tariffs, iRobot has emerged as the best performing stock in the ROBO index so far this year, up 70% YTD.

Manhattan Associates (+89%), the best-of-breed provider of supply chain management software and services, is a key beneficiary of the secular automation trends in the logistics/warehouse industry and the boom in e-commerce. The company has grown revenue at a 5% CAGR in the past five years and accelerated to 10% in the past 12 months. With its cloud-native offering, it is well positioned to continue to capitalize on the retail industry's transition to omni-channel strategies. Near term, we think Manhattan Associates may also benefit from a sizable reduction in workforce at its main competitor.

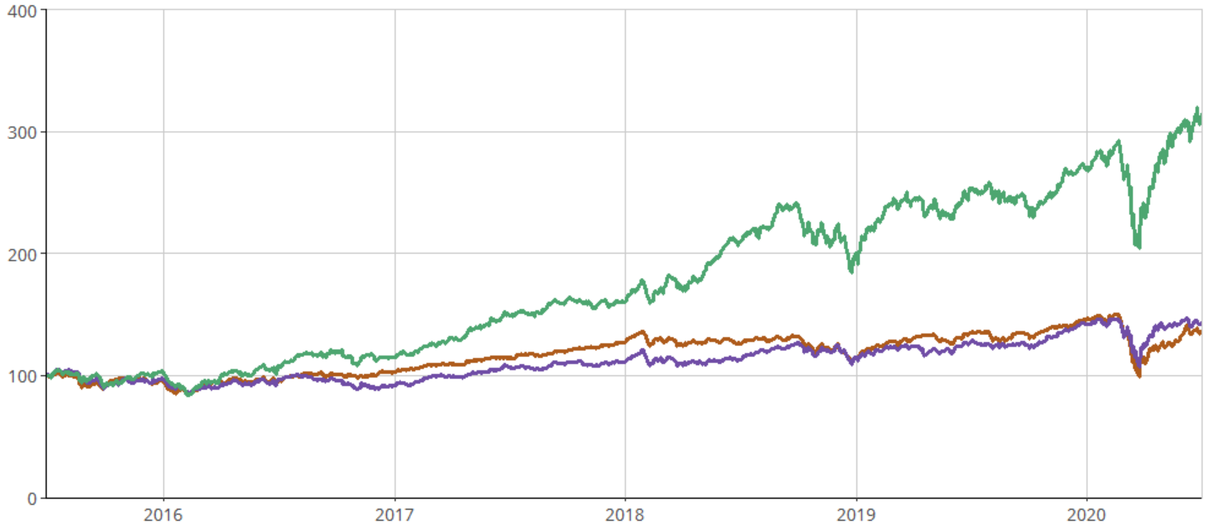
3D Systems (-9%), a dominant player in additive manufacturing, reported a weak start to 2020 with printer sales down 35% YoY, and warned of a more severe decline in its largely capex-driven business in Q2. The 3D printing industry is highly exposed to the automotive and aerospace industries, as well as elective healthcare. While 2020 is shaping up to be a particularly challenging year for the 3D printer industry, we remain confident in its potential for rapid growth over the long term.

Amano (-6%), the Japanese provider of time management IT solutions and automated parking solutions, announced surprisingly low profit guidance for the fiscal year starting April 2020, with an expected -60% YoY decline. That surprising drop follows a five-year growth period during which Amano grew EBIT at a 12% CAGR. The guidance was issued during the last week of April when car traffic was at unprecedented lows due to the pandemic and business negotiations were being disrupted by lockdowns.

HTEC: HEALTHCARE TECHNOLOGY & INNOVATION INDEX

The Healthcare Technology & Innovation Index (HTEC) returned 31.1% in 2Q2020, after declining by 11.0% in Q1, exceeding the MSCI AC World Index (+19.2%) and the S&P Global Healthcare Index (+13.6%). HTEC saw double-digit returns across eight of its nine sectors, led by Data Analytics (+46%), Diagnostics (+43%), and Precision Medicine (+41%). Regenerative Medicine was the lowest performing subsector (–3%). The index closed the quarter with a median market cap of $10.5B, and with 55% of the portfolio holding a positive net cash position.

ROBO Global® Index Performance



	Last Qtr	YTD	1 Year	5 Year
ROBO GLOBAL® HEALTHCARE TECHNOLOGY AND INNOVATION INDEX[1]	31.11%	16.65%	24.87%	214.94%
GLOBAL HEALTHCARE INDEX	13.61%	0.89%	13.76%	43.76%
GLOBAL EQUITY INDEX	19.22%	-6.25%	2.11%	36.72%

Rebased 100 on June 30, 2015; Total Return through June 30, 2020
1: Includes back-tested data prior to April 30, 2019

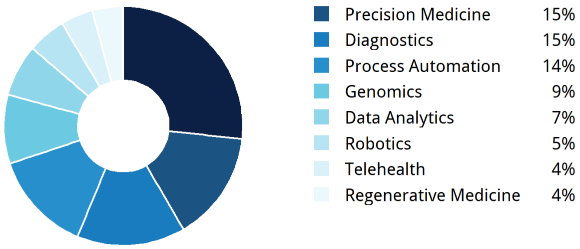
By subsector, Data Analytics returned 46%, driven by increasing demand for remote patient monitoring capabilities during the COVID-19 pandemic, enabled by cutting-edge software platforms from companies like Livongo (+163%). In Diagnostics, global market-leading companies like Quidel (+129%) and Hologic (+62%) experienced increased demand as they each launched a broad array of new coronavirus tests.

Precision Medicine returned 41%, driven by rapid innovation in coronavirus vaccines and treatments, as well as breakthrough advancements in other therapeutic areas. Moderna (+114%), a pioneer in mRNA therapy, utilizes AI and digitization throughout its entire R&D process, which enables the company to advance innovation at record speeds. During the quarter, Moderna advanced its mRNA SARS-CoV2 vaccine into Phase II, and expects to report data and initiate Phase III as early as next month. CRISPR Therapeutics (+73%) and Vertex Pharmaceuticals (+22%) presented updated data on their CTX001 CRISPR/Cas9 gene editing trial showing that two patients on their beta thalassemia therapy have become transfusion independent. CRISPR also announced plans to build a new state-of-the-art facility in Massachusetts to advance the production of its allogeneic CAR-T programs.

HTEC's lowest performing subsector, Regenerative Medicine, declined by 3% in Q2, driven by delays in elective surgeries that rely on these companies' technology.

ROBO Sub-Sector (Total Return)	Last Quarter	Last 12 Months
Data Analytics	45.8%	37.1%
Diagnostics	42.7%	28.4%
Precision Medicine	40.7%	47.4%
Genomics	40.5%	18.8%
Telehealth	38.0%	113.8%
Process Automation	26.6%	21.8%
Medical Instruments	20.7%	8.8%
Robotics	14.5%	-0.4%
Regenerative Medicine	-2.6%	-27.8%
INDEX TOTAL	**31.1%**	**24.9%**

HTEC INDEX
Industry Classification



MOVERS & SHAKERS

Livongo (+164%) offers devices that can help people manage their chronic illnesses, like diabetes and hypertension. Due to the high risk of severity of COVID-19 among this population, Livongo saw an acceleration of adoption as member enrollment doubled year over year in Q1.

Quidel (+129%), a global leader in diagnostics, changed the game in COVID-19 testing by becoming the first company to receive FDA authorization for a COVID-19 antigen test that costs less than its molecular counterparts and can be processed in 15 minutes.

Novocure (-12%) offers a medical device that uses electric fields to help treat cancer tumors. Like many med tech companies, Novocure experienced delays in trial enrollment due to the pandemic, creating uncertainty in its pipeline. However, the commercial business maintained continuity throughout the pandemic, treating every patient that was scheduled. Novocure recently obtained regulatory approval in China, which we believe will expand its market further.

Axogen (-11%), a regenerative medicine company specializing in nerve repair, experienced a significant decline in revenue during the pandemic due to delayed procedures of existing trauma patients, as well as a reduction in new trauma patients from fewer people driving and doing activities. However, Axogen has since seen a gradual ramp back up in procedures. We believe its newly expanded sales force and a recent financing deal positions Axogen for long-term growth.

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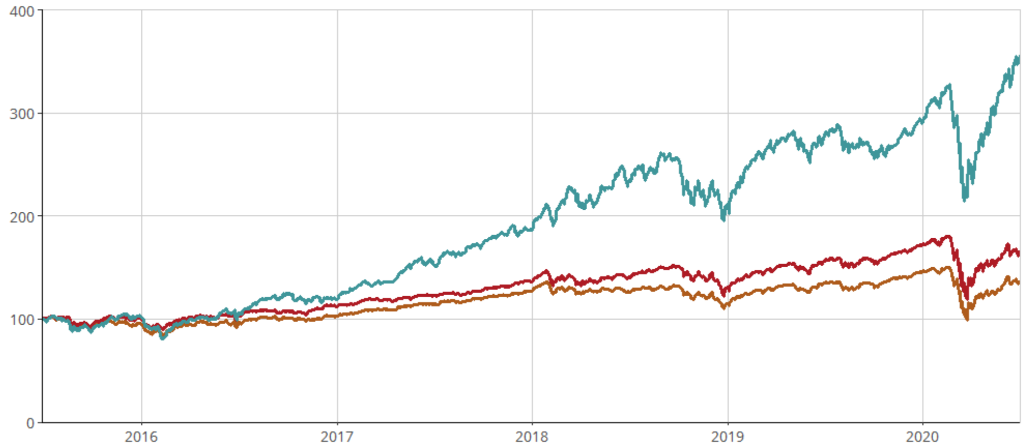
THNQ: ROBO GLOBAL ARTIFICIAL INTELLIGENCE INDEX

The ROBO Global Artificial Intelligence Index (THNQ) surged 43.8% in Q2, outperforming the MSCI AC World Index (+19.2%) and S&P 500 (+20.5%). Every sector ended in positive territory, with E-commerce (84.1%), Big Data Analytics (63.0%), and Consumer (61.8%) as the top contributors. Many of the THNQ index members are experiencing a surge in revenue as demand for cloud solutions combined with AI capabilities continues to gain momentum. These market leaders are building key data assets and leveraging machine learning capabilities to deliver new revenue streams and drive cost savings. Meanwhile, 69% of the THNQ Index members hold a net cash position, which bodes well in navigating through the current volatile environment.

Valuation has risen significantly during the quarter to a median of 7.6x EV/Sales (NTM), versus a median of 5.5x EV/Sales (NTM) in the previous quarter. Many of the developers and providers of AI and cloud services in the index have proven to have resilient business models with truly exponential revenue growth. The past quarter indicates that investors are paying the premium to own these companies as new business models such as Infrastructure-as-a-Service (IaaS) and Platform-as-a-Service (PaaS) are being created. Longer term, we anticipate that enterprises will continue to make greater capital investments in technology—especially in the areas of artificial intelligence, advanced analytics, and cloud computing—which should continue to support growth prospects for these index members. More details are available on the **ROBO Global Artificial Intelligence Index factsheet.**

Once again, the E-commerce subsector experienced tremendous growth as stay-at-home orders caused by the pandemic boosted demand for online shopping, highlighting the importance of digital transformation. Index members Wix (+154%) and Shopify (+128%) benefited from providing solutions that connect merchants with customers using advanced analytic and machine learning algorithms. Big Data Analytics delivered strong performance as companies like Alteryx (+73%) and Splunk (+57%) empowered business owners to gather and leverage intelligent data to deliver meaningful insights for use in the decision-making process. Consulting Services underperformed during Q2 due to a softer demand for strategy and consulting services as major projects remained on pause. However, we are starting to see signs of recovery in this sector as the economy begins to reopen and travel restrictions are lifted in certain regions. After declining over 50% in Q1, shares of Accenture (+32%) recovered nicely during Q2. The digital transformation that was well under way before the crisis has clearly accelerated, and consulting companies with strength in AI are positioned to benefit from this ongoing shift.

ROBO Global® Index Performance

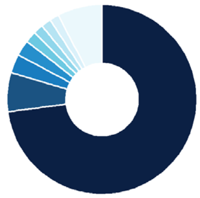


	Last Qtr	YTD	1 Year	5 Year
ROBO GLOBAL® ARTIFICIAL INTELLIGENCE INDEX[1]	43.82%	22.61%	29.56%	256.25%
US EQUITY INDEX	20.54%	-3.08%	7.51%	66.45%
GLOBAL EQUITY INDEX	19.22%	-6.25%	2.11%	36.72%

Rebased 100 on June 30, 2015; Total Return through June 30, 2020
1: Includes back-tested data prior to August 21, 2018

ROBO Sub-Sector (Total Return)	Last Quarter	Last 12 Months
Ecommerce	84.1%	75.8%
Big Data/Analytics	63.0%	46.8%
Consumer	61.8%	18.0%
Cognitive Computing	57.1%	64.1%
Factory Automation	38.3%	22.0%
Healthcare	36.9%	17.6%
Semiconductor	36.5%	44.5%
Consulting Services	34.0%	5.7%
Business Process	28.7%	3.2%
Cloud Providers	28.2%	37.0%
Network & Security	24.9%	4.2%
INDEX TOTAL	**31.1%**	**24.9%**

Geographic Breakdown



MOVERS & SHAKERS

Wix (+154%) is the leading provider of website design using AI delivered strong results. The current crisis has magnified the importance of having an online presence for SMBs, entrepreneurs, and brands, pushing many to move their businesses online as quickly as possible to engage with customers. Wix benefited from this shift, adding over 3 million new users in the first quarter, an increase of 63% YoY. Wix also has a very strong balance sheet, and free cash flow (FCF) increased 35% YoY during Q2.

Twilio (+145%), the cloud-based communication software provider, posted its Q1 results at the end of June, announcing 57% revenue growth fueled by the company's unique customer engagement platform that automates call centers using AI capabilities. Its messaging platform, which is embedded with a machine learning algorithm to improve customer interactions, remains unmatched in the marketplace. Twilio has nearly 200,000 active customers spanning every industry, and is well positioned to navigate through the new digital era as they continue to invest in its technology, AI talent and their latest AI powered Platform-as-a-Service (PaaS) model.

Teradata (-1%), a leading pioneer of data warehouse solutions, has been shifting its business to hybrid cloud analytic solutions for the past two years. However, due to ongoing macro challenges and decelerating earnings growth, first quarter results were underwhelming. Teradata will have to spend the next few years revamping its go-to-market approach with a new CEO on board. The company is also losing market share to its peers at a faster pace than we had anticipated.

Blue Prism (+1%), a leader in Robotic Process Automation (RPA), experienced weaker than expected closing rates due to the impact of the pandemic. However, the company is seeing increased interest in its new platform and a strong pipeline as companies look to automate tasks and reduce operating expenses. Its new Digital Workforce platform is embedded with advanced AI capabilities to help optimize production processes, increase profitability, and enhance customer experiences.

ROBO

ROBO Global Robotics & Automation Index

Roboglobal.com/ROBO

SUBSECTOR	EXPOSURE
Application	**48.89%**
3D Printing	2.84%
Consumer Products	1.61%
Food & Agriculture	5.47%
Healthcare	11.86%
Logistics Automation	10.63%
Manufacturing & Industrial Automation	14.84%
Security	1.64%
Technologies	**51.11%**
Actuation	11.21%
Computing, Processing, & AI	22.78%
Integration	7.38%
Sensing	9.74%

TOP 10 HOLDINGS	WEIGHT
DAIFUKU CO LTD	1.72%
MANHATTAN ASSOCIATES INC	1.70%
NVIDIA CORP	1.68%
ILLUMINA INC	1.65%
AEROVIRONMENT INC	1.64%
SERVICENOW INC	1.64%
COGNEX CORP	1.63%
IROBOT CORP	1.61%
KARDEX HOLDING AG	1.61%
BROOKS AUTOMATION INC	1.60%
TOTAL	**16.48%**

HTEC

ROBO Global Healthcare Technology & Innovation Index

Roboglobal.com/HTEC

SUBSECTOR	EXPOSURE
Data Analytics	7.02%
Diagnostics	14.67%
Genomics	9.30%
Medical Instruments	26.74%
Precision Medicine	14.86%
Process Automation	13.65%
Regenerative Medicine	4.20%
Robotics	5.18%
Telehealth	4.38%

TOP 10 HOLDINGS	WEIGHT
INVITAE CORP	1.97%
STAA R SURGICAL CO	1.90%
NATERA INC	1.83%
QUIDEL CORP	1.81%
NUANCE COMMUNICATIONS INC	1.66%
PING AN HEALTHCARE AND TECHNOLOGY CO LTD	1.66%
CELLECTIS SA	1.61%
INSULET CORP	1.61%
ILLUMINA INC	1.55%
NEOGENOMICS INC	1.54%
TOTAL	**17.14%**

THNQ

ROBO Global Artificial Intelligence Index

Roboglobal.com/THNQ

SUBSECTOR	EXPOSURE
Applications & Services	**49.09%**
Business Process	16.34%
Consulting Services	2.65%
Consumer	9.06%
Ecommerce	12.48%
Factory Automation	2.73%
Healthcare	5.83%
Infrustructure	**50.91%**
Big Data/Analytics	12.95%
Cloud Providers	10.02%
Cognitive Computing	6.71%
Network & Security	9.11%
Semiconductor	12.11%

TOP 10 HOLDINGS	WEIGHT
SPOTIFY TECHNOLOGY SA	1.98%
ALTERYX INC	1.94%
VEEVA SYSTEMS INC	1.86%
TENCENT HOLDINGS LTD	1.85%
CLOUDFLARE INC	1.83%
NUANCE COMMUNICATIONS INC	1.80%
AMAZON.COM INC	1.79%
MICROSOFT CORP	1.75%
SPLUNK INC	1.75%
SALESFORCE.COM INC	1.73%
TOTAL	**18.28%**