ROBOGLOBAL
INVESTING IN INNOVATION

FIRST QUARTER IN REVIEW: ROBO GLOBAL INNOVATION INDICES

ROBO, HTEC, and THNQ

SUMMARY

The Robotics & Automation Index (ROBO) returned 4.5% in the first quarter of 2021, the Healthcare Technology & Innovation Index (HTEC) rose 0.5%, and the Artificial Intelligence Index (THNQ) decreased 1.2%. With tech stocks trailing and cyclical and value stocks catching up as the economic recovery continues to broaden, the ROBO Global innovation indices exhibited the benefits of diversification. In this report, we discuss why robotics, AI, and healthcare technologies continue to look attractive and note the current key trends and big movers across our index portfolios.

PERFORMANCE 1Q2021 (%)

ROBO Global Indices		1Q2021	1-year	3-year	5-year
ROBO	Robotics & Automation	4.52%	89.85%	15.85%	21.76%
THNQ	Artificial Intelligence	-1.19%	94.91%	31.22%	37.08%
HTEC	Healthcare Technology & Innovation	0.54%	88.21%	37.70%	35.72%
Global Equities					
ACWI	AC World Equities	4.57%	54.60%	12.05%	13.21%

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 rose 4.6% in the first quarter of 2021, led by small caps, value, and cyclical stocks, while the "Covid-19 winners" of 2020, especially large cap growth stocks, retreated. This was in the context of a broadening and increasingly strong economic recovery and continued fiscal and monetary support. Against this backdrop, and after gains of more than 45% in 2020, the ROBO Global indices demonstrated resilience in Q1, with the Robotics & Automation Index (ROBO) rising 4.5%, the Healthcare Technology & Innovation Index (HTEC) up 0.5%, and the Artificial Intelligence Index (THNQ) down 1.2%. As shown in the above table, the three research-driven index strategies have largely outperformed the MSCI ACWI over the past one, three, and five years.



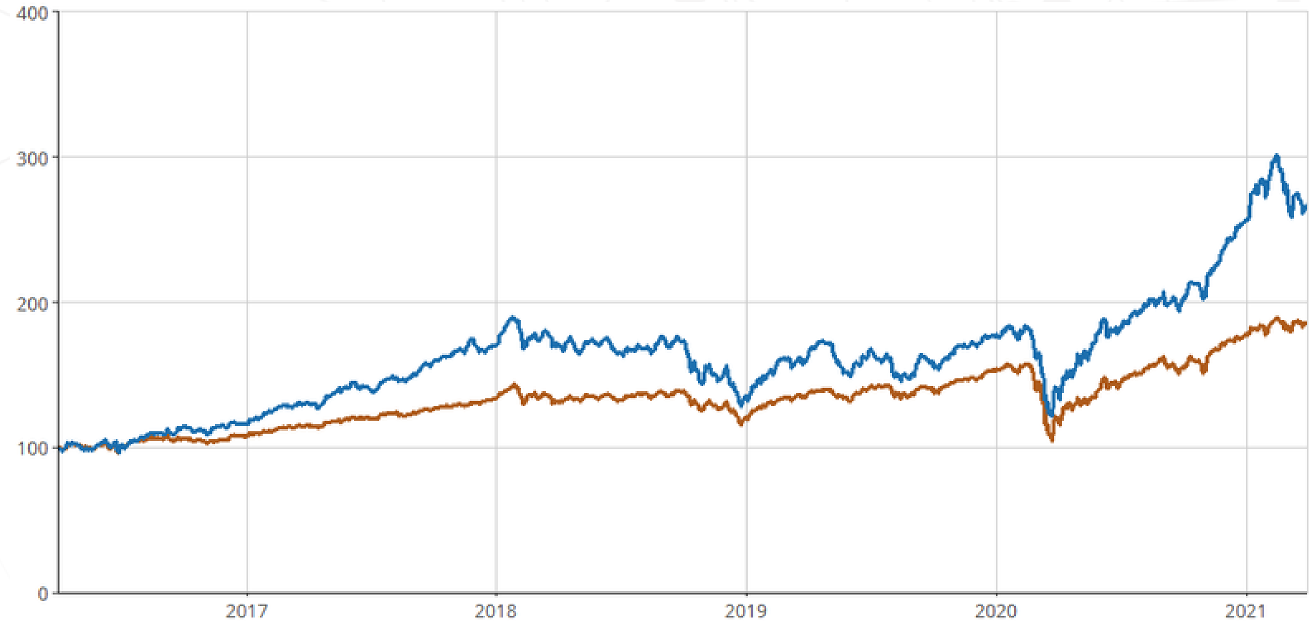

With mass vaccinations in full swing and governments and central banks determined to continue to stimulate aggressively, the global rebound has now gathered significant momentum, led by a US economy on track to grow at the fastest pace since the 1960s. And yet we see no sign of a step back in terms of the massive fiscal and monetary stimulus in all key regions, which totals more than 20% of global GDP. Policy makers around the world remain strongly committed to continuing to support a stimulus, even in the face of rising inflation expectations. Early-cycle segments of the economy, such as housing, automotive, and manufacturing remain particularly strong.

Global factory output continues to rise at some of the fastest rates seen over the past decade. Over the past couple of months, US services activity and job openings have also come roaring back. Even with large sectors such as aerospace and leisure still in limbo, the considerable pent-up demand for re-engagement is now being unleashed, putting the US economy on a robust growth trajectory. In a nutshell, we are comforted in our view that 2021 will be a boom year, and we see ample room for equities to continue to rally on the reopening dynamic, with international, cyclical, and small cap stocks leading the way. We believe our portfolios are well positioned to continue to outperform and note that the ROBO Global innovation indices have extremely limited exposure to the more speculative corners of the market.

ROBO: ROBOTICS & AUTOMATION INDEX

Robotics and Automation stocks performed in line with global equities in Q1, with the ROBO Global Robotics & Automation Index (ticker: ROBO) returning 4.5% in the quarter and a total of 45.3% in 2020, the best annual return since the inception of the index in 2013. This compares to 4.6% for the MSCI AC World Index. Seven of the 11 index subsectors delivered positive returns in Q1, with 3D Printing (+43%), Autonomous Systems (+43%), and Food & Agriculture (+16%) leading the gains, while Business Process Automation (-7%), Sensing (-4%), and Healthcare (-3%) lagged.

By region, US stocks outperformed (+12%), with strong contributions from 3D Systems, iRobot, Deere, and Aerovironment. Japan (-6%) underperformed, with pullbacks in Harmonic Drive and Daifuku. China (-2%) and Europe (flat) also lagged.

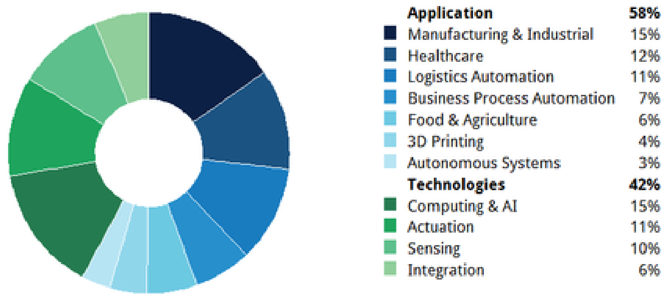


	YTD	3 Year	5 Year	Full Period
ROBO GLOBAL® ROBOTICS AND AUTOMATION INDEX	4.52%	15.85%	21.76%	21.76%
GLOBAL EQUITY INDEX	4.57%	12.05%	13.21%	13.21%

Rebased 100 on March 31, 2016; Total Return through March 31, 2021; Periods greater than 1 year have been annualized

ROBO Subsector (Total Return)	Q1 2021	Past 12 mo.
3D Printing	42.9%	166.5%
Actuation	-1.6%	92.1%
Autonomous Systems	42.8%	143.1%
Business Process Automation	-7.0%	64.9%
Computing & AI	5.8%	101.0%
Food & Agriculture	16.4%	97.6%
Healthcare	-2.6%	71.2%
Integration	4.1%	57.4%
Logistics Automation	5.9%	101.8%
Manufacturing & Industrial Automation	3.0%	92.4%
Sensing	-3.7%	65.8%
INDEX TOTAL	**4.5%**	**89.6%**

% Weight by Subsector



During much of 2020, we saw the key beneficiaries of the turbocharging of digitization across the economy in a pandemic-stricken world lead the gains for ROBO. As businesses strive to discover new ways to operate safely and efficiently amid the pandemic, technology has proven critical in supporting the distributed work environments that are making this possible: AI-powered technologies, logistics, and warehouse automation supporting the boom in e-commerce, sensing, and digital health, among others.

Starting in Q4, we saw the breadth of performance expand into the more challenged areas of automation during the downturn; namely, the industrial sector. Q1 was more of the same, with a very strong recovery in 3D printing stocks like 3D Systems and Stratasys, and solid gains at automation companies, especially in the logistics sector, with Cargotec, Zebra Technologies, KION, Toyota Industries, and Manhattan Associates all rising by double digits.

The outlook for logistics and warehouse automation remains particularly strong. The unprecedented surge in e-commerce in recent months has put tremendous pressure on unprepared supply chains. As discussed in our recent publication, robots are coming to the rescue.

We believe this set-up is attractive for robotics, AI, and automation stocks. Equities of best-in-class automation stocks from around the world are now trading on a forward P/E of 32.6x, about a third above the five-year average of 24.1x (see chart). However, forward aggregate earnings estimates are recovering rapidly. Q4 marked the return to YoY earnings growth after four consecutive quarters of contraction, with median EPS growth of +11% YoY. In Q1, we expect median EPS growth to exceed 60% YoY. And earnings estimates continue to see upward revisions. In the past three months, consensus estimates for 2021 have been revised up by 3.7% and currently point to 25% YoY growth in 2021, followed by an 18% increase in 2022.

MOVERS & SHAKERS

3D Systems (+161%), a leading provider of 3D content-to-print solutions and member of both the ROBO and HTEC indices, continued to bounce hard from a decade low point hit in September 2020, as Q4 revenue came in at more than 25% above initial estimates on the back of strength in its medical business and dental end-markets in particular. In addition, the company made progress with its restructuring plan announced in the summer of 2020, as reflected in accelerated top-line growth and rapidly strengthening operating margins, and the sale of its Cimatron and Gibbs CAM software businesses. 3D systems was not the only 3D printing stock to rise sharply in Q1, as Stratasys rose 25%.

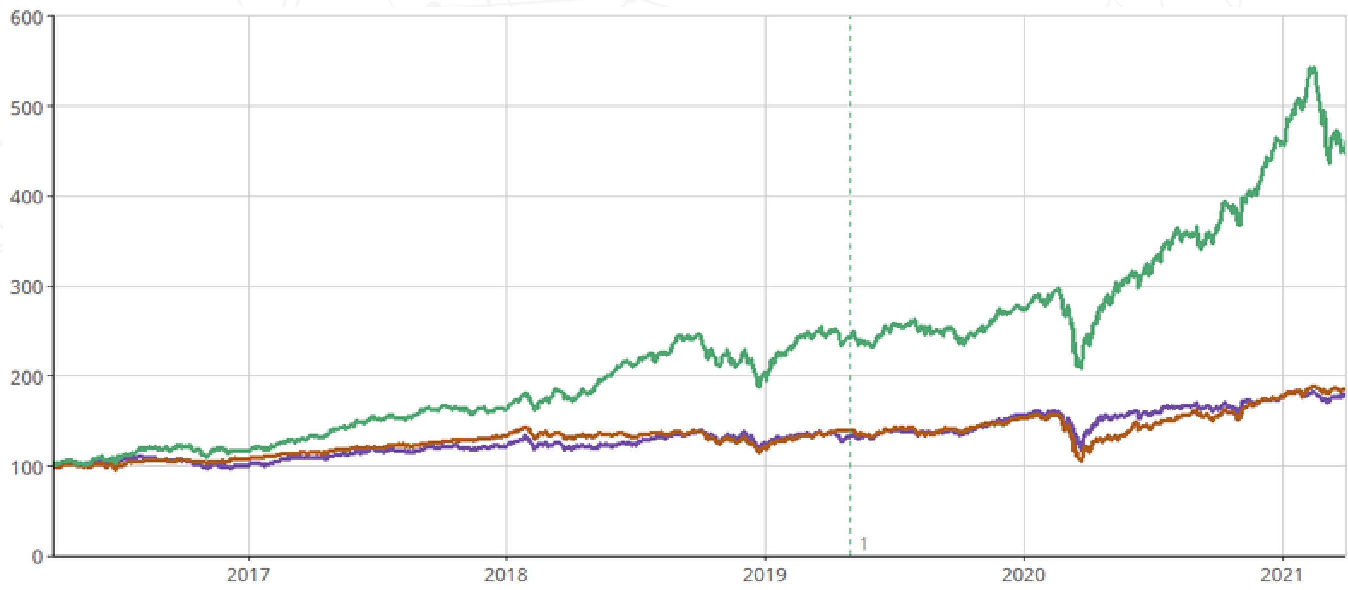
iRobot (+52%), the pioneer and leader in autonomous robotic cleaners, delivered 4Q earnings well above expectations and guidance, with US revenue up 28% YoY and international up 27%. Its product mix continues to shift towards premium robotic vacuum cleaners while its direct sales to consumers have more than doubled. iRobot is starting to benefit significantly from its growing installed base of connected robots, now more than 10m units, which enable the company to engage more intimately with consumers with upselling and value-added services. The company also provided much stronger than expected FY21 guidance, despite a likely lower margin on renewed China tariff impact. We recently sat down with Keith Hartsfield, iRobot's EVP and Chief Product Officer, to discuss the company's success and explore how iRobot is paving the way for the smart home of the future.

Luminar (-28%), the leading provider of lidar-based perception and autonomy software for cars and trucks, pulled back alongside many other SPAC-related entities that had risen strongly in the prior quarter. Luminar made several important announcements in its first earnings call as a newly public company. Lidar (Light Detection And Ranging) is a laser-based sensing technology that is key to vehicle autonomy and driver assistance. With few exceptions, almost every company working on self-driving cars now uses lidar, and it expects its order book to grow by 40% from the current $1.3bn by the end of 2021, with at least three major commercial wins in addition to its existing partnerships with Volvo, Daimler Trucks, MobilEye, and SAIC. We believe Luminar is well positioned to benefit from the rapid rise of lidar-based autonomous vehicles, with its technological advantage, first-class partners, and plenty of capital following the raise of $570m through its merger with GMHI.

Materialise NV (-34%), the Belgium-based additive manufacturing company with leading positions in 3D printing software, medical applications, and the largest non-captive on-demand 3D printing services operations in Europe, sold off the quarter after, for the first time in its 30-year history, reporting revenues that decreased YoY due to pandemic headwinds. Importantly, Materialise is well positioned to benefit from the continued adoption of 3D printing, disrupting the healthcare industry with its leading applications for medical training, personalized implants, and pre-surgical preps and surgical guides. Its 3D printing software is nearly uncontested in the market and is embedded into various aspects of 3D printing via partnerships with most of the leading CAD/CAM, CRM, ERP, and PLM providers. With strong gross margins and double-digit sales growth assumptions, we anticipate that Materialise will continue to grow earnings significantly over the coming years.

HTEC: HEALTHCARE TECHNOLOGY & INNOVATION INDEX

The ROBO Global Healthcare Technology and Innovation Index (ticker: HTEC) posted a 0.5% gain in Q1, in line with broader healthcare indices, such as S&P Global Healthcare (+0.8%), but underperforming the MSCI AC World Index (+4.6%).



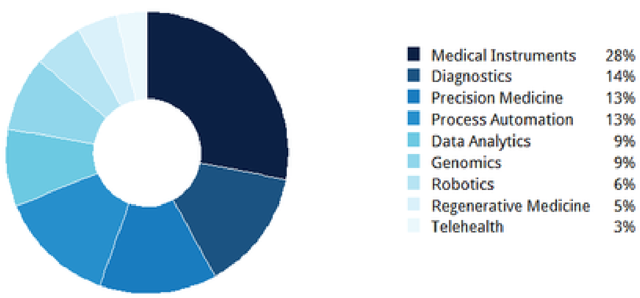
	YTD	3 Year	5 Year	Full Period
ROBO GLOBAL® HEALTHCARE TECHNOLOGY AND INNOVATION INDEX[1]	0.54%	37.70%	35.72%	35.72%
GLOBAL EQUITY INDEX	4.57%	12.05%	13.21%	13.21%
GLOBAL HEALTHCARE INDEX	0.80%	13.85%	12.29%	12.29%

Rebased 100 on March 31, 2016; Total Return through March 31, 2021; Periods greater than 1 year have been annualized
1: Includes back-tested data prior to April 30, 2019

There were mixed results across subsectors, with Genomics (+14%), Medical Instruments (+8%), and Process Automation (+5%) leading the gains, while Telehealth (-20%), Precision Medicine (-13%), and Diagnostics (-5%) underperformed during the quarter.

HTEC Subsector (Total Return)	Q1 2021	Past 12 mo.
Data Analytics	-0.6%	127.4%
Diagnostics	-4.7%	65.2%
Genomics	13.6%	194.7%
Medical Instruments	7.5%	88.7%
Precision Medicine	-13.4%	57.2%
Process Automation	5.4%	92.1%
Regenerative Medicine	-1.0%	36.8%
Robotics	0.6%	64.5%
Telehealth	-19.8%	47.5%
INDEX TOTAL	**0.5%**	**88.2%**

% Weight by Subsector



After an outstanding 2020 performance, the HTEC index rose only marginally in Q1 as some of the high-flying healthcare technology stocks of 2020 experienced a correction. With the global vaccine rollout and as the economy continues to open up around the world, the shift to healthcare innovation will only accelerate. From targeted therapeutics to treat cancer to molecular diagnostics for next generation testing capability, HTEC is well positioned to benefit from the rapidly shifting healthcare landscape.

Telehealth remains a vital component of the world today, with a McKinsey study stating that up to $250 billion of current US healthcare spending could potentially be virtualized post-pandemic.

The Genomics subsector extended its momentum into 1Q, largely led by Fulgent Genetics (+86%), which posted strong earnings and a bullish outlook. Veracyte (+10%) announced the acquisition of Decipher Biosciences, expanding its portfolio of cancer diagnostics using genomic technology.

Medical Instruments (+7%), led by Penumbra (+55%), STAAR Surgical Co (+33%), and Tactile Systems (+21%), saw growth across surgical instrument providers as the world reopens with pent-up demand for elective procedures delayed last year and general surgery coming into play.

Process Automation (+5%) proved resilient, with Brooks Automation (+20%), Medpace Holdings (+18%), and Charles River Laboratories (+16%) providing critical instruments and consumable items for Covid-19 related, highly demanding environments and workflows required for diagnostics and vaccine development.

Precision Medicine (-13%) declined, with a sharp pullback in gene editing companies such as Editas Medicine (-40%) and Cellectis SA (-25%). Editas and Cellectis are still up over 100% in the past year and had been top-performing stocks until recent profit-taking activity. The long-term prospects of these index members continue to be very strong as gene therapies have the potential to treat over 10,000 diseases in the future.

MOVERS & SHAKERS

Fulgent Genetics (+86%) continues to expand its next-generation sequencing (NGS) platform after seeing record revenue growth in 2020, up 1200% for the year, driven almost entirely by Covid-19 testing, whereas non-Covid-related business grew a modest 15% for the year. The influx of customers around the globe and newfound trust gives Fulgent a great opportunity to land and expand with its core NGS offerings.

Penumbra (+54%), a maker of thrombectomy, embolization, and other tools for neuro and vascular surgeons, recovered from its Q4 decline, which had been due to the recall of one of its Jet 7 Xtra Flex blood-clot removing catheter devices. Management handled the situation well and most customers have pivoted back to other Penumbra instruments, as opposed to competitors' devices. Penumbra continues to expand its product line and expand use cases for existing products, all while gaining traction internationally.

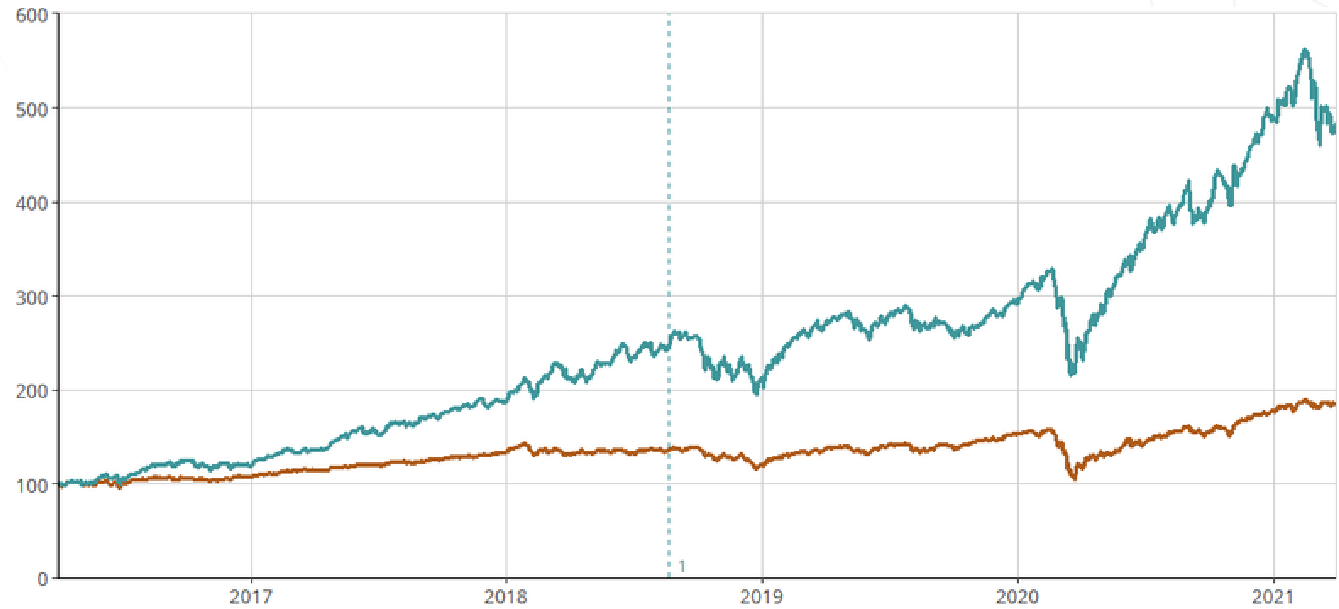
iRhythm (-42%), a maker of ambulatory cardiac monitoring solutions, fell sharply along with peers on news that its core Zio Patch product’s Medicare reimbursement rates could drop significantly, surprising news as the company had previously forecast favorable steady rates. Expectations are for a negotiation process that extends past the closing of Q1 books, a rate that is lower than the Cat 3 level but still healthy, and a retroactive application of that rate. Meanwhile, IRTC’s core business continues to perform well.

Editas (-40%), a clinical stage genome editing company focused on developing transformative genomic medicines to treat a range of serious diseases, fell off from recent all-time highs alongside its peers after an impressive rally.

THNQ: ARTIFICIAL INTELLIGENCE INDEX

The ROBO Global Artificial Intelligence Index (ticker: THNQ) declined 1.2% in 1Q21, underperforming the broader market indices, MSCI World at +4.6% and S&P 500 +6.2% gain. After a huge leadership run in 2020, high-growth technology companies stalled in Q1 as investors continued to rotate into cyclical and value stocks. Optimism around the reopening of the economy, and rising interest rates combined with inflation concerns, spurred some profit-taking and dragged many technology stocks down. Despite volatility in the group, current spending around AI fueled by digital transformation initiatives remains strong. Analyzing companies' guidance, backlog, and increases in R&D investments indicates that underlying fundamentals appear stronger than ever and that enterprise and consumer demand for cloud and AI is poised to surge. With the sharp pullback in valuation, we anticipate that M&A activity will also pick up meaningfully for the rest of the year.

Subsectors such as Big Data/Analytics (-11%), Network & Security (-7%), and Business Process (-6%) were in negative territory while Semiconductor (+8%), Healthcare (+7%), and Cloud Providers (+5%) experienced gains. The THNQ index saw one takeout during the quarter, as Talend SA, a leader in data integration and data integrity, agreed to a $2.4 billion deal with a leading software PE firm.

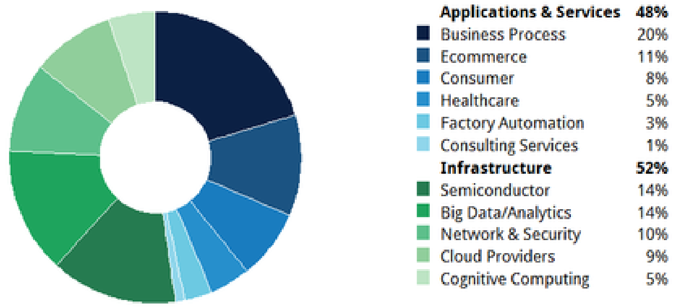


	YTD	3 Year	5 Year	Full Period
ROBO GLOBAL® ARTIFICIAL INTELLIGENCE INDEX[1]	-1.19%	31.22%	37.08%	37.08%
GLOBAL EQUITY INDEX	4.57%	12.05%	13.21%	13.21%

Rebased 100 on March 31, 2016; Total Return through March 31, 2021; Periods greater than 1 year have been annualized
1: Includes back-tested data prior to August 21, 2018

THNQ Subsector (Total Return)	Q1 2021	Past 12 mo.
Big Data/Analytics	-11.0%	66.2%
Business Process	-5.9%	64.5%
Cloud Providers	5.0%	93.8%
Cognitive Computing	-3.3%	139.3%
Consulting Services	6.0%	76.6%
Consumer	3.5%	79.7%
Ecommerce	-0.1%	163.8%
Factory Automation	4.6%	83.6%
Healthcare	6.8%	127.0%
Network & Security	-7.1%	75.6%
Semiconductor	8.4%	120.5%
INDEX TOTAL	**-1.2%**	**94.9%**

% Weight by Subsector



Semiconductor was the best performing subsector, driven by the global supply shortage and strong broad-based demand for its products. The current demand trend is driven by multiple secular and cyclical drivers such as AI, cloud computing, 5G, gaming, EVs, and IoT devices. In addition, relative to other technology subgroups, valuation in the Semiconductor industry remains more compelling. ASML Holdings NV (+27%), Lam Research (+26%), and Infineon (+11%) were standouts during the quarter as these index members are at the leading edge of computing, with AI driving much of the upgrade in spending. In the longer term, semiconductor demand will continue to rise from the reopening of the economy, as the chip industry is the key enabler of the digital economy, which will keep the supply environment tight over the coming quarters.

Healthcare continues to be one of the best performing subsectors, driven by gene-editing company Intellia Therapeutics Inc (+21%) and genomic diagnostics player Veracyte (+10%). AI and genomics are fundamental building blocks of next generation therapies and diagnostic tools. THNQ index members in the Healthcare subsector are deploying machine learning algorithms to find treatments and detect rare diseases and viruses by using emerging technology platforms.

Cloud Providers extended its momentum, up 5% during the first quarter. Index members such as Alphabet (+18%) delivered outstanding earnings results as its leadership in multi-cloud with AI capabilities helped them deliver revenue growth of 47% YoY with a record backlog that grew 60% from the previous quarter. Strong deployment of cloud by enterprise customers, driven by accelerated digital transformation, appears unstoppable. Chinese eCommerce provider Tencent (+8%) also outperformed during the quarter, while Cloudflare (-8%) pulled back modestly, despite being one of our top performers last year with shares rising almost 200%.

In the first quarter, Big Data Analytics and Network & Security subsectors posted steep declines for the first time since 2018. These two subsectors were top outperformers in 2020 but gave back some gains in the first quarter. THNQ index members, such as Alteryx (-32%), MongoDB (-26%), and Rapid7 (-17%), suffered losses driven by longer sales cycles and the “pause” of large AI projects as business leaders are still working on meeting the needs of remote workers and business continuity. Companies like Splunk, Alteryx, Appen, and New Relic are supporting tools and platforms for AI teams to extract intelligent insights from unstructured data. While these companies are providing tremendous value to their customers, the long implementation times have pushed out various AI-related projects in the near term. As the world focuses more on data quality and data integrity, especially in cloud environments for running projects related to AI, solutions from companies like Alteryx and Appen are poised to get greater attention than ever. The long-term prospects for data analytic companies are very promising as AI is playing a critical role in the data journey for all enterprises undergoing digital transformation.

Meanwhile, Network & Security providers were large outperformers in 2020 and there was some profit-taking during the quarter. These infrastructure enablers and developers of cloud-based platforms and next generation infrastructure for AI systems and applications posted very solid earnings results but it was not enough to withstand the tech-related sell-off. In the longer term, we are witnessing a major network and security transformation occurring at the enterprise level, and there is an increasing need for AI-powered network visibility and vulnerability assessment. The work from home dynamics, coupled with remote learning, have made protecting the new threat landscape and finding solutions that combine AI with human expertise to autonomously detect and respond to the needs of IT security and networks even more urgent in this new environment.

MOVERS & SHAKERS

Talend SA (+66%), a leader in data integration, has entered into an agreement to be acquired by Thoma Bravo for $2.4 billion, representing a premium of 29%, and valuing the company at over 7x NTM enterprise sales. Headquartered in France, Talend focuses on helping organizations move data, manage data, and use data effectively so enterprise can extract intelligent data to support important decision making. An index member of THNQ since inception, Talend shares have surged nearly 120% in the past 12 months with double-digit sales growth execution.

ASML (+27%) holds a dominant position in providing EUV (extreme ultraviolet) semiconductor equipment for all the leading players in the semiconductor industry. The most recent quarter indicates that EUV demand continues to be very robust with a healthy backlog. Specifically, approximately +$30 billion of EUV orders reflect customers' desire to invest in disruptive technologies such as AI, supercomputers, autonomous systems, and edge computing. Tight supply capacity in the semiconductor industry and capital expenditure increases for EUV equipment by key customers such as Taiwan Semiconductor and Intel has significantly increased ASML's growth prospects and visibility over the next +5 years.

Appen Ltd (-37%) is the market leader in labeling data for training AI models with its AI-assisted data annotation platform. Projections for the AI market are growing rapidly, but the global pandemic has caused much of the data analytic market to be negatively impacted as AI projects are still getting pushed out. We anticipate that Appen will see accelerated growth rates as the economy reopens and budget cycles from Enterprises return to normal.

CD Projekt SA (-35%) underperformed once again this quarter. The video game developer from Poland has several strong franchises, including its "The Witcher" series. The company has a strong history of innovation, incorporating AI into the digital video game experience. Since the launch of the most awaited release of Cyberpunk 2077 in December 2020, the team has been working on releasing several major patches to fix software issues for the console platforms. The management team will need to take the majority of this year to regain credibility from the gaming community.

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ROBO

ROBO Global Robotics & Automation Index

roboglobal.com/ROBO

SUBSECTOR	EXPOSURE
Application	**57.84%**
3D Printing	4.26%
Autonomous Systems	3.31%
Business Process Automation	6.60%
Food & Agriculture	5.77%
Healthcare	11.55%
Logistics Automation	11.05%
Manufacturing & Industrial Automation	15.30%
Technologies	**42.16%**
Actuation	11.43%
Computing & AI	14.54%
Integration	6.33%
Sensing	9.85%

TOP 10 HOLDINGS	WEIGHT
INTUITIVE SURGICAL INC	1.69%
BROOKS AUTOMATION INC	1.67%
AEROVIRONMENT INC	1.66%
IROBOT CORP	1.65%
COGNEX CORP	1.63%
KARDEX HOLDING AG	1.59%
HEXAGON AB	1.57%
IPG PHOTONICS CORP	1.57%
ZEBRA TECHNOLOGIES CORP	1.54%
HARMONIC DRIVE SYSTEMS INC	1.54%
TOTAL	**16.11%**

HTEC

ROBO Global Healthcare Technology & Innovation Index

roboglobal.com/HTEC

SUBSECTOR	EXPOSURE
Data Analytics	8.86%
Diagnostics	13.97%
Genomics	8.53%
Medical Instruments	28.05%
Precision Medicine	13.45%
Process Automation	13.36%
Regenerative Medicine	4.59%
Robotics	5.69%
Telehealth	3.50%

TOP 10 HOLDINGS	WEIGHT
TABULA RASA HEALTHCARE INC	1.89%
CELLECTIS SA	1.64%
STAAR SURGICAL CO	1.62%
CHARLES RIVER LABRATORIES INTERNATIONAL INC	1.56%
ABIOMED INC	1.56%
INTEGRA LIFESCIENCES HOLDINGS CORP	1.54%
INTUITIVE SURGICAL INC	1.53%
INSULET CORP	1.53%
NEOGENOMICS INC	1.51%
NUANCE COMMUNICATIONS INC	1.51%
TOTAL	**15.88%**

THNQ

ROBO Global Artificial Intelligence Index

roboglobal.com/THNQ

SUBSECTOR	EXPOSURE
Applications & Services	**47.78%**
Business Process	20.30%
Consulting Services	1.04%
Consumer	7.72%
Ecommerce	11.17%
Factory Automation	3.03%
Healthcare	4.52%
Infrastructure	**52.22%**
Big Data/Analytics	13.90%
Cloud Providers	9.21%
Cognitive Computing	5.20%
Network & Security	9.87%
Semiconductor	14.04%

TOP 10 HOLDINGS	WEIGHT
FAIR ISAAC CORP	1.79%
INTERNATIONAL BUSINESS MACHINES CORP	1.78%
ARISTA NETWORKS INC	1.72%
NVIDIA CORP	1.72%
ANALOG DEVICES INC	1.70%
AMAZON.COM INC	1.69%
ASML HOLDING NV	1.69%
NUANCE COMMUNICATIONS INC	1.68%
MICROSOFT CORP	1.67%
IROBOT CORP	1.66%
TOTAL	**17.14%**

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