

Thematic ETFs performance

Q1 2023

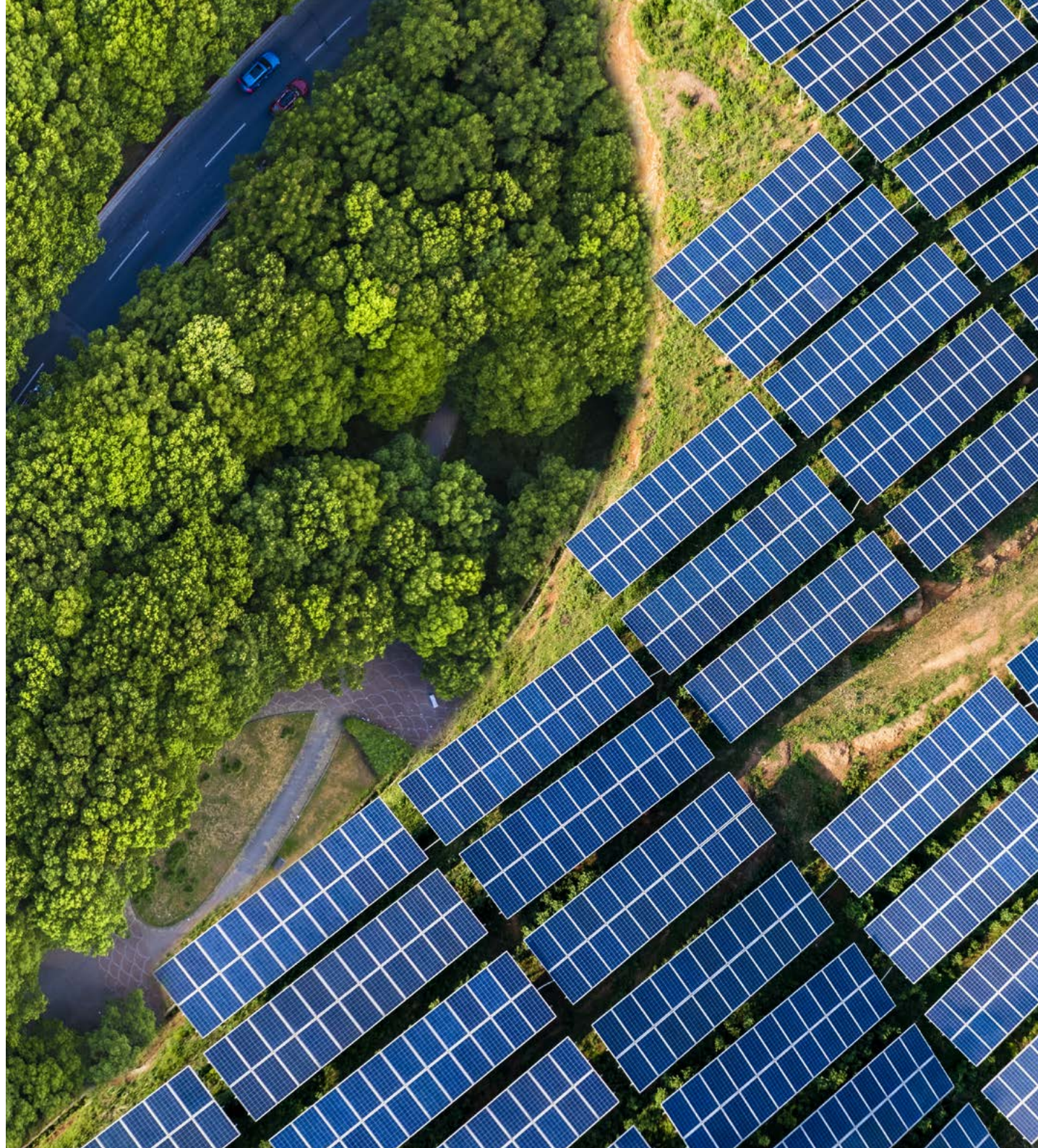
Key risk

The value of an investment and any income taken from it is not guaranteed and can go down as well as up; You may not get back the amount you originally invested. Simulated and past performance is not a guide to the future.



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L&G Thematic ETFs



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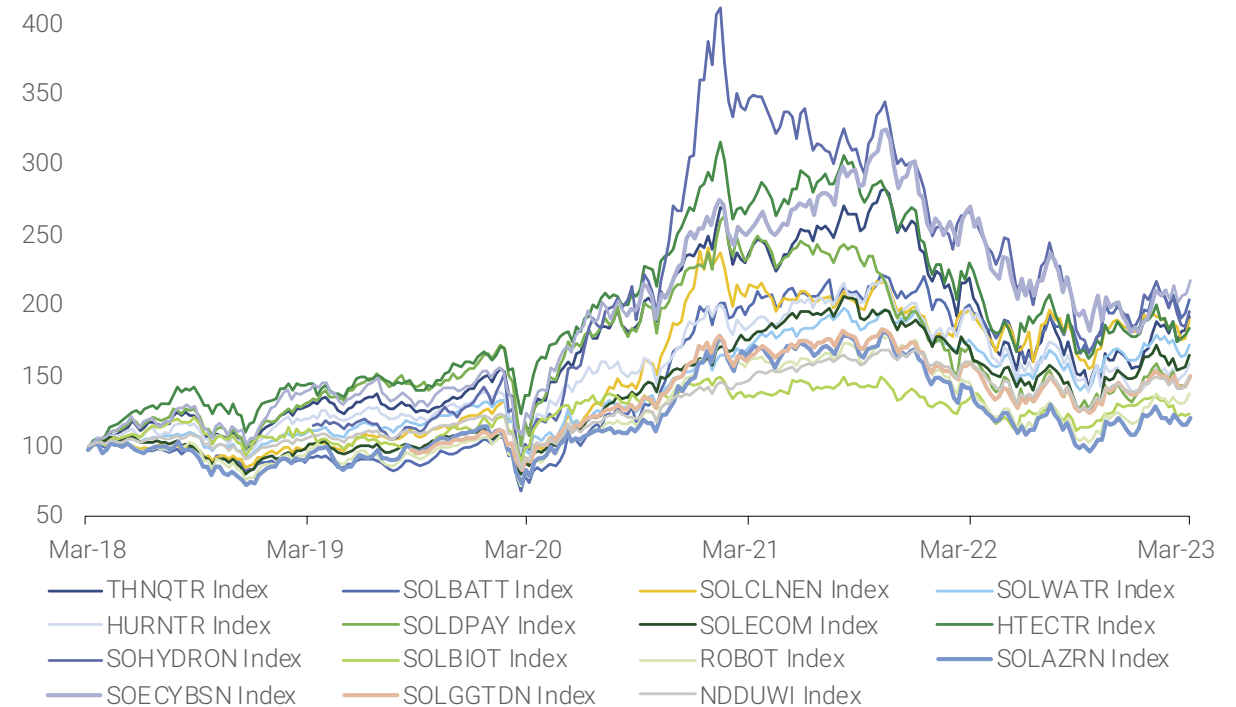
Performance commentary

In the first quarter of 2023, most thematic strategies delivered positive returns. Technology-driven themes that struggled over 2022 bounced back stronger, and the themes that performed best were Artificial Intelligence, Robotics and Automation, and Emerging Cyber Security. Only the Pharma Breakthrough theme delivered negative returns, after being the best-performing theme in 2022.

Key risk

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Historical and simulated index performance*





L&G Thematic ETFs

Rolling 12 month performance to 31/03/2023

Index ticker	ETF ticker	2018	2019	2020	2021	2022	2023
THNQTR Index	AIAI	56.3%	25.0%	-7.1%	94.9%	-5.7%	-11.8%
SOLBATT Index	BATT	16.5%	-10.7%	-11.3%	145.6%	2.1%	2.0%
SOLCLNEN Index	RENW	17.3%	-2.0%	-4.5%	124.8%	-7.1%	-3.9%
SOLWATR Index	GLUG	20.0%	7.4%	-8.2%	66.5%	4.3%	-1.1%
HURNTR Index	USPY	20.0%	18.0%	-5.7%	60.4%	8.8%	-19.5%
SOLDPAY Index	DPAY	44.2%	28.1%	-9.6%	93.9%	-25.8%	-11.8%
SOLECOM Index	ECOM	24.5%	-2.4%	-8.9%	94.0%	-1.3%	-4.6%
HTECTR Index	DOCT	31.9%	40.9%	-1.4%	88.2%	-16.1%	-17.8%
SOHYDRON Index	HTWO	-	-	-5.5%	232.8%	-22.3%	-27.0%
SOLBIOT Index	BIOT	11.5%	8.7%	-7.2%	32.4%	-2.8%	-6.2%
ROBOT Index	ROBO	32.2%	-7.0%	-11.8%	89.6%	-6.7%	-6.2%
SOLAZRN Index	LAZR	52.2%	-10.2%	-6.8%	93.6%	-12.7%	-15.6%
SOECYBSN Index	ESPY	16.9%	36.7%	-9.2%	96.5%	8.0%	-19.0%
SOLGGTDN Index	THMZ	-	-	-	73.0%	-1.8%	-5.6%
NDDUWI Index	MSCI World	13.6%	4.0%	-10.4%	54.0%	10.1%	-7.0%

Source: Bloomberg , all values are based in USD; as at 31 March 2023. Performance based on index levels gross of fees but net of dividend withholding taxes, where applicable. The effect of fees and charges would reduce the returns shown.

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Macro update

Economy and policy

While markets started the year positively, the bank failures triggered by the collapse of SVB in March, including Credit Suisse, raised volatility. Despite the equity market retreat, central banks kept rising rates to fight inflation. In February the Fed raised rates by 0.25%, the ECB by 0.50%, and the Bank of England by 0.50%. In March contractionary policies continued as the Fed hiked by 0.25% to 4.75-5.00%, the Bank of England hiked by 0.25% to 4.25% and the ECB hiked by 0.50% to 3.50%.

In January the World Economic Forum held their annual meeting in Davos, where leaders discussed topics such as cybersecurity and digital economy.

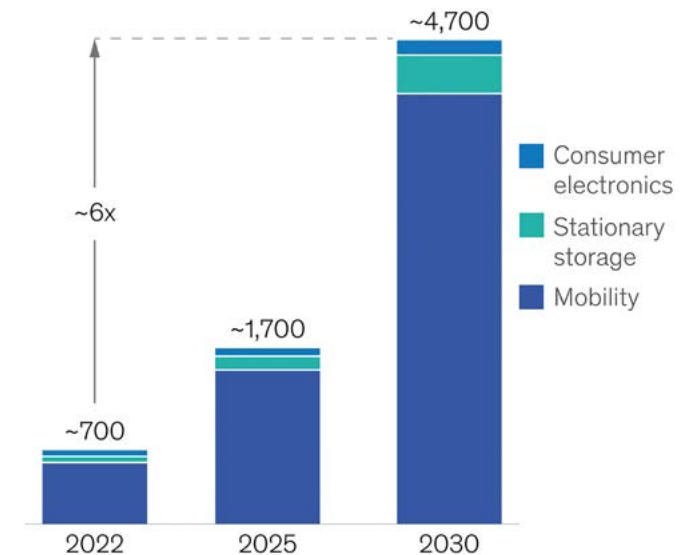
Climate news

Global li-ion battery demand is expected to grow at a ~33% compound annual growth rate (CAGR) to reach around 4,700 GWh by 2030. Mobility applications are a major source of demand and are expected to account for 4,300 GWh by 2030. This trend is boosted by net zero targets, greater demand from end consumers and announcements from auto manufacturers that they will cease production of internal combustion engine (ICE) vehicles.

The global electric vehicle market should reach \$550.4 billion by 2024 from \$257.4 billion in 2019, growing at a CAGR of 16.4%.

Sources: McKinsey, January 2023; BCC Research, August 2022.

Global Li-ion battery cell demand, GWh, base case, by sector



Source: McKinsey, January 2023.

Source: LGIM, McKinsey, January 2023, BCC Research, August 2022.

For illustrative purposes only. The above information does not constitute a recommendation to buy or sell any security. There is no guarantee that any forecasts made will come to pass.



Macro update

Investment themes

Clean Water – The UN 2023 Water Conference took place on 22nd-24th March in New York. Representatives of international organisations discussed commitments, implementation goals and review processes to achieve international clean water goals and targets.

Source: [Water Commission](#), March 2023

Cyber Security – The cybersecurity market has grown by double digits over the past five years, and cybersecurity revenues are expected to reach \$173.5bn in 2023, led by security services. The market is then expected to grow at a 10.9% CAGR through to 2027.

Source: [Statista](#), Nasdaq, March 2023

Digital Payments – According to Worldpay's Global Payments Report 2023, by 2026 cash's share of global point of sale (POS) transaction value is expected to decline to less than 10%. Legislation and trends vary across countries, but among the main drivers of the long-term shift to a cashless society are the growth of Account to Account (A2A) real-time payments and digital wallets.

Source: [FIS](#), March 2023

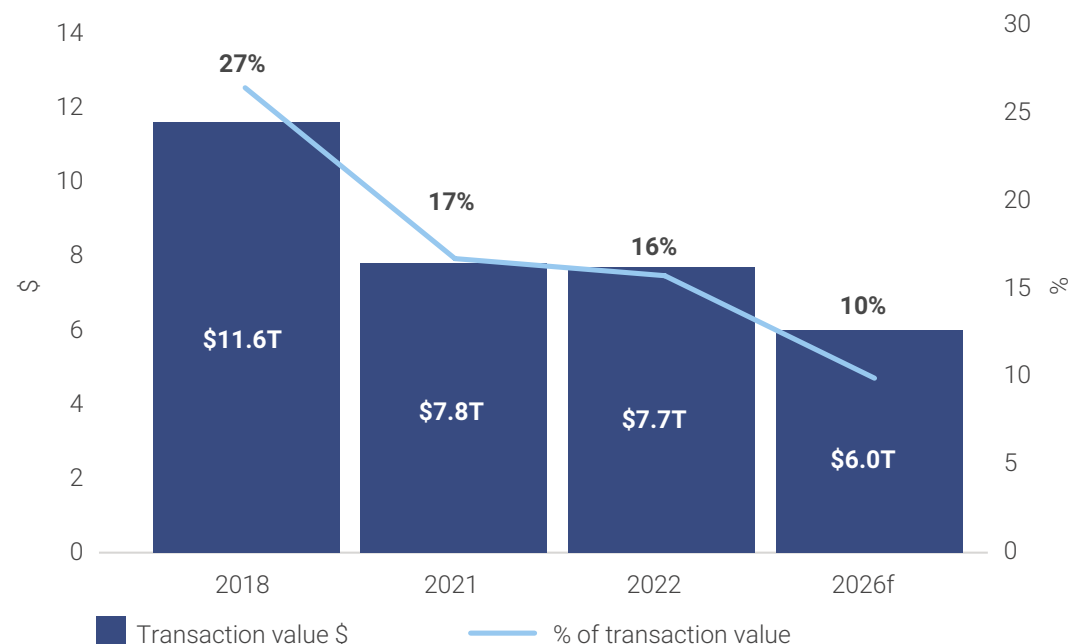


Did you know?

Ocean ecosystems produce half the oxygen we breathe and are the world's largest carbon sink. The High Seas Treaty sealed in March by the United Nations (UN) after over 10 years of negotiation is a historic milestone that aims to turn 30% of seas into protected areas by 2030, to tackle biodiversity loss and climate change.

Source: [LGIM](#), March 2023

Global cash transaction value 2018 - 2026f, US\$ trillions (share %)



Source: [LGIM](#), [Water Commission](#), [Statista](#), [FIS Global](#), March 2023.

Source: [FIS](#), March 2023

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ETF Updates



Thematic investment insights

Want to stay ahead of the latest developments shaping the future of technology, energy and resources, and demographics? Our regular blogs and podcasts cover a wide range of key thematic investment topics.



Cyber Security blog:

How is AI changing cyber security?

[Read here](#)



Metaverse blog (from our access range of ETFs):

How metaverse technology is powering real-world innovation

[Read here](#)



Pharma Breakthrough podcast:

How the market made a home for orphan drugs

[Listen here](#)



Emerging Cyber Security blog:

Smart devices: an open door to hackers?

[Read here](#)



Pharma Breakthrough blog:

Rare Disease Day: how the market made a home for orphan drugs

[Read here](#)



Emerging Cyber Security blog:

The invisible threat: 'below the OS' cyber attacks revealed

[Read here](#)



Artificial Intelligence blog:

Generative AI: what chatbots mean for the future of work

[Read here](#)



Metaverse blog (from our access range of ETFs):

World Cup 2022: how the metaverse is changing the game

[Read here](#)



Optical Technology and Photonics blog:

World Cup 2022: photonics in focus

[Read here](#)



Ecommerce Logistics blog:

Delivering progress: how automation is transforming ecommerce logistics

[Read here](#)



ETF overlaps

Overlap across our themes

The following chart shows the overlap across our thematic range of investment strategies. When we design an investment strategy, we aim to provide pure exposure to the theme, which results in our thematic ETFs usually having little to no overlap, where possible. This allows investors to allocate according to their preferences and aim to reduce concentration risks in a portfolio.



	Artificial Intelligence	Battery Value-Chain	Clean Energy	Clean Water	Cyber Security	Digital Payments	Ecommerce Logistics	Emerging Cyber Security	Global Thematic	Healthcare Breakthrough	Hydrogen Economy	Pharma Breakthrough	Optical Technology & Photonics
Battery Value-Chain	1% (1)												
Clean Energy	1% (1)	7% (3)											
Clean Water	0% (0)	0% (0)	0% (0)										
Cyber Security	10% (8)	0% (0)	0% (0)	0% (0)									
Digital Payments	6% (4)	0% (0)	0% (0)	0% (0)	1% (1)								
eCommerce Logistics	4% (2)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)							
Emerging Cyber Security	13% (8)	0% (0)	0% (0)	0% (0)	46% (24)	3% (1)	0% (0)						
Global Thematic	13% (64)	15% (25)	11% (32)	9% (44)	9% (25)	1% (4)	11% (36)	13% (32)					
Healthcare Breakthrough	5% (4)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	15% (72)				
Hydrogen Economy	0% (0)	0% (0)	5% (2)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (1)	0% (0)			
Pharma Breakthrough	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	10% (20)	6% (5)	0% (0)		
Photonics	1% (1)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	2% (10)	1% (1)	0% (0)	0% (0)	
Robotics and Automation	14% (11)	2% (2)	1% (1)	1% (1)	0% (0)	0% (0)	4% (3)	0% (0)	14% (70)	14% (11)	0% (0)	0% (0)	14% (10)

Source: LGIM, Bloomberg as at 31 March 2023. Figures represent % weight and number of stocks. Percentage overlap is calculated as the minimum of weight overlap between two portfolios.

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Artificial Intelligence

Company spotlight

C3.ai

C3.ai, based in California and founded by Tom Siebel, a pioneer in the customer relationship management (CRM) software space, is a leader in enterprise software focusing on the AI market. It is projected to see a market-size expansion in the hundreds of billions of dollars over the coming years. The company aims to bridge the gap between operational technology and IT by offering AI and machine learning-powered software platform solutions through a cloud-based software as a service (SaaS) approach. With a large and rapidly growing market opportunity, C3.ai provides cost savings to industrial customers and generates billions of dollars in annual economic benefits. C3.ai has customers of the calibre of Alphabet, AstraZeneca, Engie and Yokogawa Electric.

The company offers multiple deployment models, including Azure, AWS, IBM, Google and on-premise solutions. Its large average contract size provides strong revenue visibility. C3.ai has a quick cadence of new product releases and a large footprint. It is also in a solid position to benefit from recent trends in generative AI, and was quick to launch solutions in Q1 to address this area, in addition to its ESG tools, which

are being used by Shell and Cargill. The strength of the stock performance in Q1 2023 is due in part to a retracement of 2022 downtrends. Enterprise interest in AI has driven strong pipeline advancement ahead of expectations and the company aims to hit positive cash flow by year-end 2024.

In the 2022 Forrester Wave Leader Report C3.ai was named Leader for AI and Machine Learning Platforms. It also achieved the highest possible score in a number of categories such as Product Vision, Application Accelerators and Performance.

Last quarter performance commentary

The ROBO Global Artificial Intelligence Index returned +22.8% over the quarter.

The advances of ChatGPT have created increased optimism in the market. AI reaches far beyond 'just' data analytics. According to many of the world's most influential technology visionaries, it is the most disruptive technology innovation of our lifetime. AI is being embraced by enterprises to use all sorts of data to their advantage and integrate processes across all lines of business and industries. The list of applications is as impressive as it is vast.

ChatGPT, which stands for Chat Generative Pre-trained Transformer, has gained popularity for its ability to generate human-like text and hold natural and engaging conversations with users. It is a type of AI that uses machine learning algorithms to analyse large amounts of text and generate responses in a conversational manner. It can understand and respond to a wide range of topics and can even generate personalized responses based on user input. This makes it a useful tool for tasks such as customer service, chatbots and even creating content for social media or websites. It is also relatively easy to use and requires minimal setup. Many software developers and companies have begun incorporating ChatGPT into products and services, making it more widely available and accessible to the general public.

The main contributors to performance were C3.ai, (returned +200.0%), Nvidia (+90.1%), and Global Unichip (+70.6%). The main detractors were Kingdee International Software Group (-24.5%), Butterfly Network (-23.6%), and JD.com (-21.8%).

Source: LGIM, Bloomberg, ROBO Global®, as at 31 March 2023.

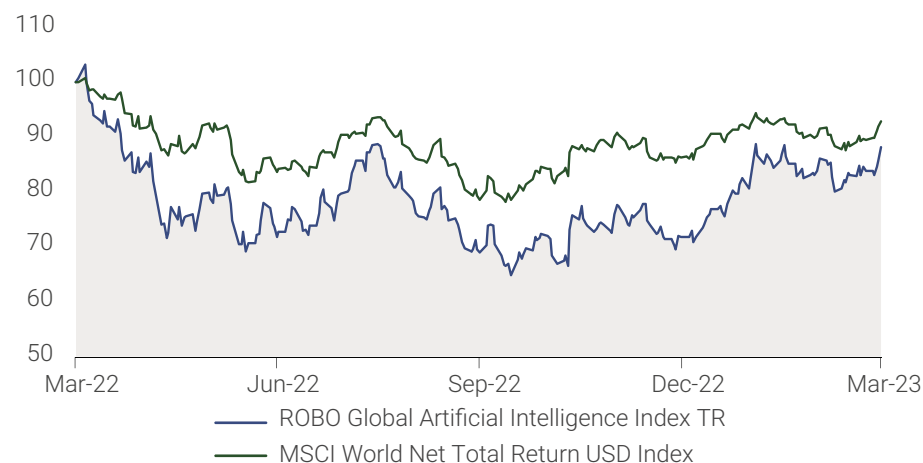
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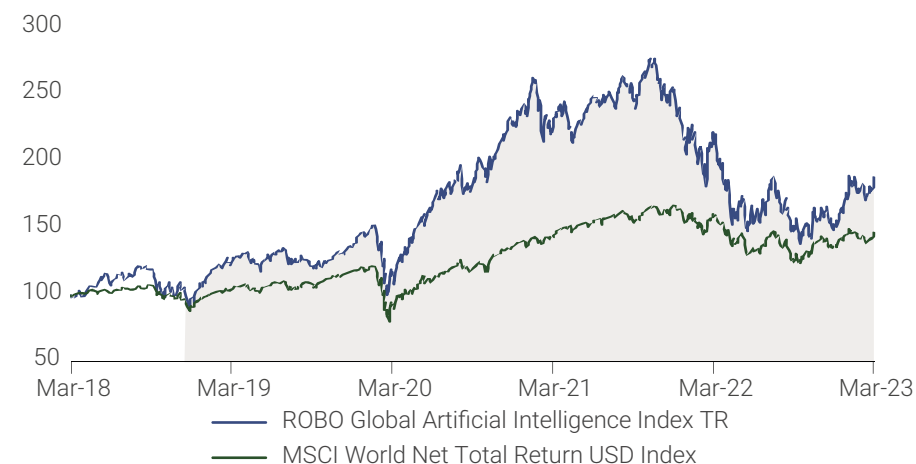
Artificial Intelligence

Performance

Historical and simulated performance (1y)



Historical and simulated performance (5y)



*Source: Bloomberg as at 31 March 2023, all values are based in USD. The backtested index data has been sourced from the index provider and is based on what they perceive to be reasonable assumptions and objective data; The index data is gross of fees/costs but is net of withholding taxes. The effect of fees and charges would reduce the returns shown. Shaded area indicates live period of the index.

Index performance*

Index performance*	QtD	1 year	3 years	5 years
Cumulative return	22.80%	-11.75%	62.15%	88.24%
Annualized return			17.49%	13.48%
Volatility	27.73%	36.97%	30.70%	29.63%
Information ratio	461.76%	-31.81%	56.98%	45.49%
Max drawdown	-9.71%	-37.04%	-50.09%	-50.09%

Index total return contribution (QtD)

Top 5		Bottom 5	
C3.Ai Inc-A	▲ 1.64%	Kingdee Intl Sft	▼ -0.26%
Nvidia Corp	▲ 1.38%	Butterfly Networ	▼ -0.24%
Global Unichip	▲ 0.93%	Jd.Com Inc-Adr	▼ -0.22%
Samsara Inc-Cl A	▲ 0.86%	Gen Digital Inc	▼ -0.21%
Spotify Technolo	▲ 0.84%	Costar Group Inc	▼ -0.12%

Portfolio composition

Latest additions	Latest deletions
no additions in Q1 2023	no deletions in Q1 2023

Fund information

Ticker	AIAI LN	ISIN	IE00BK5BCD43
TER	0.49%	Inception date	02/07/2019
Currency	USD	Index inception date	14-Dec-18
Securities lending	No	Replication method	Physical

Key risk

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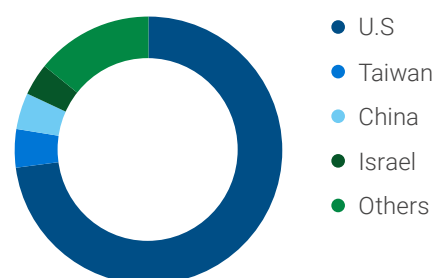


Artificial Intelligence

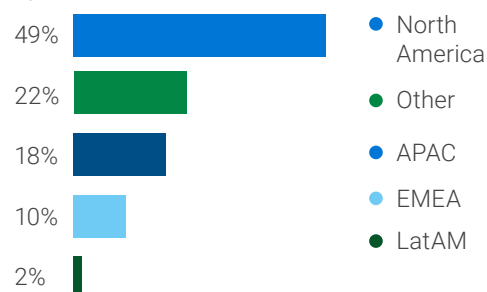
Characteristics

Geographical breakdown

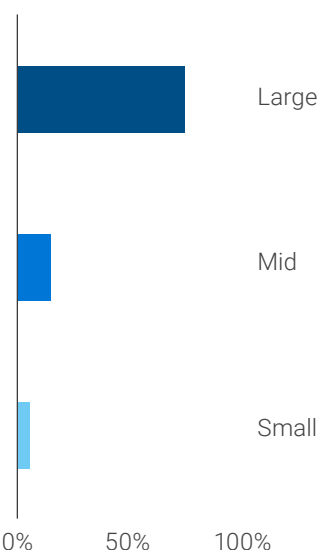
By domicile



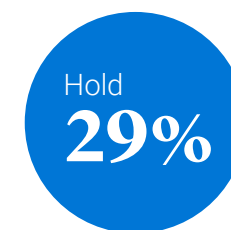
By revenue source



Market cap breakdown



Third party analyst stock consensus ratings**



Key ratios

	Current	Q1 2022
EPS	1.03	0.86
Price/Sales	6.16	9.42
BPS	12.91	13.32
P/E Positive	38.17	39.88
ROE	7.71	6.34
Price/Book	7.43	9.60
P/E (1y fwd)	64.88	91.50
P/E (3y fwd)	39.18	46.55
Sales (1y fwd)	20,517	17,808
Sales (3y fwd)	27,807	24,574

Constituents overlap

S&P 500	14.2%
MSCI World	11.4%
Nasdaq 100	19.5%
Total stocks = 68	

Source: Bloomberg, LGIM; All values are based in USD; As close of 31 March 2023. Please refer to end of this report for all definitions. **Consensus ratings are based on the average of recommendations for each underlying stock made by analysts on Bloomberg within the last 12 months.

Consensus ratings do not constitute a recommendation to buy or sell any security. The consensus ratings presented in this chart are not in relation to the L&G Thematic ETFs.

Key risk

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Battery Value-Chain

Company spotlight

Nissan

Nissan is a Japanese auto manufacturer that operates through the Nissan and Infiniti brands. The latter is a premium brand that owns the company's most innovative technologies and designs.

Nissan produces the LEAF lithium-ion EV batteries, and aims to reach a 40% EV sales target globally by the 2026 fiscal year, and 50% by the 2030 fiscal year. The Nissan LEAF became the world's first mass-produced 100% electric vehicle over 10 years ago.

Over the quarter, Nissan increased its targets, and now aims to introduce 27 new electrified models (from 23 previously), including 19 EVs (from 15) by 2030, increasing its electrification mix to 55% (from 50%). This implies that the electrification rate of its fleet is planned to reach 98% in Europe in 2026, and between 35% and 58% in other geographies.

Nissan is part of an alliance founded in 1999 with Renault and Mitsubishi Motors that invests \$15bn in capex and R&D annually and aims to spur innovation through a leader/follower approach, in which the company that excels in one area shares its expertise with the other two partners, and all three companies can benefit from sharing their assets and technologies.

Nissan and Renault have a 15% cross-shareholding, and Nissan is considering an investment of up to 15% in Renault's EV and software business, Ampere.

In 2022 Nissan acquired Vehicle Energy Japan, an owner of advanced battery management system technologies and manufacturer of automotive lithium-ion batteries. As well as working on electrification, Nissan is developing intelligent mobility technologies in other areas such as driver assistance.

Last quarter performance commentary

The Solactive Battery Value-Chain Index returned +12.7% over the quarter.

Passenger electric vehicle (EV) sales hit the 10 million unit milestone in 2022, growing by 60% from the previous year. The slowdown at the start of 2023 has been mainly caused by weaker demand on the back of rising costs. Sentiment was influenced by China, where since the start of the year original equipment manufacturers (OEMs) have no longer been eligible to receive subsidies for EV production. Coupled with the rising cost of raw materials, this pushed automakers such as BYD to pass some costs on to customers. The slowdown along the value chain put pressure on lithium prices, which fell from their peak.

A number of companies have expanded their North American footprint to benefit from the Inflation Reduction Act (IRA). These include LG Energy Solution, Mercedes, BMW, Tesla and PowerCo (Volkswagen).

Samsung SDI entered a \$33bn 10-year contract with Posco to source cathode materials and increase competition with peers such as LG Energy Solution and SK Innovation. At the Consumer Electronic Show (CES) 2023, BMW and Volkswagen unveiled their new electric-powered models i Vision Dee (for Digital Emotional Experience) and ID.7. At its analyst day Mercedes outlined its strategy to roll out a new software architecture for its Hyperscreen display and its first of its kind collaboration with Google Maps, along with a partnership with Nvidia to focus on Advanced Driver Assistance Systems (ADAS).

The main contributors to performance were Tesla (returned +68.4%), BMW (+23.0%), and Renault (+22.0%). The main detractors were Hyundai Electric & Energy System (-13.6%), ESS Tech (-42.8%) and Toshiba (-4.0%).

Source: LGIM, Bloomberg, FastMarkets, Benchmark Mineral Intelligence, as at 31 March 2023.

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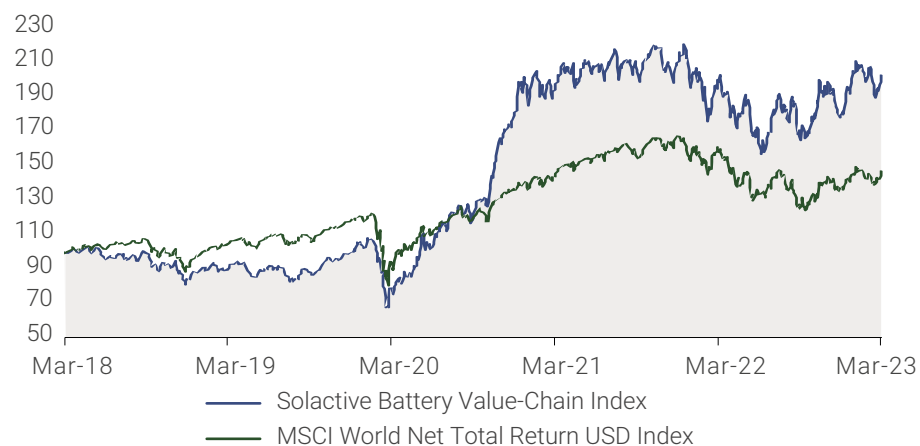
Battery Value-Chain

Performance

Historical and simulated performance (1y)



Historical and simulated performance (5y)



*Source: Bloomberg as at 31 March 2023, all values are based in USD. The backtested index data has been sourced from the index provider and is based on what they perceive to be reasonable assumptions and objective data; The index data is gross of fees/costs but is net of withholding taxes. The effect of fees and charges would reduce the returns shown. Shaded area indicates live period of the index.

Index performance*

Index performance*	QtD	1 year	3 years	5 years
Cumulative return	12.74%	2.03%	155.79%	102.78%
Annualized return			36.79%	15.18%
Volatility	17.67%	22.20%	22.03%	20.79%
Information ratio	349.86%	9.15%	166.97%	73.01%
Max drawdown	-10.26%	-22.68%	-29.07%	-37.30%

Index total return contribution (QtD)

Top 5		Bottom 5	
Tesla Inc	▲ 1.63%	Hyundai Electric	▼ -0.45%
Bmw Ag	▲ 1.10%	Ess Tech Inc	▼ -0.38%
Renault Sa	▲ 1.06%	Toshiba Corp	▼ -0.15%
Lg Energy Soluti	▲ 1.02%	Ivanhoe Electric	▲ 0.00%
Energys	▲ 0.82%	Sebang Global Ba	▲ 0.13%

Portfolio composition

Latest additions	Latest deletions
no rebalancing in Q1 2023	no rebalancing in Q1 2023

Fund information

Ticker	BATT LN	ISIN	IE00BF0M2Z96
TER	0.49%	Inception date	23/01/2018
Currency	USD	Index inception date	03-Jan-18
Securities lending	No	Replication method	Physical

Key risk

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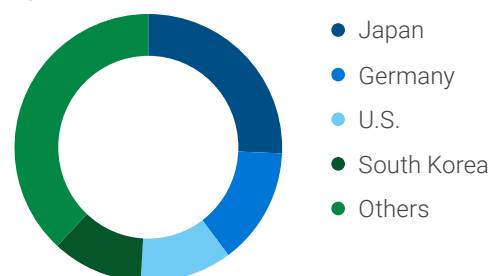


Battery Value-Chain

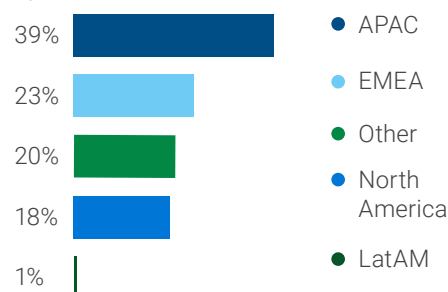
Characteristics

Geographical breakdown

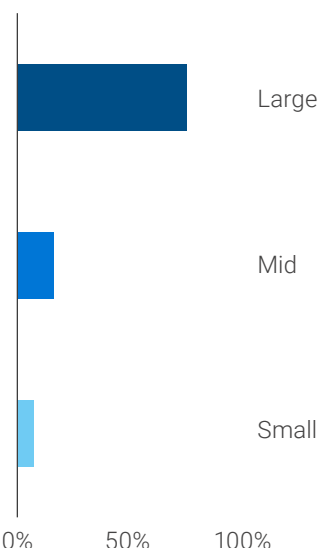
By domicile



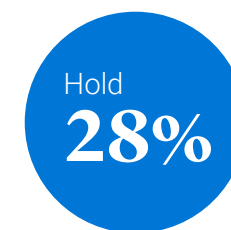
By revenue source



Market cap breakdown



Third party analyst stock consensus ratings**



Key ratios

	Current	Q1 2022
EPS	1.87	2.43
Price/Sales	0.92	0.93
BPS	15.51	20.34
P/E Positive	13.97	13.54
ROE	14.32	10.33
Price/Book	1.61	1.46
P/E (1y fwd)	27.33	18.43
P/E (3y fwd)	15.19	22.07
Sales (1y fwd)	24,104	40,984
Sales (3y fwd)	38,274	37,664

Constituents overlap

S&P 500	1.7%
MSCI World	1.6%
Nasdaq 100	3.7%
Total stocks = 29	

Source: Bloomberg, LGIM; All values are based in USD; As close of 31 March. Please refer to end of this report for all definitions. **Consensus ratings are based on the average of recommendations for each underlying stock made by analysts on Bloomberg within the last 12 months.

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Key risk

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Clean Energy

Company spotlight

Valmet Oyj

Valmet is a Finnish technology, automation and services provider for biomass conversion and emission control, which specialises in the automation of fluidised bed boilers. Its biomass gasification solution is one of the company's newest solutions. It enables the substitution of fossil fuels in industrial large-scale processes with biogas, biofuels and biomaterials. Other activities include the conversion of biomass into recyclable products such as pulp, board, paper and tissue, and the provision of modular power plants for sustainable power generation and combined heat and power (CHP) generation.

The company's solutions for biomass energy include wood handling for biomass-to-energy, boiler combustion technologies such as BFB (bubbling fluidised bed) and advanced CFB (circulating fluidised bed), gasification solutions, power plants, heating plants, air emission control solutions, and automation technologies that support clean energy production. Valmet provides major biomass powerplants with components (such as conveyors, screening and handling equipment) and technologies that enable these processes from end to end, from flue receiving, handling and drying to feeding into the boilers.

Valmet owns a single Distributed Control System (DCS) called Valmet DNA for power plant process automation, machine controls and quality assurance. The system monitors the performance of fluidised bed boilers and manages fuel while providing the user with transparency with information management. The data used by the system is protected by a third-party cyber security specialist.

In the past year Valmet announced the supply of an automation system to an energy-from-waste plant, and the completion of a biomass boiler, flue gas cleaning and condensing system for a power plant in Europe and Asia.

Last quarter performance commentary

The Solactive Clean Energy Index NTR returned +4.5% over the quarter.

According to the 2023 Electricity Market Report by the International Energy Agency (IEA), the share of renewables in the global power generation mix is set to rise by approximately 20% over the next three years, which is more than all other sources combined, increasing from 29% in 2022 to 35% in 2025. This rise in the renewables share is expected to be balanced by

a fall in fossil fuel power generation (mainly coal and gas), with emissions of global power generation expected to plateau to 2025 and its CO2 intensity to further decline in subsequent years. Government policies that are supporting investment in renewable energy, such as the IRA in the US, have been pivotal to aim for these targets.

While the SVB collapse caused ripple effects on the climate tech market among others and is likely to draw some more scrutiny on clean energy project visibility, according to former Bank of England Governor Mark Carney, it is unlikely to have a material impact on the availability of climate tech investment capital.

At its investor day Tesla presented the Master Plan 3 strategy to reach a fully sustainable energy future on earth. This is the third stage of the plan initially unveiled in 2006. In this year's update Tesla included the strategies to add renewable power to the grid, along with the manufacturing of more heat pumps and EVs.

The main contributors to performance were SMA Solar (returned +47.3%), First Solar (+45.2%) and Tesla (+68.4%). The main detractors were Azure Power (-42.2%), PNE (-35.7%), and West Holding (-27.2%).

Source: LGIM, Bloomberg, IEA, Tesla as at 31 March 2023.

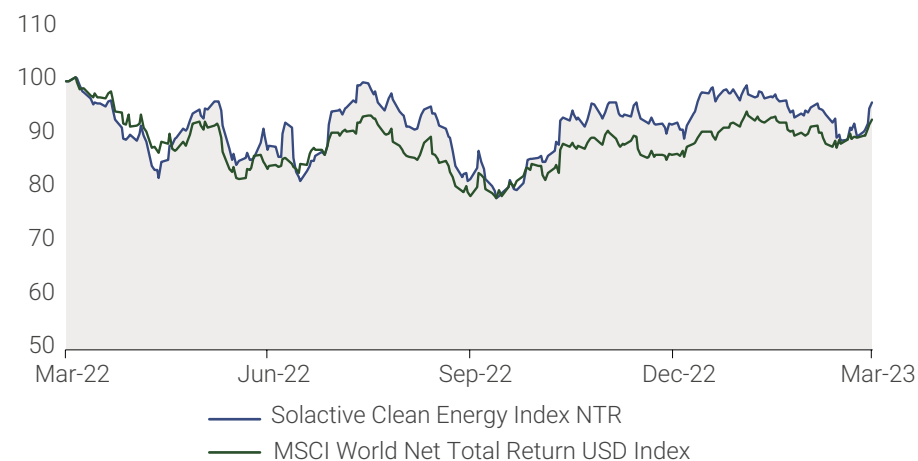
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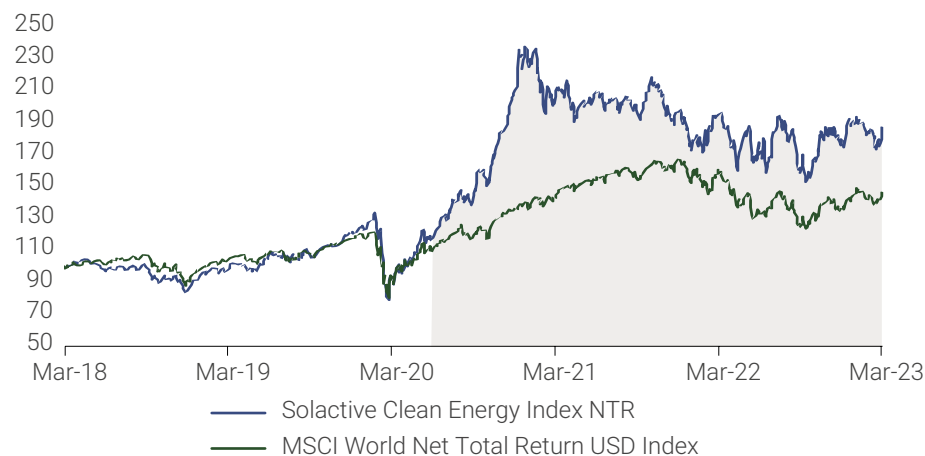
Clean Energy

Performance

Historical and simulated performance (1y)



Historical and simulated performance (5y)



*Source: Bloomberg as at 31 March 2023, all values are based in USD. The backtested index data has been sourced from the index provider and is based on what they perceive to be reasonable assumptions and objective data; The index data is gross of fees/costs but is net of withholding taxes. The effect of fees and charges would reduce the returns shown. Shaded area indicates live period of the index.

Index performance*

Index performance*	QtD	1 year	3 years	5 years
Cumulative return	4.48%	-3.88%	100.68%	87.80%
Annualized return			26.15%	13.43%
Volatility	20.80%	25.50%	23.58%	22.32%
Information ratio	92.48%	-15.21%	110.92%	60.16%
Max drawdown	-10.41%	-22.40%	-35.88%	-40.72%

Index total return contribution (QtD)

Top 5		Bottom 5	
Sma Solar Techno	▲ 1.22%	Azure Power Glob	▼ -1.02%
First Solar Inc	▲ 0.97%	Pne Ag	▼ -0.82%
Tesla Inc	▲ 0.73%	West Holdings Co	▼ -0.52%
Andritz Ag	▲ 0.53%	Aes Corp	▼ -0.45%
Canadian Solar I	▲ 0.48%	Energiekontor Ag	▼ -0.34%

Portfolio composition

Latest additions		Latest deletions
Energia Innov. Y Desarrollo Fotov.	AES Corp	Mitsubishi Electric
Obrascon Huarte	Aker Solutions	PNE AG
Siemens Energy	CS Wind	Saipem
Soltec Power Holdings	Downer Edi	Subsea 7
	Encavis	Toyota Tsusho
	Energiekontor	TPI Composites
		WSP Global

Fund information

Ticker	RENW LN	ISIN	IE00BK5BCH80
TER	0.49%	Inception date	11/11/2020
Currency	USD	Index inception date	26-Jun-20
Securities lending	No	Replication method	Physical

Key risk

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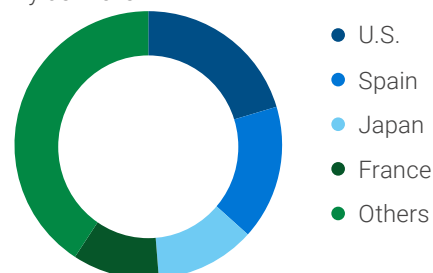


Clean Energy

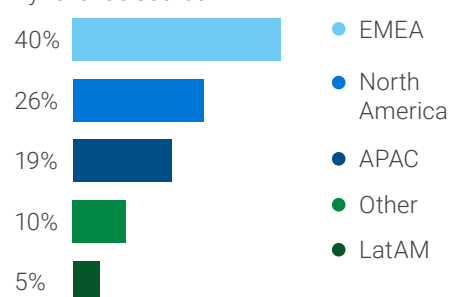
Characteristics

Geographical breakdown

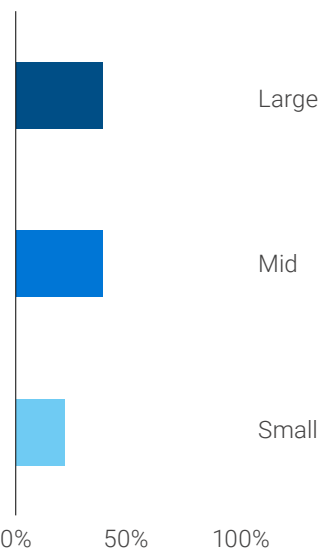
By domicile



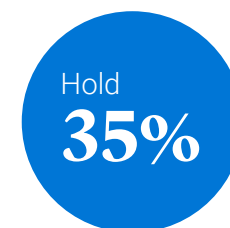
By revenue source



Market cap breakdown



Third party analyst stock consensus ratings**



Key ratios

	Current	Q1 2022
EPS	0.76	1.01
Price/Sales	1.85	2.59
BPS	12.09	10.14
P/E Positive	25.34	30.70
ROE	9.59	7.30
Price/Book	2.38	2.66
P/E (1y fwd)	42.55	40.42
P/E (3y fwd)	24.40	34.04
Sales (1y fwd)	13,225	13,381
Sales (3y fwd)	14,297	13,263

Constituents overlap

S&P 500	2.3%
MSCI World	2.1%
Nasdaq 100	2.7%
Total stocks = 43	

Source: Bloomberg, LGIM; All values are based in USD; As close of 31 March 2023. Please refer to end of this report for all definitions. **Consensus ratings are based on the average of recommendations for each underlying stock made by analysts on Bloomberg within the last 12 months.

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Key risk

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Clean Water

Company spotlight

Mueller Water

Mueller Water Products is a North American company that supplies services and equipment related to the transmission, distribution and measurement of water. It specialises in systems for fluid handling equipment, and smart water technologies such as acoustic sensors, advanced metering infrastructure (AMI) meters, automated meter reading (AMR) meters, and distribution network data management. More than half of its revenues come from the supply of water flow solutions, while the rest comes from water-management solutions.

Mueller Water is the main provider of gate valves and hydrants in North America, and its technologies help customers – mainly municipalities in the region – prioritise action and spending for installations, maintenance and repair of water networks.

Mueller leverages internet of things (IoT) data, artificial intelligence (AI) and machine learning (ML) to collect data and provide real-time insights and analytics to utilities, so that they can identify anomalies and risks before they become issues. For instance, utilities can detect leaks and manage metering, flow and pressure via the IoT-based digital services platform Sentryx™.

This water-intelligence tool collects data sent from sensors, smart valves and meters that are connected to the existing water infrastructure, allowing customers to visualise the scenario and make informed decisions.

Mueller enriched its digital technologies portfolio in 2021 with the acquisition of I2O Water, a provider of solutions to remotely control and optimise water networks. Previously, Mueller acquired Krausz Industries and Singer Valve to strengthen its water infrastructure and engineering capabilities. Mueller has a stake in Echologics, a digital technology business with a global footprint that specialises in leak detection.

Last quarter performance commentary

The Solactive Clean Water Index NTR returned +7.1% over the quarter.

The fluid handling equipment market in which companies such as Mueller Water Products operate is mainly made up of pipes (~70%), followed by pumps and valves. This market was valued at \$116m in 2022 and is projected to grow by ~20% cumulatively in the next five years. It is the largest segment of the water technology market, followed by biological treatment, physical/chemical treatment, sludge management, disinfection and dissolved solids removal. The fluid

handling technology market is driven by new projects in developing markets and the need to renew existing infrastructure in developed markets. Digital services are helping manufacturers stay competitive and operate in the most efficient possible way thanks to the use of smart data.

The growth in the pharmaceuticals and biotechnology industry has resulted in this being the industry with the highest rate of growth of water capex in the next five years. High-quality water is needed as an ingredient and for cleaning and sanitation, and as wastewater regulations becomes stricter, technology is essential to prevent hazards and reduce contaminant levels.

Over the quarter, digital solutions and technology provider Badger Meter acquired Syrinix, a provider of intelligent water solutions. However, Xylem's acquisition of Evoqua at a 33% premium took the spotlight as the deal between the two water engineering companies, aimed to be finalised in June, was worth \$7.4bn.

The main contributors to performance were technology and digital solutions providers Norma Group (returned +29.5%), Mueller Water Products (+30.0%) and Evoqua (+25.6%). The main detractors were Tetra Technologies (-23.4%), Nov Inc (-11.2%), and China Lesso (-14.4%).

Source: LGIM, Bloomberg, Global Water Intelligence, as at 31 March 2023.

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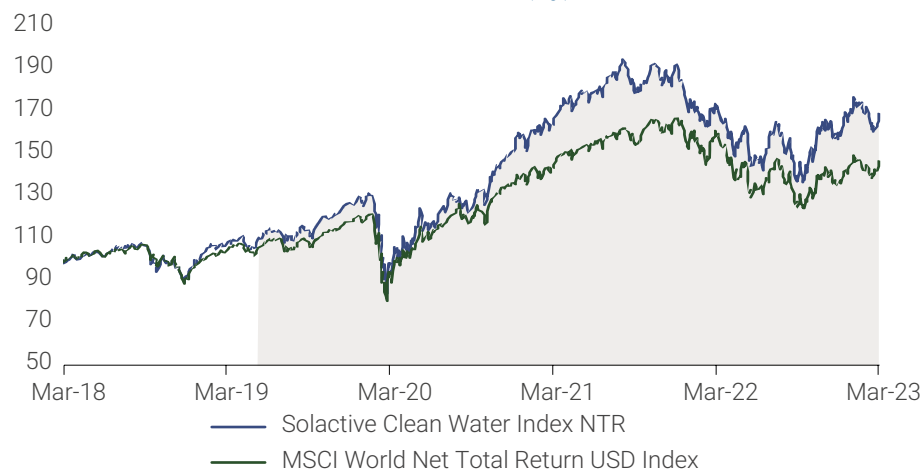
Clean Water

Performance

Historical and simulated performance (1y)



Historical and simulated performance (5y)



*Source: Bloomberg as at 31 March 2023, all values are based in USD. The backtested index data has been sourced from the index provider and is based on what they perceive to be reasonable assumptions and objective data; The index data is gross of fees/costs but is net of withholding taxes. The effect of fees and charges would reduce the returns shown. Shaded area indicates live period of the index.

Index performance*

Index performance*	QtD	1 year	3 years	5 years
Cumulative return	7.09%	-1.14%	71.66%	69.19%
Annualized return			19.75%	11.08%
Volatility	15.03%	20.60%	19.35%	19.91%
Information ratio	210.41%	-5.54%	102.06%	55.67%
Max drawdown	-9.09%	-20.80%	-29.87%	-36.00%

Index total return contribution (QtD)

Top 5		Bottom 5	
Norma Group Se	▲ 0.58%	Tetra Technologi	▼ -0.47%
Mueller Water-A	▲ 0.56%	Nov Inc	▼ -0.37%
Evoqua Water Tec	▲ 0.53%	China Lesso	▼ -0.27%
Organo Corp	▲ 0.51%	Sjw Group	▼ -0.14%
Pentair Plc	▲ 0.45%	Sabesp-Adr	▼ -0.13%

Portfolio composition

Latest Additions	Latest Deletions
Northwest Pipe	Alfa Laval
Ferguson Plc	Consolidated Water
Uponor Oyj	Nov Inc
	Tetra Technologies

Fund information

Ticker	GLUG LN	ISIN	IE00BK5BC891
TER	0.49%	Inception date	02/07/2019
Currency	USD	Index inception date	07-Jun-19
Securities lending	No	Replication method	Physical

Key risk

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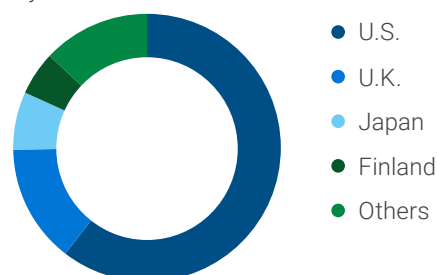


Clean Water

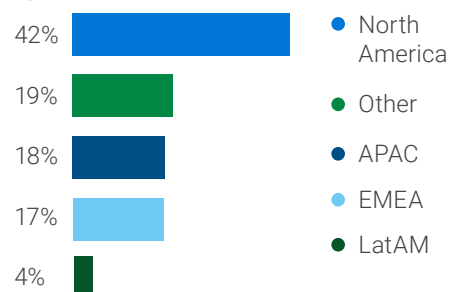
Characteristics

Geographical breakdown

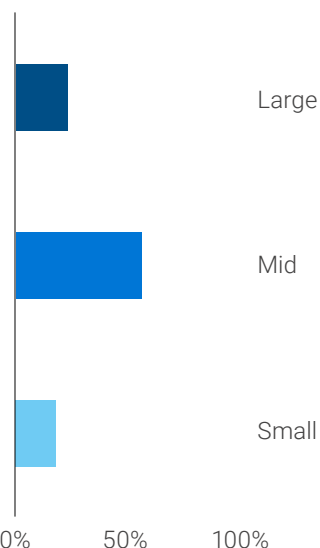
By domicile



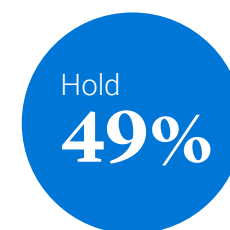
By revenue source



Market cap breakdown



Third party analyst stock consensus ratings**



Key ratios

	Current	Q1 2022
EPS	1.81	1.72
Price/Sales	2.49	2.71
BPS	14.58	13.81
P/E Positive	25.11	27.15
ROE	13.11	12.01
Price/Book	3.07	3.69
P/E (1y fwd)	30.88	28.24
P/E (3y fwd)	21.99	26.74
Sales (1y fwd)	2,516	2,605
Sales (3y fwd)	2,864	2,207

Constituents overlap

S&P 500	0.6%
MSCI World	0.5%
Nasdaq 100	0.0%
Total stocks = 53	

Source: Bloomberg, LGIM; All values are based in USD; As close of 31 March 2023. Please refer to end of this report for all definitions. **Consensus ratings are based on the average of recommendations for each underlying stock made by analysts on Bloomberg within the last 12 months.

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Key risk

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Cyber Security

Company spotlight

Atos

Atos is the leading European company in cybersecurity, cloud and high-performance computing. At a global level, Atos offers among the most advanced and comprehensive solutions in the cybersecurity space. In 2021 it topped Gartner's global league table for achieving the highest revenues in managed security services (MSS), moving up from second place.

The company's Digital Security division owns a number of cybersecurity solutions. The products offered are Digital Identities (trust infrastructure to generate identities, protect data transfers and manage credentials), Identity and Access Management, Data Protection and Governance, IoT security, Digital Workplace Security, Hybrid Cloud Security, and Advanced Detection and Response. Atos's solutions are used by public and private clients in the financial services and insurance, healthcare & life sciences, manufacturing and telecommunications sectors.

Since 1997 Atos has acquired 73 companies. Among the major ones was Syntel, acquired in July 2018 for \$3.5bn, to expand Atos's offering of all-round IT solutions in cloud, social media, mobile, analytics, IoT and automation.

In June 2022 Atos announced a study to reorganise the business in two parts to have a more focused

Source: LGIM, Bloomberg, Nasdaq, as at 31 March 2023.

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strategy. SpinCo (Evidian) would operate in digital transformation, big data and cybersecurity and partly be sold to Airbus as part of a long-term strategic and technological partnership. Tech Foundations Perimeter (TFCo) would operate in Managed Infrastructure Services, Digital Workplace and Professional Services.

In June 2022 Atos expanded its partnership with IBM to supply its cybersecurity monitoring solutions to the IBM Cloud for Financial Services community and help finance professionals adopt cloud technology.

Atos will be the official cybersecurity services and operations supporter of the Paris 2024 Olympics.

Last quarter performance commentary

The ISE Cyber Security UCITS NTR Index returned +13.4% over the quarter.

Among the various initiatives that the US government has put in place to strengthen cybersecurity, in March the White House released the new US National Cybersecurity Strategy, to increase international collaboration. The US also struck a deal with the EU, on the back of the EU-US Transatlantic Data Privacy Framework draft published in December, to allow multinational companies to transfer personal data across the two regions. In the EU the NIS2 directive became effective, requiring members to harmonise cybersecurity structures across the bloc.

Some notable ransomware attacks and breaches victims were Royal Mail, the UK's postal service; Yum Brands, the owner of restaurants such as KFC and Taco Bell; a database containing Twitter users' personal data; and Pepsi Bottling Ventures, the bottler of Pepsi-Cola products in the US.

Fortinet launched the Cybercrime Atlas at the annual World Economic Forum meeting, to help organisations map the cybercrime landscape; Cloudflare launched new Zero Trust email security solutions; Palo Alto launched a cloud infrastructure solution in the Swiss market; and Darktrace launched the PREVENT/OT AI-powered product, which maps the paths that attackers might follow to disrupt the operations of clients' critical infrastructure.

Over the quarter, Dell and CrowdStrike formed a cybersecurity alliance, and Canadian application software provider Open Text completed the acquisition of the enterprise cybersecurity solutions provider Micro Focus, bought at an 85% premium.

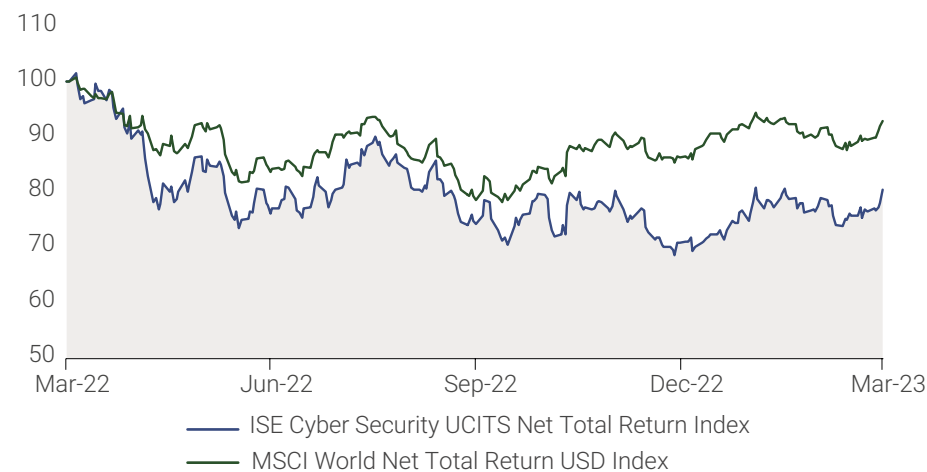
The main contributors to performance were Fastly (returned +116.9%), Palo Alto (+43.1%), and Fortinet (+35.9%). The main detractors were Gen Digital, previously known as NortonLifeLock (-19.5%); NetScout (-11.9%); and Telos (-50.3%).



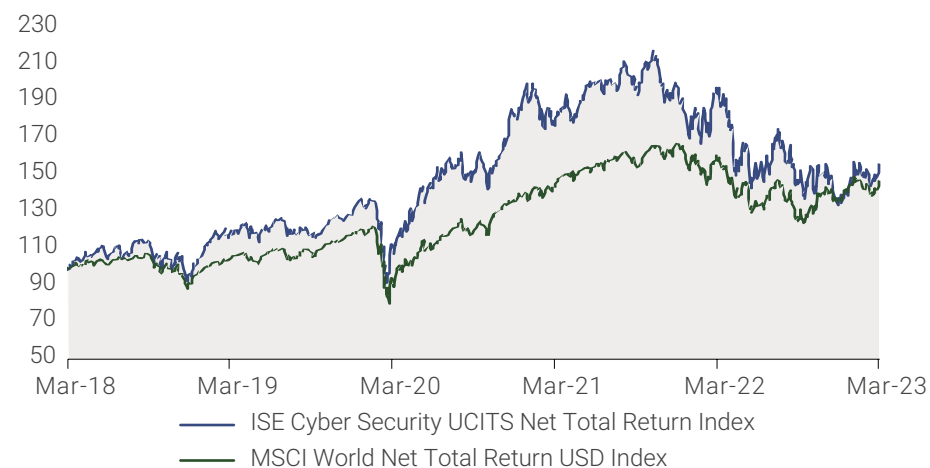
Cyber Security

Performance

Historical and simulated performance (1y)



Historical and simulated performance (5y)



*Source: Bloomberg as at 31 March 2023, all values are based in USD. The backtested index data has been sourced from the index provider and is based on what they perceive to be reasonable assumptions and objective data; The index data is gross of fees/costs but is net of withholding taxes. The effect of fees and charges would reduce the returns shown. Shaded area indicates live period of the index.

Index performance*

Index performance*	QtD	1 year	3 years	5 years
Cumulative return	13.40%	-19.54%	40.43%	56.30%
Annualized return			11.99%	9.34%
Volatility	24.10%	31.58%	25.86%	25.05%
Information ratio	272.39%	-61.90%	46.38%	37.28%
Max drawdown	-8.46%	-32.29%	-38.67%	-38.67%

Index total return contribution (QtD)

Top 5		Bottom 5	
Fastly Inc -CI A	▲ 2.82%	Gen Digital Inc	▼ -0.74%
Palo Alto Networ	▲ 1.75%	Netscout Systems	▼ -0.49%
Fortinet Inc	▲ 1.48%	Telos Corp	▼ -0.34%
Cloudflare Inc-A	▲ 1.47%	Absolute Softwre	▼ -0.33%
Blackberry Ltd	▲ 1.42%	Rackspace Techno	▼ -0.28%

Portfolio composition

Latest additions	Latest deletions
no additions in Q1 2023	no deletions in Q1 2023

Fund information

Ticker	USPY LN	ISIN	IE00BYPLS672
TER	0.69%	Inception date	28/09/2015
Currency	USD	Index inception date	31-Aug-15
Securities lending	No	Replication method	Physical

Key risk

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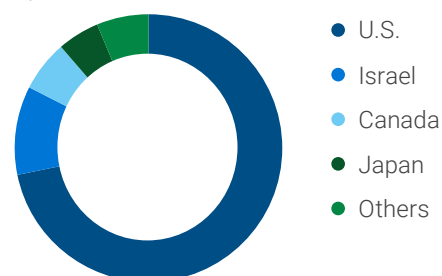


Cyber Security

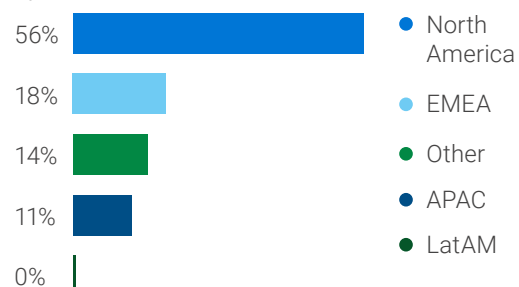
Characteristics

Geographical breakdown

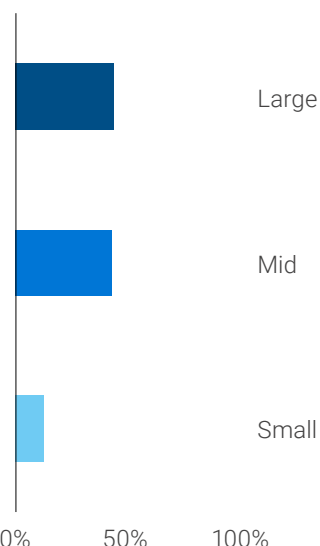
By domicile



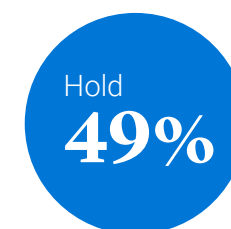
By revenue source



Market cap breakdown



Third party analyst stock consensus ratings**



Key ratios

	Current	Q1 2022
EPS	0.03	0.54
Price/Sales	4.02	5.24
BPS	5.69	7.77
P/E Positive	26.14	34.22
ROE	-0.70	4.08
Price/Book	3.52	5.68
P/E (1y fwd)	32.87	34.12
P/E (3y fwd)	24.70	25.82
Sales (1y fwd)	3,135	3,393
Sales (3y fwd)	3,014	2,867

Constituents overlap

S&P 500	0.9%
MSCI World	0.9%
Nasdaq 100	2.8%
Total stocks = 43	

Source: Bloomberg, LGIM; All values are based in USD; As close of 31 March 2023. Please refer to end of this report for all definitions. **Consensus ratings are based on the average of recommendations for each underlying stock made by analysts on Bloomberg within the last 12 months.

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Key risk

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Digital Payments

Company spotlight

Nuvei

Nuvei is a pure-play Canadian provider of payment technology solutions that specialises in payment gateways, merchant acquiring, and transaction and processing services. Its payment platform enables the acceptance of over 600 alternative payment methods (outside of debit and credit cards), in almost 150 currencies and over 200 markets. The company offers four main products: payments, payouts, platform integrations and banking as a service. Along with pay-ins and payouts, optimisation and orchestration, Nuvei's full-stack solution integrates security features to detect fraud and risk management into a single tool. Customers can also monitor payments and leverage data insights.

With a significant presence in EMEA and North America, it is expanding in EM, most recently in Asia in 2022 through Singapore and Hong Kong and has recently launched its solutions in Australia to strengthen its global footprint.

Over the quarter Nuvei acquired Paya Holdings for \$1.4bn at a 23% premium. This is a significant move that diversifies Nuvei's revenue streams from the more discretionary industries it has historically served, such

as gaming, online retail and travel and mobility. The acquisition also diversified the company on a geographical level, and strengthens its offering in the areas of digital payments and ecommerce. Paya Holdings, the North American acquirer, payment gateway, processor and technology provider, was a constituent of our portfolio until the acquisition. Previously, Nuvei acquired Paymentez to expand its footprint in Latin America; SimplexCC to provide better cryptocurrency payment solutions; Mazooma Technical Services to enhance its real-time payment solutions in North America; and other technology-driven payments platforms such as PayU Fintech Holdings BV, Base Commerce LLC and Smart2pay BV.

Last quarter performance commentary

The Solactive Digital Payments Index NTR returned +9.8% over the quarter.

New studies carried out by Juniper Research explored the expected growth in various areas of digital payments, from open banking to virtual card transactions. The studies revealed that open banking transaction values are expected to increase at a 55% CAGR to \$330bn in 2027 from 2023, and the number of instant payments is expected to rise at a 33% CAGR, reaching 235 billion in 2027 from 2023.

Over 100 countries are exploring Central Bank Digital Currencies (CBDC), but only 11 have fully launched one. Over the quarter the UK Treasury and the Bank of England started a consultation for the digital pound, the European Central Bank mentioned 2027 as a possible issuance date for a digital euro, and the Reserve Bank of Australia started to explore the potential benefits of a CBDC along with the Digital Finance Cooperative Research Centre (DFCRC).

Worldline launched a Metaverse shopping mall in Decentraland, where users can make transactions with or without cryptocurrency. OneSpan acquired Australian blockchain technology start-up ProvenDB, aiming to integrate its technology with the Transaction Cloud Platform and improve the integrity and assurance features of its digital payments.

The main contributors to performance were Nuvei (returned +71.2%), Remitly (+48.0%), and OneSpan (+56.4%), on the back of positive results. The main detractors were Marqeta (-25.2%), Fidelity National Information Services (FIS) (-19.2%), and Repay Holdings (-18.4%). The fintech solutions provider FIS announced the spin-off of its Merchant Business Worldpay, acquired in 2019, to strengthen its strategic and operational focus.

Source: LGIM, Bloomberg, Juniper Research, as at 31 March 2023.

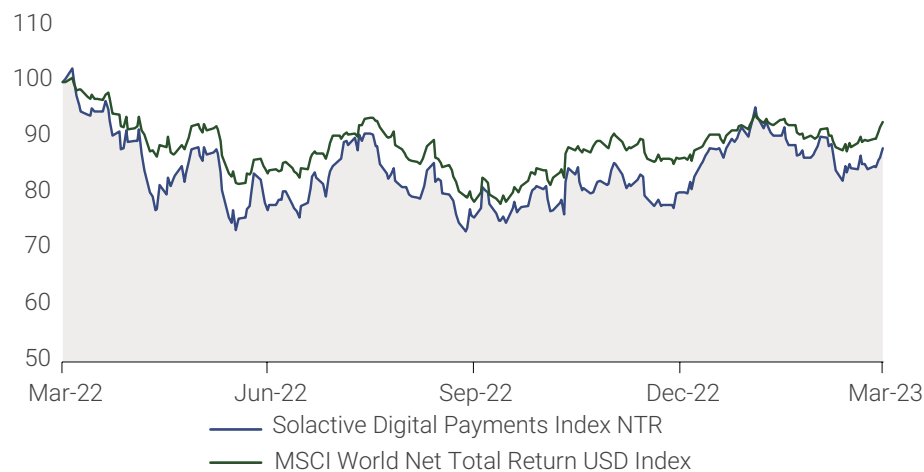
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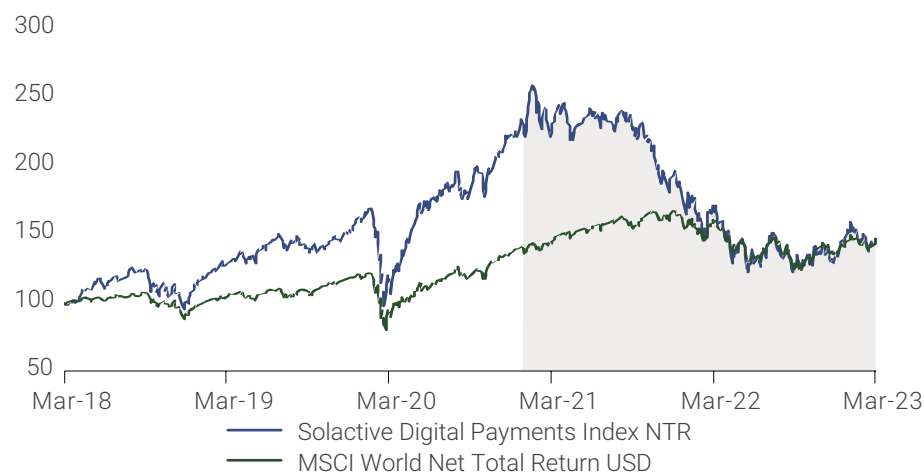
Digital Payments

Performance

Historical and simulated performance (1y)



Historical and simulated performance (5y)



*Source: Bloomberg as at 31 March 2023, all values are based in USD. The backtested index data has been sourced from the index provider and is based on what they perceive to be reasonable assumptions and objective data; The index data is gross of fees/costs but is net of withholding taxes. The effect of fees and charges would reduce the returns shown. Shaded area indicates live period of the index.

Index performance*

Index performance*	Qtd	1 year	3 years	5 years
Cumulative return	9.82%	-11.77%	27.04%	47.01%
Annualized return			8.31%	8.01%
Volatility	24.11%	31.90%	27.78%	27.41%
Information ratio	189.30%	-36.91%	29.92%	29.21%
Max drawdown	-13.76%	-28.52%	-52.89%	-52.89%

Index total return contribution (Qtd)

Top 5		Bottom 5	
Nuvei Corp-Sub V	▲ 1.51%	Marqeta Inc-A	▼ -0.56%
Remit Global Inc	▲ 1.23%	Fidelity Nationa	▼ -0.47%
Onespan Inc	▲ 1.16%	Repay Holdings C	▼ -0.44%
Zuora Inc -CI A	▲ 1.07%	Network Internat	▼ -0.33%
Shopify Inc - A	▲ 0.86%	Q2 Holdings Inc	▼ -0.24%

Portfolio composition

Latest additions	Latest deletions
no rebalancing in Q1 2023	no rebalancing in Q1 2023

Fund information

Ticker	DPAY LN	ISIN	IE00BF92J153
TER	0.49%	Inception date	27/05/2021
Currency	USD	Index inception date	26-Jan-21
Securities lending	No	Replication method	Physical

Key risk

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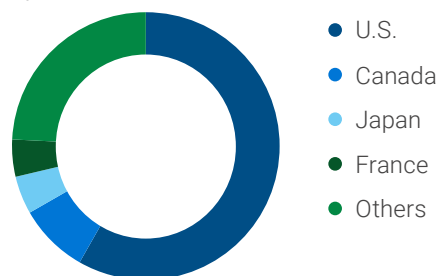


Digital Payments

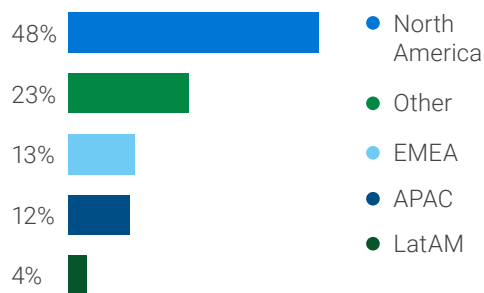
Characteristics

Geographical breakdown

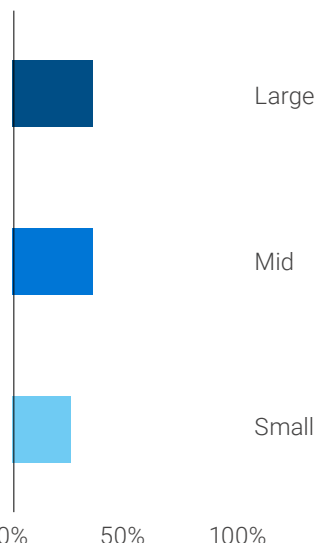
By domicile



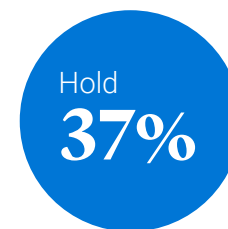
By revenue source



Market cap breakdown



Third party analyst stock consensus ratings**



Key ratios

	Current	Q1 2022
EPS	0.46	0.95
Price/Sales	3.18	4.47
BPS	8.89	10.31
P/E Positive	34.66	35.44
ROE	3.25	5.38
Price/Book	3.40	4.10
P/E (1y fwd)	31.51	27.85
P/E (3y fwd)	19.60	24.51
Sales (1y fwd)	4,722	4,477
Sales (3y fwd)	5,927	5,248

Constituents overlap

S&P 500	3.0%
MSCI World	2.1%
Nasdaq 100	1.2%
Total stocks = 41	

Source: Bloomberg, LGIM; All values are based in USD; As close of 31 March 2023. Please refer to end of this report for all definitions. **Consensus ratings are based on the average of recommendations for each underlying stock made by analysts on Bloomberg within the last 12 months.

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Key risk

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Ecommerce Logistics

Company spotlight

SAP

SAP is a software company headquartered in Germany, operating in the technology segment of ecommerce logistics.

The vast majority of its revenues come from the cloud and software segment; however, the company also has a support and services business. Cloud and software has been the highest-growing area for SAP, with 33% year-on-year growth in related revenues in 2022.

Such exposure to cloud solutions could prove very beneficial to SAP. Cloud is a critical part of IT and, similarly to cyber security, is one that clients are unlikely to cut a lot despite tighter budgets. Therefore, while in the short term macro headwinds such as wage inflation, rising rates and supply chain issues could impact SAP through its clients, in our view the company is well positioned to benefit from the long-term process of digital transformation.

The company's products fit into different areas: enterprise resource planning, financial management, business technology platform, CRM and customer experience, human capital management, supply chain management, and spend management. Within supply

management, SAP offers planning and logistics solutions. The supply-planning solutions feature analytics, simulations and alerts that combine sales and operation planning with forecasting and demand and inventory planning, to help users coordinate their processes and collaborate with partners. The Yard Logistics solution is an application that allows customers to achieve better visibility regarding on-premises activities.

In 2022 SAP acquired analytics startups Askdata and Innaas, and in 2023 it announced the divestiture of the experience management software provider Qualtrics, which is likely to result in an improved cash profile for SAP and contribute to profitability in 2023.

Last quarter performance commentary

The Solactive eCommerce Logistics Index returned +10.5% over the quarter.

Shopify and Google Cloud entered a partnership to solve the search abandonment problem, which is estimated to cost the global retail industry more than \$2tn every year. With this integration, Shopify's clients will be able to use Google's AI technology to increase search volumes and improve customer shopping experiences.

On the back of the interest raised by Chat GPT over the last quarter, Amazon is one of the companies that have been turning more actively to generative AI to revive interest in cloud computing, an area whose growth has slowed significantly in recent months. Amazon uses AI tools to improve search results, generate recommendations and chat with online customers. Over the quarter AWS has announced a partnership with Hugging Face to improve the capabilities of its AI applications, and it has been reported that Amazon is planning to offer up to \$300k of free computing resources to AI start-ups that sign up to its cloud.

The main contributors to performance were Shopify (returned +37.5%), FedEx (+32.7%), and Zalando (+18.0%). Fedex reported strong earnings despite the cuts announced earlier in the year. Kuehne + Nagel was also among the top performers, having reported strong results for 2022 despite macro and geopolitical challenges that the firm expects will protract through 2023. After the Roadmap 2022 concluded in December, the company revealed its roadmap to 2026, in which the development of its digital ecosystem is one of the four cornerstones. The main detractors were CJ Logistics (-17.4%); Ocado (-11.5%), on the back of the inflation's impact on sales; and Concentrix (-8.5%).

Source: LGIM, Bloomberg, Transport Intelligence Logistics, as at 31 March 2023.

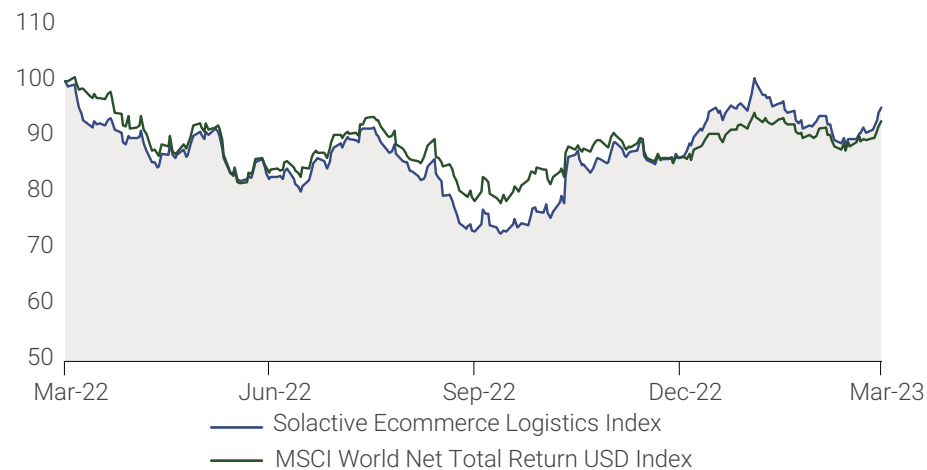
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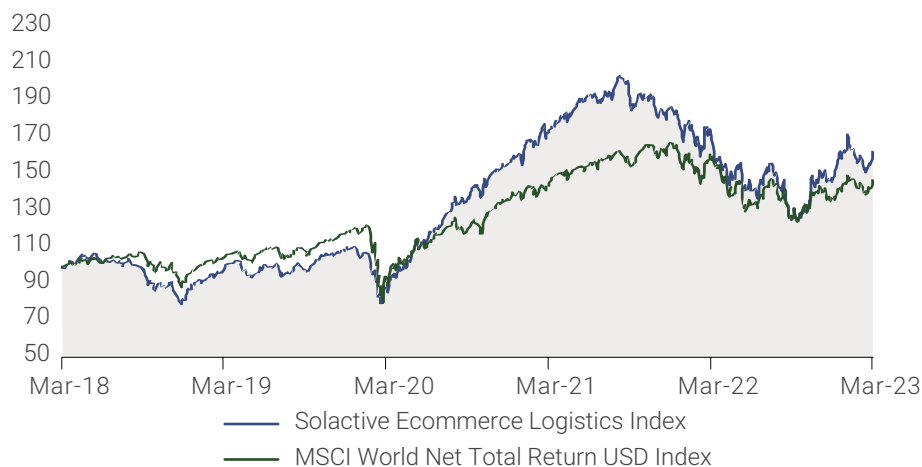
Ecommerce Logistics

Performance

Historical and simulated performance (1y)



Historical and simulated performance (5y)



*Source: Bloomberg as at 31 March 2023, all values are based in USD. The backtested index data has been sourced from the index provider and is based on what they perceive to be reasonable assumptions and objective data; The index data is gross of fees/costs but is net of withholding taxes. The effect of fees and charges would reduce the returns shown. Shaded area indicates live period of the index.

Index performance*

Index performance*	Qtd	1 year	3 years	5 years
Cumulative return	10.49%	-4.60%	82.69%	62.49%
Annualized return			22.26%	10.19%
Volatility	17.48%	21.41%	17.90%	17.38%
Information ratio	281.71%	-21.50%	124.40%	58.63%
Max drawdown	-11.91%	-27.10%	-39.20%	-39.20%

Index total return contribution (QtD)

Top 5		Bottom 5	
Shopify Inc - A	▲ 1.22%	Cj Logistics	▼ -0.55%
Fedex Corp	▲ 0.92%	Ocado Group Plc	▼ -0.38%
Zalando Se	▲ 0.87%	Concentrix Corp	▼ -0.24%
Kuehne & Nagel-R	▲ 0.80%	Jd Logistics Inc	▼ -0.17%
Deutsche Post-Rg	▲ 0.78%	Kerry Logistics	▼ -0.15%

Portfolio composition

Latest additions	Latest deletions
no rebalancing in Q1 2023	no rebalancing in Q1 2023

Fund information

Ticker	ECOM LN	ISIN	IE00BF0M6N54
TER	0.49%	Inception date	23/01/2018
Currency	USD	Index inception date	03-Jan-18
Securities lending	No	Replication method	Physical

Key risk

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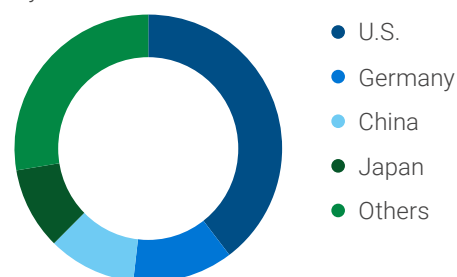


Ecommerce Logistics

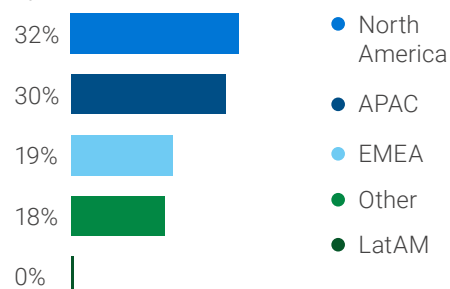
Characteristics

Geographical breakdown

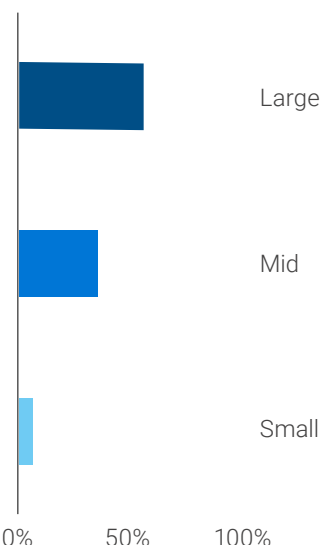
By domicile



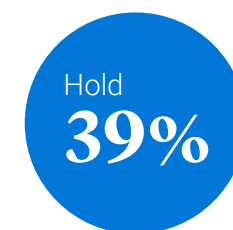
By revenue source



Market cap breakdown



Third party analyst stock consensus ratings**



Key ratios

	Current	Q1 2022
EPS	2.60	2.19
Price/Sales	0.72	0.93
BPS	17.47	17.64
P/E Positive	13.74	17.28
ROE	11.69	13.50
Price/Book	2.22	3.15
P/E (1y fwd)	24.63	29.21
P/E (3y fwd)	11.77	16.29
Sales (1y fwd)	51,151	45,925
Sales (3y fwd)	59,679	55,115

Constituents overlap

S&P 500	4.1%
MSCI World	3.8%
Nasdaq 100	2.3%
Total stocks = 36	

Source: Bloomberg, LGIM; All values are based in USD; As close of 31 March 2023. Please refer to end of this report for all definitions. **Consensus ratings are based on the average of recommendations for each underlying stock made by analysts on Bloomberg within the last 12 months.

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Key risk

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Emerging Cyber Security

Company spotlight

Renesas Electronics

Renesas Electronics is a Japanese provider of semiconductor solutions for automotive, industrial, home electronics, automation and technology and IoT applications. With a mission statement of “Enabling the New Normal”, it operates in the emerging segment of our emerging cyber security portfolio, specialising in secure hardware and quantum computing.

Renesas integrates security solutions into IoT devices such as medical wearables and cameras, providing secure internet protocol (IP) for autonomous security. Being connected to the network, IoT devices are constantly exposed to a variety of threats. The company’s solutions such as the RX range features strong security technology that uses built-in Trusted Secure IP and provides self-contained security for IoT endpoint devices.

Renesas has also integrated quantum-based security technology into its ranges of microcontrollers that use its Secure Cryptographic Engine (SCE) and Trusted Secure IP (TSIP) blocks.

Renesas’s main revenue streams are from the industrial and infrastructure IoT and automotive areas. In February it announced a buyback and posted results

ahead of expectations, supported by strong demand for automotive chips, despite a slowdown in the consumer electronics sector. Renesas is well positioned to also benefit from the structural trends of powertrain electrification, advanced driver assistance systems, and industrial chip production for remote working, 5G network and data centre applications.

In 2022 Renesas acquired Steradian Semiconductors to enhance its radar solutions and Reality Analytics to expand in the non-visual sensor data space with AI/ML solutions. In 2021 the company acquired Celeno Communications, a provider of wireless solutions, and Dialog Semiconductor, a provider of integrated circuits used in IoT applications.

Last quarter performance commentary

The Solactive Emerging Cyber Security Index NTR returned +18.2% over the quarter.

In its spring budget the UK unveiled its quantum strategy, with which it aims to become a leading quantum-enabled economy by 2033. The country is making a £2.5bn research and innovation programme available. Quantum technologies could be used in two ways. First, they could enable growth in many areas including cybersecurity; on the other hand, they could decrypt traditional codes. With the regards to this concern, the National Cyber Security Centre (NCSC)

issued guidance on the transition to quantum-safe cryptography and announced a collaboration with the National Quantum Technologies Programme.

Russia’s state-sponsored attacks continue, as highlighted in Microsoft’s Threat Intelligence report on Russian activity. According to the report, in 2023 Russia has targeted mainly government organisations of European nations that supply aid to Ukraine.

Within the emerging areas of cybersecurity, a leader in post-quantum cryptography (mechanisms that can protect from both quantum and traditional computers), Cloudflare, pledged it would offer this service for free to all customers, in support of a more democratised and resilient Internet. Meanwhile, Rapid7 acquired Minerva Labs, provider of ransomware prevention technology, to enhance its managed detection and response (MDR) capabilities.

The main contributors to performance were Fastly (returned +116.9%), from the growth, cloud protection segment; Renesas Electronics (+59.5%), from the emerging, hardware security segment; and OneSpan (+56.4%), from the growth, identification segment. The main detractors were Telos (-50.3%), from the growth, threat management segment; Rackspace (-36.3%), from the growth, cloud protection segment; and NetScout Systems (-11.9%), from the growth, data protection segment.

Source: LGIM, Bloomberg, as at 31 March 2023.

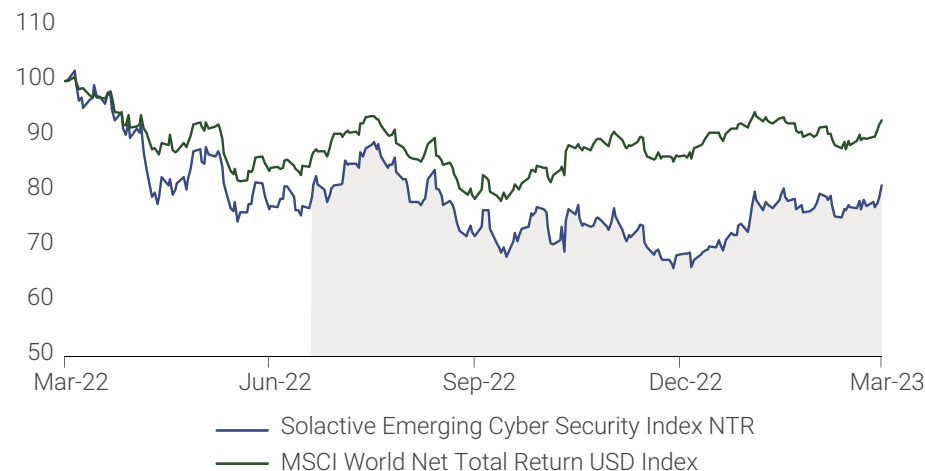
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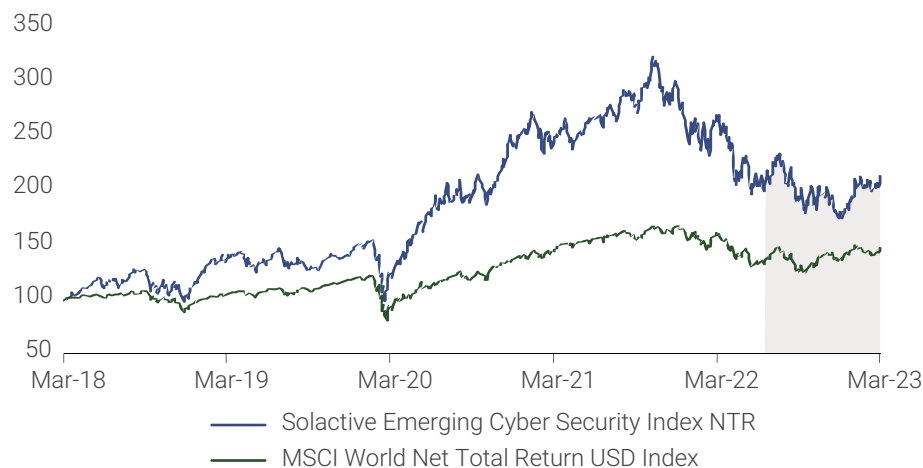
Emerging Cyber Security

Performance

Historical and simulated performance (1y)



Historical and simulated performance (5y)



*Source: Bloomberg as at 31 March 2023, all values are based in USD. The backtested index data has been sourced from the index provider and is based on what they perceive to be reasonable assumptions and objective data; The index data is gross of fees/costs but is net of withholding taxes. The effect of fees and charges would reduce the returns shown. Shaded area indicates live period of the index.

Index performance*

Index performance*	QtD	1 year	3 years	5 years
Cumulative return	18.15%	-18.99%	71.94%	113.49%
Annualized return			19.81%	16.37%
Volatility	25.82%	33.76%	29.33%	28.96%
Information ratio	369.26%	-56.28%	67.56%	56.54%
Max drawdown	-6.60%	-35.34%	-46.08%	-46.08%

Index total return contribution (QtD)

Top 5		Bottom 5	
Fastly Inc -CI A	▲ 3.03%	Telos Corp	▼ -1.45%
Renesas Electron	▲ 1.93%	Rackspace Techno	▼ -0.96%
Onespan Inc	▲ 1.79%	Netscout Systems	▼ -0.40%
Stmicroelectroni	▲ 1.67%	Identiv Inc	▼ -0.32%
Palo Alto Networ	▲ 1.26%	A10 Networks Inc	▼ -0.31%

Portfolio composition

Latest additions	Latest deletions
Elan Microelectronicis	Fingerprint Cards
eMemory Technology	
GB Group	
Infineon Technologies	
IonQ Inc	
Mitek Systems	
SentinelOne	

Fund information

Ticker	ESPY LN	ISIN	IE000ST40PX8
TER	0.49%	Inception date	07/09/2022
Currency	USD	Index inception date	18-Jul-22
Securities lending	No	Replication method	Physical

Key risk

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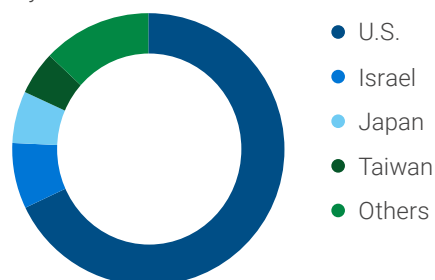


Emerging Cyber Security

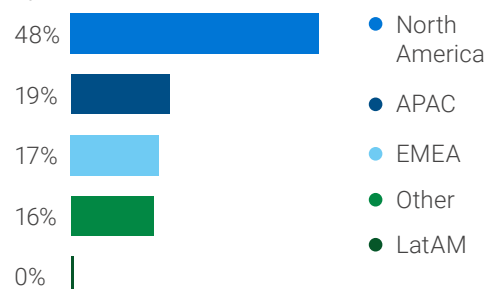
Characteristics

Geographical breakdown

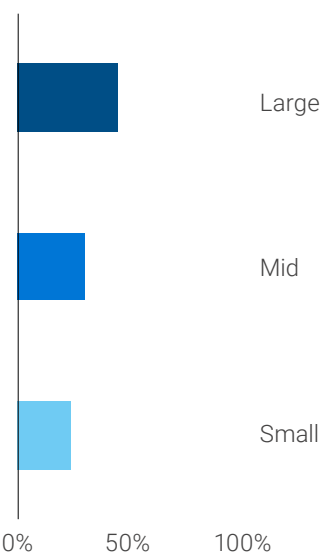
By domicile



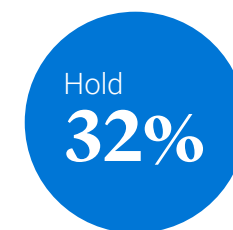
By revenue source



Market cap breakdown



Third party analyst stock consensus ratings**



Key ratios

	Current	Q1 2022
EPS	0.11	0.44
Price/Sales	4.07	6.41
BPS	5.45	5.64
P/E Positive	30.81	30.07
ROE	2.08	4.34
Price/Book	3.52	5.11
P/E (1y fwd)	39.56	37.33
P/E (3y fwd)	24.34	27.50
Sales (1y fwd)	5,480	5,756
Sales (3y fwd)	6,573	5,708

Constituents overlap

S&P 500	1.6%
MSCI World	1.5%
Nasdaq 100	4.8%
Total stocks = 38	

Source: Bloomberg, LGIM; All values are based in USD; As close of 31 March 2023. Please refer to end of this report for all definitions. **Consensus ratings are based on the average of recommendations for each underlying stock made by analysts on Bloomberg within the last 12 months.

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Key risk

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Global Thematic

Last quarter performance commentary

The Solactive L&G Global Thematic Index NTR returned +9.6% over the quarter.

The index had a strong start of the year, returning +9.3% in January, then it retreated returning -2.3% in February and +2.6% in March.

The strong start was in line with equity markets, which enjoyed optimism around seemingly cooling inflation in the US, and COVID restrictions being relaxed in China, pointing to possible signs of economic recovery. In January all themes contributed positively to performance, led by Battery Value-Chain, Artificial Intelligence, and Robotics and Automation. Within Battery Value-Chain, lithium miners and electric vehicle (EV) manufacturers contributed the most to performance. The performance of the Artificial Intelligence theme was lifted by enthusiasm around Microsoft's proposed acquisition of a stake in OpenAI, the owner of ChatGPT, a tool that is democratising the use of AI. Performance was also boosted by C3.ai, on the back of a new product launch. The Robotics and Automation theme was boosted by Emerson Electric's proposed acquisition of the measurement software provider National Instruments.

Volatility started rising in February as the US dollar strengthened and markets started to price in the hawkish monetary policy decisions of major central banks, which raised rates over the course of the month on the back of sticky inflation. The Artificial Intelligence theme kept contributing positively to performance. Within Emerging Cyber Security, cloud protection provider Fastly drove returns on the back of strong revenue growth and margin improvements, followed by hardware security provider Renesas on the back of positive results. Within Clean Water, Norma rallied due to M&A rumours. The main detractors were Pharma Breakthrough, Ecommerce Logistics and Clean Energy. The Pharma Breakthrough theme slowed down after being the best-performing theme in 2022. Within Ecommerce Logistics, retailers owning logistics technology such as Zalando, Shopify, Ocado and Alibaba felt the impact of inflation through weaker consumer demand and stronger margin compression. In the Clean Energy theme, renewable energy producers within the utility and independent power production segments were among the main detractors.

In March volatility rose and hit its highest point in the quarter, around the collapse of SVB. Artificial

Intelligence remained one of the themes that contributed most to performance, along with Emerging Cyber Security and Ecommerce Logistics. Pharma Breakthrough, Clean Water and Healthcare Breakthrough detracted. The delay of a therapy application weighed on Pharma Breakthrough and the impact of possible limitations on CareDx's product coverage under Medicare was a drag in Healthcare Breakthrough.

Over the quarter, on a thematic basis, the themes that contributed most positively to performance were Artificial Intelligence (returned +22.8%), Emerging Cyber Security (+18.2%) and Battery Value-Chain (+12.7%), while Pharma Breakthrough detracted (-4.1%).

On a stock basis, the main contributors were Fastly (returned +116.9%) from our Emerging Cyber Security theme; Battery Value-Chain, Clean Energy, and Artificial Intelligence component Tesla (+68.4%); and oncology drug developer from our Pharma Breakthrough portfolio Seagen (+57.6%). The main detractors were Pharma Breakthrough component PharmaMar (-30.2%), Clean Energy component PNE (-35.7%), and Healthcare and Pharma Breakthrough component Alnylam Pharmaceuticals (-15.7%).

Source: LGIM, Bloomberg, as at 31 March 2023.

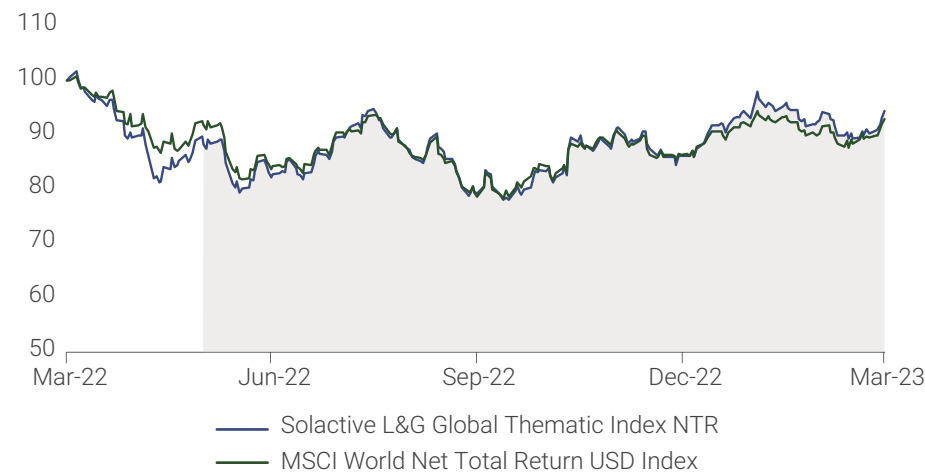
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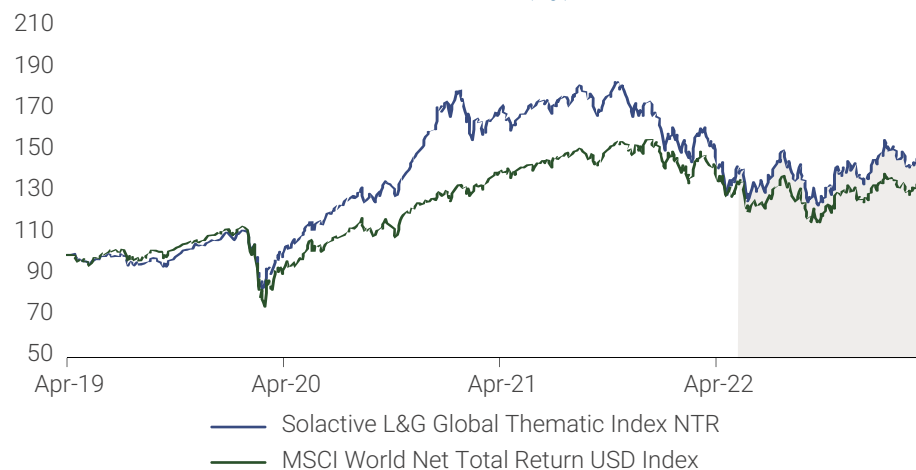
Global Thematic

Performance

Historical and simulated performance (1y)



Historical and simulated performance (5y)



*Source: Bloomberg as at 31 March 2023, all values are based in USD. The backtested index data has been sourced from the index provider and is based on what they perceive to be reasonable assumptions and objective data; The index data is gross of fees/costs but is net of withholding taxes. The effect of fees and charges would reduce the returns shown. Shaded area indicates live period of the index.

Index performance*

Index performance*	QTD	1 year	3 years
Cumulative return	9.56%	-5.64%	60.31%
Annualized return			17.05%
Volatility	15.94%	22.09%	18.69%
Information ratio	277.56%	-25.55%	91.22%
Max drawdown	-8.79%	-23.32%	-32.55%

Index total return contribution (QTD)

Top 5		Bottom 5	
Fastly Inc -CI A	▲ 0.37%	Pharma Mar Sa	▼ -0.17%
Tesla Inc	▲ 0.32%	Pne Ag	▼ -0.14%
Seagen Inc	▲ 0.26%	Alnylam Pharmace	▼ -0.14%
Onespan Inc	▲ 0.25%	Azure Power Glob	▼ -0.14%
Renesas Electron	▲ 0.23%	United Therapeut	▼ -0.13%

Portfolio composition

Latest additions	Latest deletions
no rebalancing in Q1 2023	no rebalancing in Q1 2023

Fund information

Ticker	THMZ LN	ISIN	IE000VTOHNZ0
TER	0.6%	Inception date	07/09/2022
Currency	USD	Index inception date	30-May-22
Securities lending	No	Replication method	Physical

Key risk

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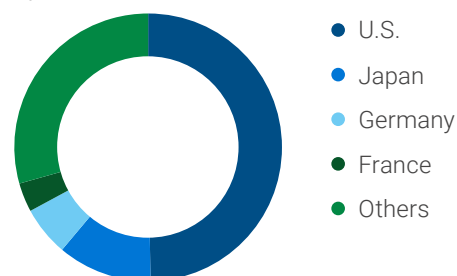


Global Thematic

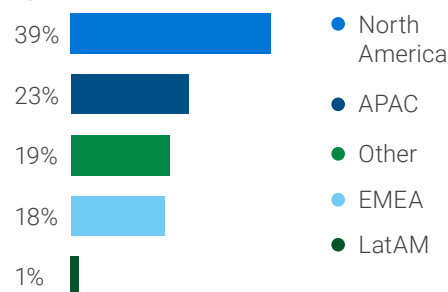
Characteristics

Geographical breakdown

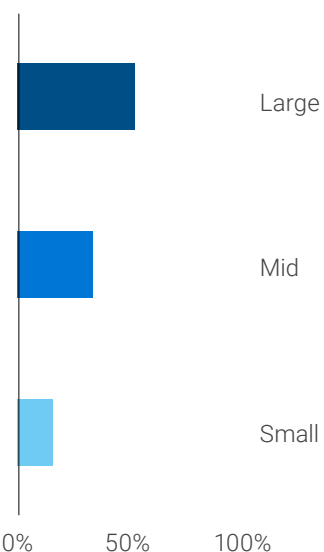
By domicile



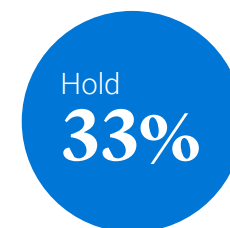
By revenue source



Market cap breakdown



Third party analyst stock consensus ratings**



Key ratios

	Current	Q1 2022
EPS	1.30	1.21
Price/Sales	3.29	4.08
BPS	14.09	13.21
P/E Positive	25.34	27.02
ROE	10.61	10.36
Price/Book	3.41	4.18
P/E (1y fwd)	36.19	37.40
P/E (3y fwd)	23.06	27.90
Sales (1y fwd)	12,502	13,181
Sales (3y fwd)	16,003	14,727

Constituents overlap

S&P 500	11.4%
MSCI World	13.5%
Nasdaq 100	9.1%
Total stocks = 380	

Source: Bloomberg, LGIM; All values are based in USD; As close of 31 March 2023. Please refer to end of this report for all definitions. **Consensus ratings are based on the average of recommendations for each underlying stock made by analysts on Bloomberg within the last 12 months.

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Key risk

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Healthcare Technology

Company spotlight

Align Technology

Align Technology has been a pioneer and leader in design and manufacturing systems of clear align therapy, intra-oral scanners, proprietary materials, and CAD/CAM digital services used in dentistry, orthodontics, and dental records storage for over 25 years. Align has supported over 14.5 million people through its flagship Invisalign® system, the most advanced clear aligner on the market, and recently launched Invisalign® First for kids +6 years old with recent approvals to expand their addressable market.

The Clean Aligner segment, which encompasses the Invisalign® products and ancillary products, accounts for the majority of the company's revenues at approximately 80%. The Imaging Systems and CAD/CAM services segment accounts for the rest of the revenues and includes the iTero® systems and scanning and software solutions that help orthodontics professionals integrate workflows and expand diagnostics.

Align's customers are mainly dentistry specialists, General Practitioner (GP) dentists, and dental support organisations (DSOs) that distribute the products to specialised practices.

Align recently beat street expectations on a stronger-than-expected year-end 2022. After a strong 2020, the company has seen tough comparisons and a difficult macroeconomic backdrop in discretionary spending, yet retainers continue to gain share against traditional braces. Align Technology is gaining geographical expansion too in Japan and China and has expanded partnerships, such as the one with the 3D printing solutions provider Desktop Metal, which expands Align's restorative dentistry potential. Align Technology is currently in a \$1 billion share repurchase programme and approved a \$250 million purchase in February, deploying strong positive cash flows into further R&D.

Last quarter performance commentary

The ROBO Global Healthcare Technology and Innovation Index returned +3.3% over the quarter.

In general, healthcare technology companies are still trading at relatively low valuations compared with the pre- and post-pandemic long-term average. Positive gains were driven by Data Analytics (+14.5%) but offset by Regenerative Medicine (-12.6%) and Precision Medicine (-11.9%). Importantly, during the quarter we continued to see major innovation milestones as evidenced by the Vertex/CRISPR licensing agreement.

This builds on their prior focus of creating cell and genetic therapies for eradicating serious diseases and cementing their leadership in these modalities by accelerating the development of Vertex's Hypoimmune Cell Therapies for the Treatment of Type 1 Diabetes.

Natera announced positive news coming less than six months after their VA coverage agreement for Minimum Residual Disease Monitoring (MRD), by announcing that the Molecular Diagnostics Services Program (MolDX) will cover the Signatera molecular MRD for patients with IIb or higher breast cancer, including the HR-positive, HER2 and triple negative types, adding to their existing colorectal, bladder and pan-cancer monitoring. The impact was clear to the market as the stock jumped 17% on the day. The average selling price of the treatment is estimated to be \$2,500-3,500 and there are tens of thousands of eligible patients annually, which could result in \$30m accretive this year, and a possible 3-5% boost to the top line this year alone, depending on adoption speed.

The main contributors to performance were Align Technology (returned +58.4%), Natera (+38.2%), and Catalent (+46.0%). The main detractors were Arrowhead Pharmaceuticals (-37.4%), Twist Bioscience (-36.7%), and Diasorin (-24.5%).

Source: LGIM, Bloomberg, ROBO Global®, as at 31 March 2023.

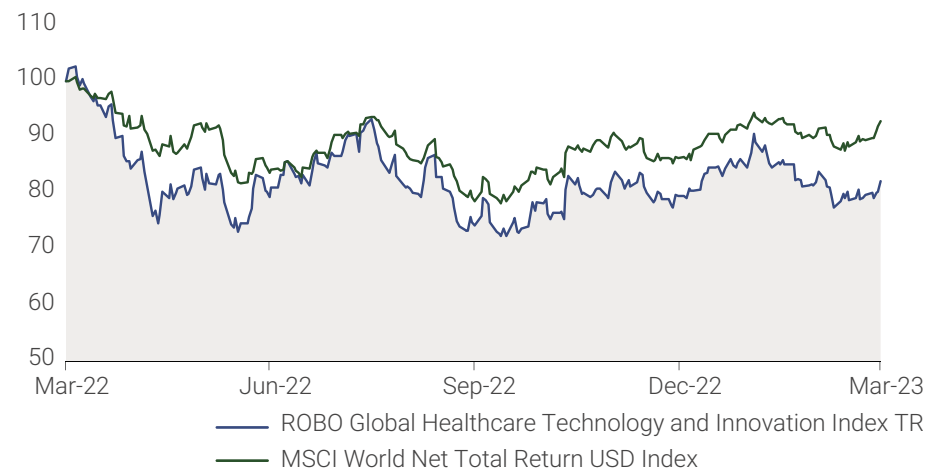
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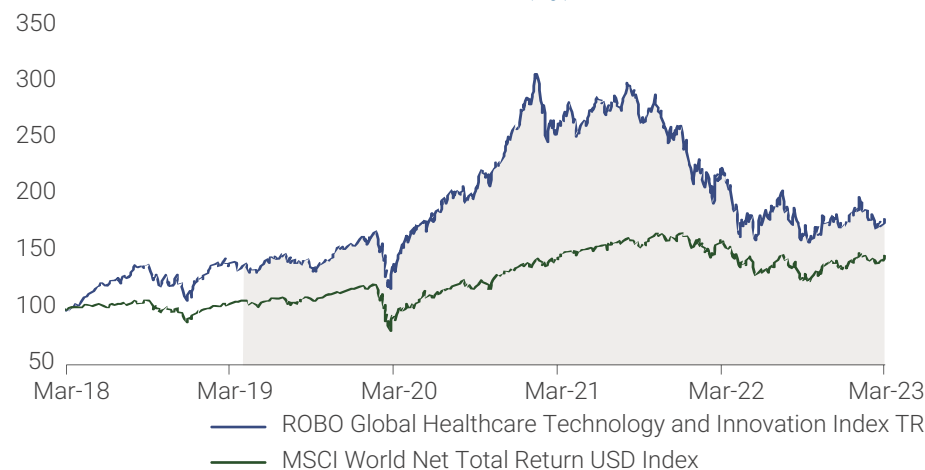
Healthcare Technology

Performance

Historical and simulated performance (1y)



Historical and simulated performance (5y)



*Source: Bloomberg as at 31 March 2023, all values are based in USD. The backtested index data has been sourced from the index provider and is based on what they perceive to be reasonable assumptions and objective data; The index data is gross of fees/costs but is net of withholding taxes. The effect of fees and charges would reduce the returns shown. Shaded area indicates live period of the index.

Index performance*

Index performance*	QtD	1 year	3 years	5 years
Cumulative return	3.33%	-17.79%	29.79%	80.38%
Annualized return			9.09%	12.52%
Volatility	22.72%	31.29%	26.79%	25.74%
Information ratio	61.74%	-56.91%	33.92%	48.63%
Max drawdown	-14.49%	-29.56%	-48.53%	-48.53%

Index total return contribution (QtD)

Top 5		Bottom 5	
Align Technology	▲ 0.77%	Arrowhead Pharma	▼ -0.75%
Natera Inc	▲ 0.61%	Twist Bioscience	▼ -0.42%
Catalent Inc	▲ 0.58%	Diasorin Spa	▼ -0.41%
Tactile Systems	▲ 0.55%	Azenta Inc	▼ -0.29%
Exact Sciences	▲ 0.47%	Caredx Inc	▼ -0.29%

Portfolio composition

Latest additions	Latest deletions
Crispr Therapeutics GE Healthcare Technology	Glaukos GN Store Nord

Fund information

Ticker	DOCT LN	ISIN	IE00BK5BC677
TER	0.49%	Inception date	02/07/2019
Currency	USD	Index inception date	01-May-19
Securities lending	No	Replication method	Physical

Key risk

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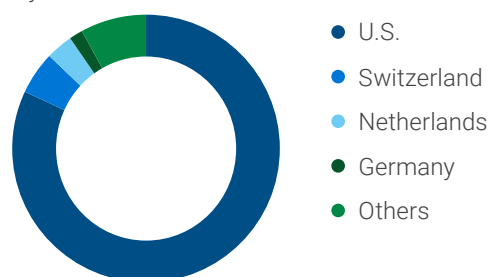


Healthcare Technology

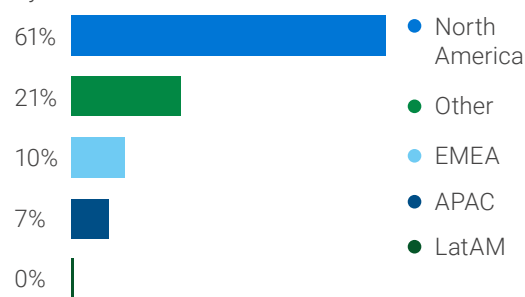
Characteristics

Geographical breakdown

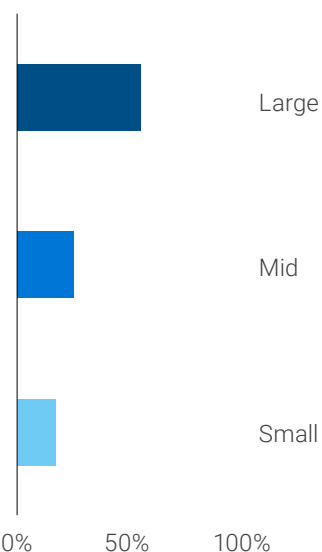
By domicile



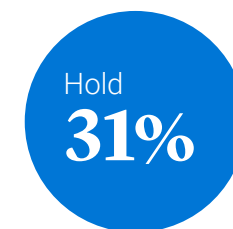
By revenue source



Market cap breakdown



Third party analyst stock consensus ratings**



Key ratios

	Current	Q1 2022
EPS	1.17	0.99
Price/Sales	4.46	5.65
BPS	17.65	15.99
P/E Positive	29.97	33.57
ROE	6.12	8.14
Price/Book	3.78	4.83
P/E (1y fwd)	36.60	47.21
P/E (3y fwd)	25.89	29.99
Sales (1y fwd)	5,510	4,716
Sales (3y fwd)	6,927	6,498

Constituents overlap

S&P 500	4.8%
MSCI World	3.9%
Nasdaq 100	3.2%
Total stocks = 77	

Source: Bloomberg, LGIM; All values are based in USD; As close of 31 March 2023. Please refer to end of this report for all definitions. **Consensus ratings are based on the average of recommendations for each underlying stock made by analysts on Bloomberg within the last 12 months.

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Key risk

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Hydrogen Economy

Company spotlight

Nippon Sanso

Nippon Sanso is a Japanese holding company and a subsidiary of Mitsubishi Chemical Holdings Corp. It provides hydrogen and other industrial gases as well as handling equipment to the industrial, electronics, plants and engineering, and medical care sectors. It operates as an integrated player in the hydrogen economy, along with three other major players in the industrial gases business, namely Linde, Air Liquide and Air Products and Chemicals, which are also included in our portfolio.

Nippon Sanso specialises in the fuel stations segment of the hydrogen value-chain, having developed Hydro Shuttle, a package-type hydrogen refuelling station. The station simplifies the structure of the dispenser, the pre-cool heat exchanger, the hydrogen gas booster and the C-FRP vessel (the four components of a typical hydrogen refuelling station), and integrates them in a single unit that can be stationary or moving. This simplified structure can reduce installation costs and potentially facilitate the penetration of fuel-cell vehicles (FCVs).

In June 2020, it opened a new hydrogen filling station at the Kawasaki Mizue Operation Office in Japan for forklift refuelling, and in April 2022 it announced a successful demonstration test with 100% hydrogen combustion to melt glass using a hydrogen-oxygen burner.

The expansion of the hydrogen, CO, Syngas plus Co2 (HYCO) business line through their US business Matheson Tri-Ga is one of the three key strategic areas for Nippon Sanso. The group has various production sites globally: three in Europe, one in India, three in Japan, five in the US and one in Latin America, as well as a number of innovation and R&D centres.

Last quarter performance commentary

The Solactive Hydrogen Economy Index NTR returned +5.3% over the quarter.

The number of countries with a hydrogen strategy keeps rising. According to BNEF, currently 42 have an H2 strategy and 36 are preparing one. The amount of funding is also on the rise with \$146bn to 2030, which include targeted support for clean hydrogen and technology-neutral funds that could include H2 as well as other projects. A study by the International Energy

Agency (IEA) and the European Patent Office revealed that the automotive sector has attracted more hydrogen international patent families than all other applications combined in 2011-2020.

Ballard achieved a new milestone, having 150 million kilometres (equivalent to 3,700 times the Earth's perimeter and an industry-leading record) covered by fuel cell electric vehicles including buses and trucks around the world, all powered by its proton exchange membrane (PEM) fuel cells.

Air Liquide, the second largest gas producer after Linde, launched a new pilot project in the Antwerp port, partly financed by the Flemish Agency for Innovation and Entrepreneurship, to build an ammonia cracking plant that should become operational next year. Ammonia can be used to transport hydrogen and then broken down to be converted back into hydrogen.

The main contributors to performance were Siemens Energy (returned +15.9%), on the back of strong results; Weichai Power (+19.5%); and Nippon Sanso (+23.6%). The main detractors were Hyzon Motors (-47.4%), due to the consequences of its revenue recognition issues; Air Products & Chemicals (-6.3%); and Johnson Matthey (-4.8%).

Source: LGIM, Bloomberg, Bloomberg NEF, IEA, as at 31 March 2023.

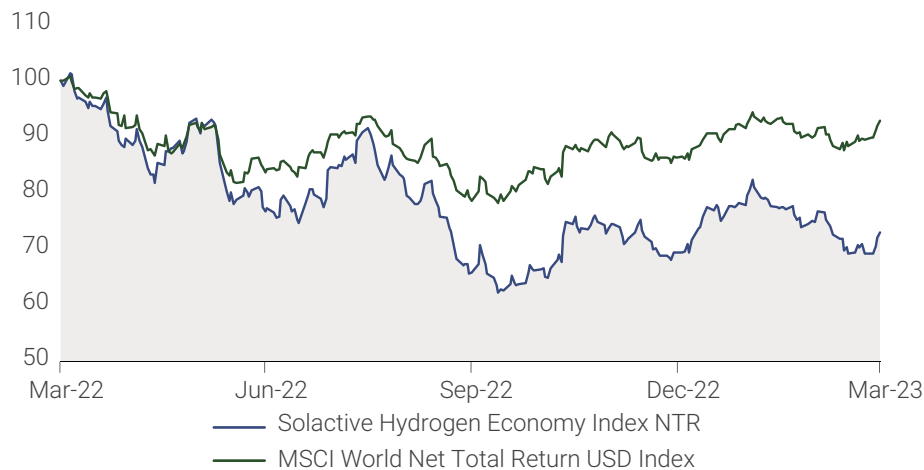
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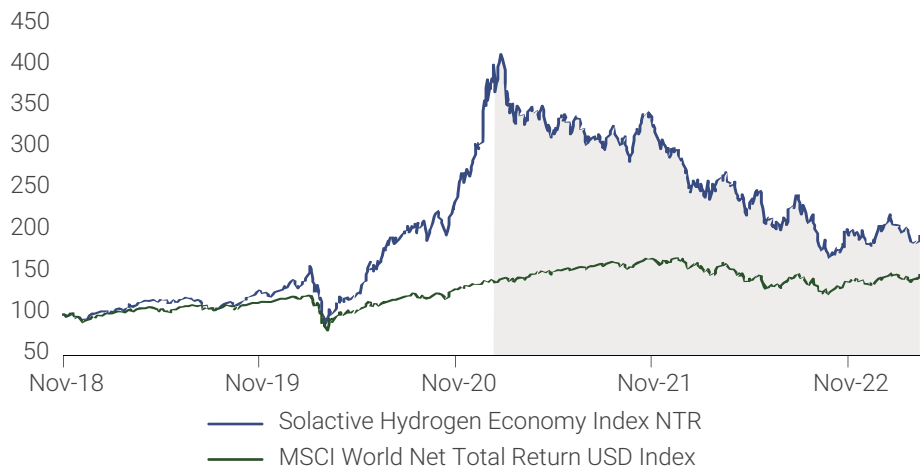
Hydrogen Economy

Performance

Historical and simulated performance (1y)



Historical and simulated performance (5y)



*Source: Bloomberg as at 31 March 2023, all values are based in USD. The backtested index data has been sourced from the index provider and is based on what they perceive to be reasonable assumptions and objective data; The index data is gross of fees/costs but is net of withholding taxes. The effect of fees and charges would reduce the returns shown. Shaded area indicates live period of the index.

Index performance*

Index performance*	QTD	1 year	3 years
Cumulative return	5.27%	-26.99%	88.82%
Annualized return			23.62%
Volatility	23.28%	29.35%	31.46%
Information ratio	98.37%	-91.99%	75.06%
Max drawdown	-16.02%	-38.51%	-59.85%

Index total return contribution (QTD)

Top 5		Bottom 5	
Siemens Energy A	▲ 1.13%	Hyzon Motors Inc	▼ -0.89%
Weichai Power-H	▲ 1.06%	Air Prods & Chem	▼ -0.24%
Nippon Sanso Hol	▲ 0.94%	Johnson Matthey	▼ -0.19%
Hyundai Motor	▲ 0.87%	Orsted A/S	▼ -0.18%
Air Liquide Sa	▲ 0.85%	Itm Power Plc	▼ -0.17%

Portfolio composition

Latest additions	Latest deletions
no rebalancing in Q1 2023	no rebalancing in Q1 2023

Fund information

Ticker	HTWO LN	ISIN	IE00BMYDM794
TER	0.49%	Inception date	10/02/2021
Currency	USD	Index inception date	26-Jan-21
Securities lending	No	Replication method	Physical

Key risk

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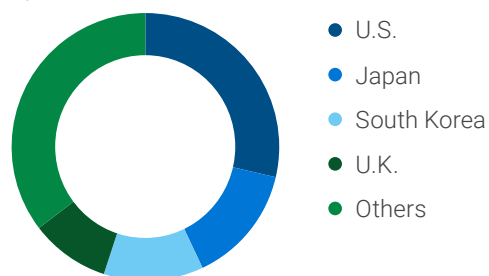


Hydrogen Economy

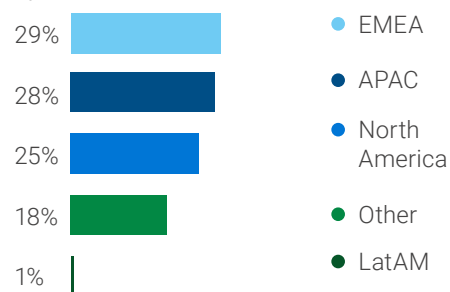
Characteristics

Geographical breakdown

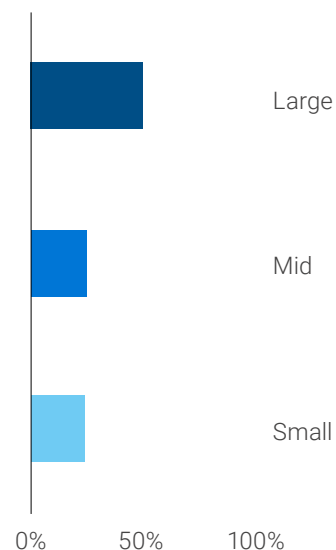
By domicile



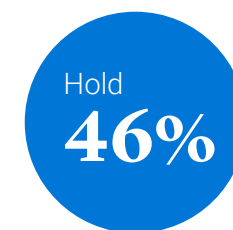
By revenue source



Market cap breakdown



Third party analyst stock consensus ratings**



Key ratios

	Current	Q1 2022
EPS	0.06	0.86
Price/Sales	3.32	4.59
BPS	7.17	11.95
P/E Positive	16.08	16.24
ROE	4.78	5.47
Price/Book	2.09	3.53
P/E (1y fwd)	20.44	20.83
P/E (3y fwd)	15.35	20.62
Sales (1y fwd)	24,368	24,019
Sales (3y fwd)	21,918	21,119

Constituents overlap

S&P 500	0.8%
MSCI World	1.1%
Nasdaq 100	0.0%
Total stocks = 26	

Source: Bloomberg, LGIM; All values are based in USD; As close of 31 March 2023. Please refer to end of this report for all definitions. **Consensus ratings are based on the average of recommendations for each underlying stock made by analysts on Bloomberg within the last 12 months.

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Key risk

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Optical Technology & Photonics

Company spotlight

Luminar Technologies

Luminar Technologies is a North American provider of automobile technologies, in particular light detection and ranging (lidar) solutions for autonomous vehicles. The company has over 50 commercial partners and serves global consumer and commercial automotive original equipment manufacturers (OEMs). Its biggest clients are Volvo and Mercedes-Benz Group. The latter recently expanded its supply deal to install sensors for assisted-driving cars.

Lidar sensors provide advanced safety and autonomous features for automakers, such as automated breaking, by identifying the objects that surround the vehicle. Luminar's solutions aim to be more reliable than current Advanced Driver Assistance Systems (ADAS). The company has Iris, a long-range sensor that can detect dark objects at night up to 250 metres away with a maximum range of 600 metres, and Sentinel, a platform that encompasses the lidar, software, mapping technology and other features that enable safe autonomous driving.

2022 marked a number of milestones for Luminar. It exceeded its targets of 60% year-on-year total programme wins and forward-looking orderbook

growth, achieved the start of production phase for Iris and the beta milestone for Sentinel.

In January, Luminar acquired Civil Maps, a lidar data company whose 3D mapping data with automatic update features will be used in Luminar's Sentinel platform.

In February, the company had its Luminar Day 2023, at which it announced a series of partnerships with companies leading in the autonomous driving technology, AI and insurance space, and the creation of Luminar Semiconductor, resulting from the combination of three subsidiaries.

Last quarter performance commentary

The Solactive EPIC Optical Technology & Photonics Index NTR returned +10.7% over the quarter.

Optical technologies and photonics have a wide range of applications in a very diverse range of fields, as a few developments over the course of the quarter have revealed.

Within the medical field, in March the sensor producer Hamamatsu announced distribution agreements with Siemens Healthineers and Agilent for the supply of scanners that will allow healthcare tech companies to advance in digital pathology and remote diagnostics.

In the augmented and virtual reality (AR/VR) space, designer of AR/VR displays Vuzix entered a deal with the AR/VR solutions distributor MACE Virtual Labs.

Laser devices such as the new one launched by the 3D optical sensing technology company ams-OSRAM target use in industrial applications such as drones, robots and factory automation equipment.

Photonics is also a key enabler for high-speed information transmission. Lumentum was recognised in the 2023 Lightwave Innovation reviews for its externally modulated lasers, photonic integrated circuits that support the operation of next-generation data centre with high bandwidth. It also received FiberHome's 2022 Excellent Core Partner Award for being a critical supplier of innovative optical solutions to enable high-speed communication networks.

The main contributors to performance were laser provider Desktop Metal (+69.1%), on the back of a revenue beat; Velodyne Lidar (+70.6%), which was acquired by another lidar sensor provider, Ouster; and sensor manufacturer Horiba (returned +36.2%). The main detractors were Ouster (-3.05%), sensor provider Faro Technologies (-16.3%) and sensor manufacturer Luna Innovations (-18.2%).

Source: LGIM, Bloomberg, as at 31 March 2023.

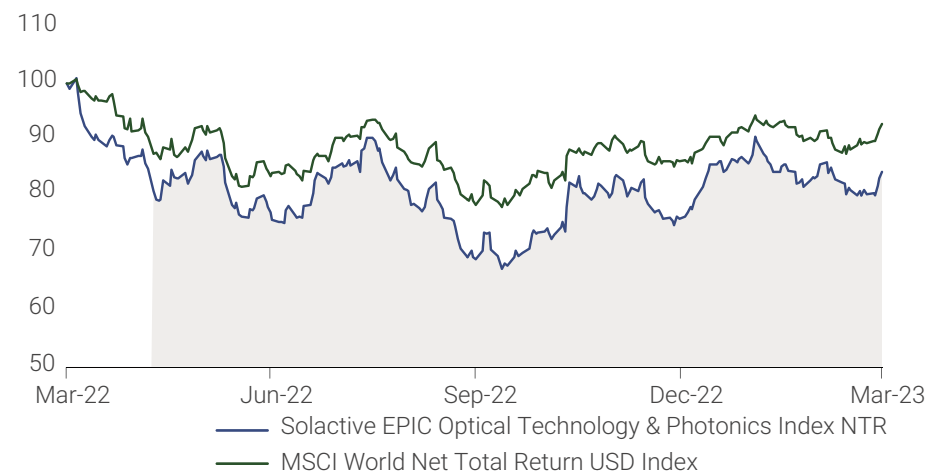
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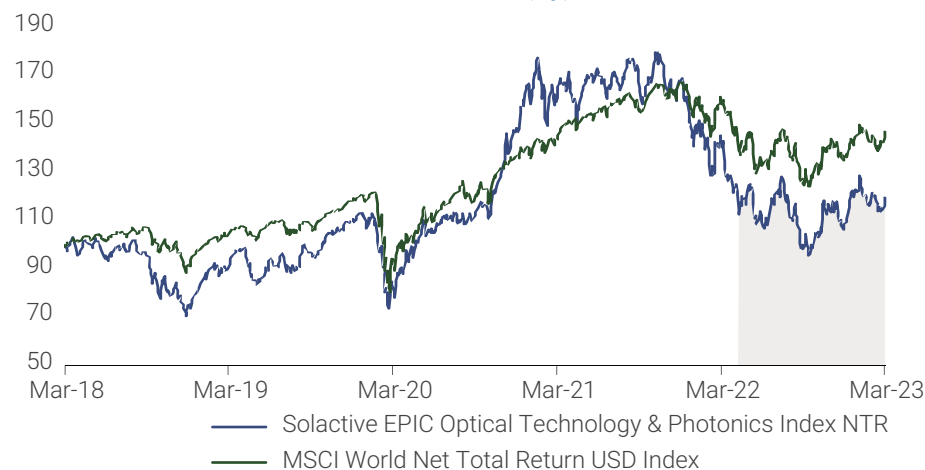
Optical Technology & Photonics

Performance

Historical and simulated performance (1y)



Historical and simulated performance (5y)



*Source: Bloomberg as at 31 March 2023, all values are based in USD. The backtested index data has been sourced from the index provider and is based on what they perceive to be reasonable assumptions and objective data; The index data is gross of fees/costs but is net of withholding taxes. The effect of fees and charges would reduce the returns shown. Shaded area indicates live period of the index.

Index performance*

Index performance*	QTD	1 year	3 years	5 years
Cumulative return	10.69%	-15.56%	42.70%	19.49%
Annualized return			12.59%	3.62%
Volatility	21.03%	26.80%	24.10%	23.49%
Information ratio	239.35%	-58.11%	52.25%	15.42%
Max drawdown	-11.53%	-33.21%	-46.90%	-46.90%

Index total return contribution (QTD)

Top 5		Bottom 5	
Desktop Metal-A	▲ 1.27%	Ouster Inc	▼ -0.52%
Velodyne Lidar I	▲ 1.15%	Faro Tech	▼ -0.48%
Horiba Ltd	▲ 0.98%	Luna Innovations	▼ -0.47%
Stratasys Ltd	▲ 0.89%	El.En. Spa	▼ -0.42%
Ipg Photonics	▲ 0.82%	Lightwave Logic	▼ -0.34%

Portfolio composition

Latest additions	Latest deletions
Jenoptik	Everlight Electronics
Lightwave Logic	Koito Manufacturing
	LPKF Laser
	Ouster

Fund information

Ticker	LAZR LN	ISIN	IE000QNJAOX1
TER	0.49%	Inception date	07/09/2022
Currency	USD	Index inception date	06-May-22
Securities lending	No	Replication method	Physical

Key risk

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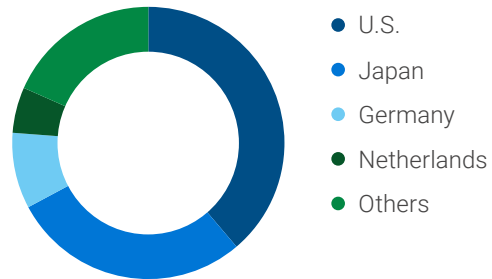


Optical Technology & Photonics

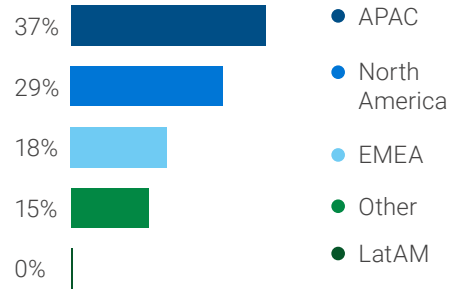
Characteristics

Geographical breakdown

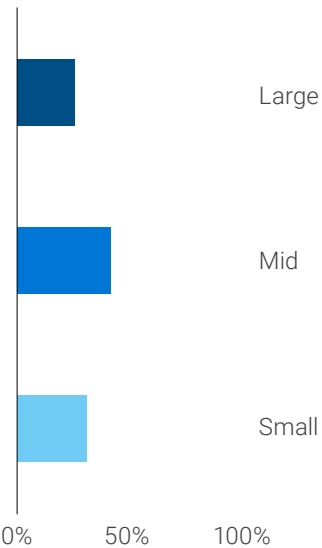
By domicile



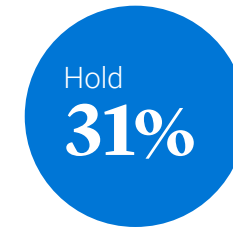
By revenue source



Market cap breakdown



Third party analyst stock consensus ratings**



Key ratios

	Current	Q1 2022
EPS	1.25	0.98
Price/Sales	2.67	3.45
BPS	14.06	13.54
P/E Positive	25.45	22.36
ROE	11.35	10.71
Price/Book	2.39	3.32
P/E (1y fwd)	40.73	34.14
P/E (3y fwd)	25.69	32.29
Sales (1y fwd)	2,617	2,707
Sales (3y fwd)	3,148	3,018

Constituents overlap

S&P 500	0.1%
MSCI World	1.0%
Nasdaq 100	0.0%
Total stocks = 36	

Source: Bloomberg, LGIM; All values are based in USD; As close of 31 March 2023. Please refer to end of this report for all definitions. **Consensus ratings are based on the average of recommendations for each underlying stock made by analysts on Bloomberg within the last 12 months.

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Key risk

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Pharma Breakthrough

Company spotlight

PTC Therapeutics

PTC Therapeutics is a North American company that develops drugs with small molecules and gene therapy for disorders related to neurology, metabolism and oncology. The foundations of the company's research into orphan drugs lie in RNA biology, DNA science and protein expression.

Four out of their six commercialised therapies are orphan, as are five out of 15 in development. Out of these five, two products are in the pre-clinical phase, one in phase II and two in phase III. Orphan drugs represent over 95% of the company's revenues.

The first successes for PTC came from research on treatments for Duchenne muscular dystrophy (DMD), but the company has also expanded into other therapy areas. Duchenne is the most common form of muscular dystrophy. It is a neurological disease caused by a genetic disorder that results in muscle weakness and deterioration. It occurs in approximately one in 5,000 male births, and about 20,000 babies worldwide are born with it each year. The disease typically appears in children between the age of three and five, and life expectancy into a patient's early 30s is now becoming more common. Although no cure is currently available, therapies that help lengthen

patients' lives exist, and DMD remains a promising growth area for PTC for 2023.

PTC grew its revenues by almost 30% from 2021 to 2022 to \$699m, and expects further growth of between 34% and 43% in 2023. In 2022 the company increased its R&D spending to \$652m.

In 2022 PTC had the first gene therapy administered directly into the brain, Upstaza™, approved in Europe and the UK, and in February it won the EURORDIS Company Award for Innovation in recognition of advancements in orphan drugs.

Last quarter performance commentary

The Solactive Pharma Breakthrough Value Index returned -4.1% over the quarter.

While over 10% of SVB's deposits were funding small healthcare and life sciences start-ups, most publicly listed companies had no material exposure.

As time passes and patents approach expiry, companies may take advantage of the cheaper valuations to acquire other players and boost their portfolios. AstraZeneca acquired Neogene Therapeutics to develop its portfolio of T-cell receptor therapies for tumours and CinCor Pharma, at a 121%

premium, to add to its cardiorenal portfolio of treatments; and Sanofi bought Provention Bio to leverage its diabetes treatment, at a premium of 191%. However, the most notable acquisition over the quarter was Seagen, acquired by Pfizer at a 39% premium for \$41m, to complement its oncology drugs portfolio.

Among the most significant approvals in the quarter were Sanofi's therapy for haemophilia A, Traveer's nephropathy drug, and Eisai/Biogen's Alzheimer's therapy. The latter shows how this therapy area is likely to remain in focus in 2023, along with Covid vaccines and cures.

Going forward, in September 2023 we should find out the first 10 drugs that will be eligible for price negotiation in the US, under the IRA, according to which biologics would become eligible 13 years after approval.

The main contributors to performance were oncology drug developer Seagen (returned +57.6%) on the back of positive guidance and its acquisition, PTC Therapeutics (+26.9%), and blood disease therapy developer Swedish Orphan Biovitrum (+12.7%) on the back of strong results and positive guidance. The main detractors were PharmaMar (-30.2%), Bluebird Bio (-54.1%) and United Therapeutics (-19.5%).

Source: Muscular Dystrophy Association, February 2019, LGIM, Bloomberg, Evaluate Pharma, as at 31 March 2023.

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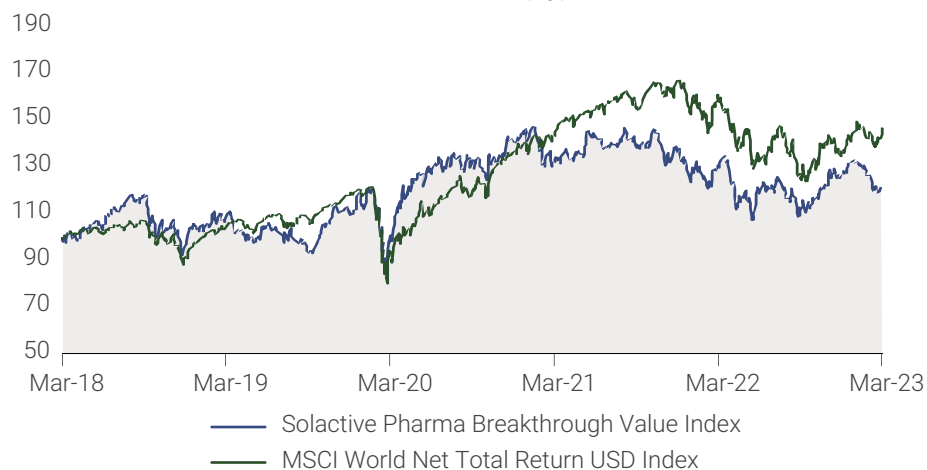
Pharma Breakthrough

Performance

Historical and simulated performance (1y)



Historical and simulated performance (5y)



*Source: Bloomberg as at 31 March 2023, all values are based in USD. The backtested index data has been sourced from the index provider and is based on what they perceive to be reasonable assumptions and objective data; The index data is gross of fees/costs but is net of withholding taxes. The effect of fees and charges would reduce the returns shown. Shaded area indicates live period of the index.

Index performance*

Index performance*	QtD	1 year	3 years	5 years
Cumulative return	-4.08%	-6.21%	20.73%	21.77%
Annualized return			6.49%	4.02%
Volatility	11.96%	18.91%	18.06%	19.58%
Information ratio	-128.68%	-32.85%	35.91%	20.52%
Max drawdown	-11.19%	-20.45%	-27.20%	-27.35%

Index total return contribution (QtD)

Top 5		Bottom 5	
Seagen Inc	▲ 1.42%	Pharma Mar Sa	▼ -0.95%
Ptc Therapeutics	▲ 0.60%	Bluebird Bio Inc	▼ -0.84%
Swedish Orphan B	▲ 0.35%	United Therapeut	▼ -0.73%
Halozyyme Therape	▲ 0.35%	Nippon Shinyaku	▼ -0.69%
Sarepta Therapeu	▲ 0.31%	Grifols Sa	▼ -0.58%

Portfolio composition

Latest additions		Latest deletions	
AstraZeneca	Halozyyme Therapeutics	AbbVie	PharmaMar
Biocryst Pharmaceuticals	Innovent Biologics	Amicus	Roche
Bluebird Bio	JCR Pharmaceuticals	Basilea	Sanofi
CTI BioPharma	Kyowa Kirin	CSL Ltd	Seagen
Eisai	Sarepta Therapeutics	Grifols	Sino Biopharma.
Genmab	Sciclone Pharmaceuticals	Novartis	Supernus Pharma.

Fund information

Ticker	BIOT LN	ISIN	IE00BF0H7608
TER	0.49%	Inception date	23/01/2018
Currency	USD	Index inception date	03-Jan-18
Securities lending	No	Replication method	Physical

Key risk

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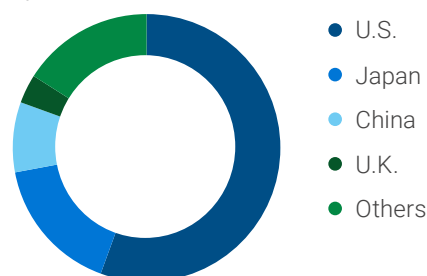


Pharma Breakthrough

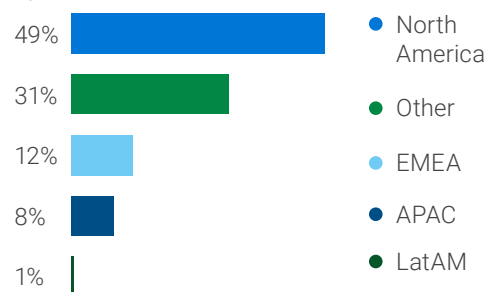
Characteristics

Geographical breakdown

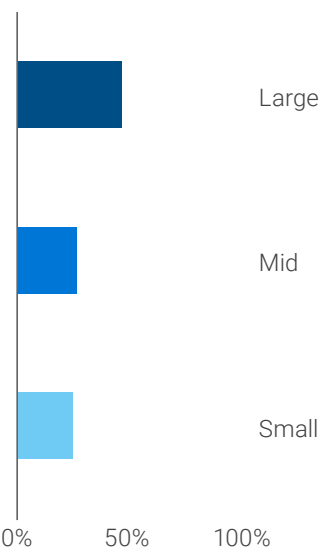
By domicile



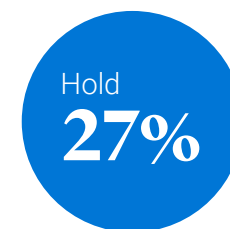
By revenue source



Market cap breakdown



Third party analyst stock consensus ratings**



Key ratios

	Current	Q1 2022
EPS	0.60	1.76
Price/Sales	5.70	5.65
BPS	10.83	12.11
P/E Positive	24.23	19.46
ROE	9.40	11.10
Price/Book	3.35	3.35
P/E (1y fwd)	25.17	32.07
P/E (3y fwd)	21.19	22.88
Sales (1y fwd)	4,136	3,119
Sales (3y fwd)	4,811	4,441

Constituents overlap

S&P 500	0.8%
MSCI World	0.8%
Nasdaq 100	1.2%
Total stocks = 33	

Source: Bloomberg, LGIM; All values are based in USD; As close of 31 March 2023. Please refer to end of this report for all definitions. **Consensus ratings are based on the average of recommendations for each underlying stock made by analysts on Bloomberg within the last 12 months.

Consensus ratings do not constitute a recommendation to buy or sell any security. The consensus ratings presented in this chart are not in relation to the L&G Thematic ETFs.

Key risk

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Robotics & Automation

Company spotlight

Samsara

Samsara is a pioneer in real-world asset tracking and AI analytics. It offers a connected operations platform using sensing, video and data analytics, security, and vehicle fleet telematics across various industries such as food and beverage, transportation and logistics, construction, passenger transit, and field services fleets.

Samsara has seen increased growth and adoption by blue chip customers with the mission to “increase the safety, efficiency, and sustainability of the operations that power our economy”. But most importantly, Samsara’s IoT solutions result in significant cost savings for users. Samsara’s supply chain logistics and trucking customers have been able to realise substantial reductions in preventable accidents and millions of dollars of savings in fuel and insurance costs.

One of Samsara’s passenger transit clients, travel operator Abbey Travel, managed to reduce its insurance premium by over £60k thanks to the intelligent camera systems that in case of an incident can submit paperwork, footage and detailed documentation within minutes, making it much easier to process insurance claims.

The company was founded in 2015 by the American entrepreneurs Sanjit Biswas and John Bicket, who sold their previous digital technology and cybersecurity start-up Meraki to Cisco in 2012. Revenue has grown from \$120 million in 2020 to over \$652 million in 2022 and is projected to grow around 30% annually to break \$1 billion in revenue by 2025. According to ROBO Global, Samsara could break even in 2024 while continuing to innovate, with nearly 30% of current revenue spent on R&D and over \$700 million in cash. Additionally, they believe that the company has a runway to expand revenue by 10x over time.

Last quarter performance commentary

The ROBO Global Robotics and Automation UCITS Index returned +17.7% over the quarter.

The index gains were led by strong performance in Manufacturing & Industrial Automation (+17.4%), Logistics (+18.3%) and Computing & AI (+24.5%) - although all 10 subsectors showed positive returns. While large organisations have been investing heavily in robotics for years, the vast majority of companies with 500 or fewer employees have not had that luxury. However, this is changing thanks to the availability of smaller sensors and faster processors that have enabled the development of smaller, cheaper, more

flexible robots that are easier to instruct and safer to operate than their heavy industrial counterparts. This has set the stage to the next wave of adoption: innovative small and midsize enterprises.

Automation has become an absolute necessity. This was exacerbated by the pandemic, which altered consumer habits, increased consumer expectations, and put pressure on companies to increase margins and accelerate their supply chains. The rate of adoption for automation has continued to accelerate. There are green shoots everywhere, including in M&A, which is always in play. US engineering and industrial software company Emerson Electric Co. disclosed a near \$7 billion offer for National Instruments Corp., which it has been trying to buy for several months. 3D printer maker Nano Dimension Ltd. recently raised its offer to buy the stake it does not already own in larger peer Stratasys Ltd. to \$19.55 per share in cash from \$18 per share.

The main contributors to performance were Nvidia (returned +90.1%), Samsara (+58.7%), and Hiwin Technologies (+38.4%). The main detractors were Azenta (-23.4%), Globus Medical (-23.7%), and Faro Technologies (-16.3%).

Source: LGIM, Bloomberg, ROBO Global®, as at 31 March 2023.

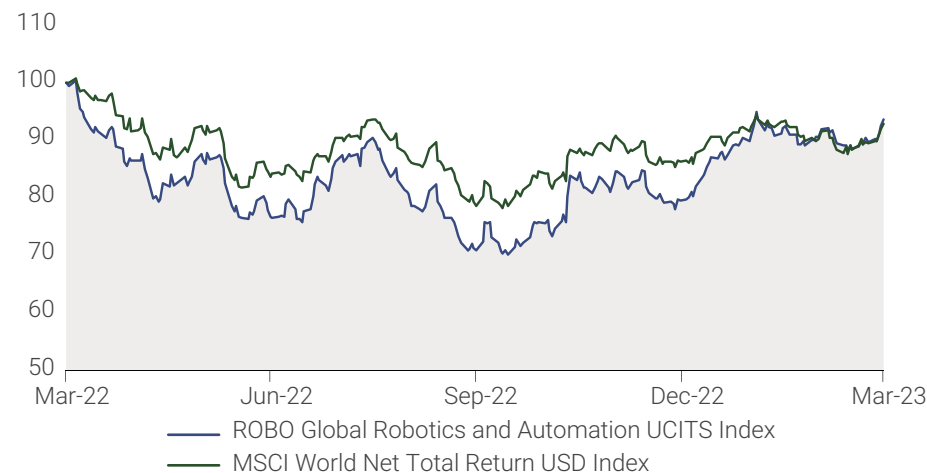
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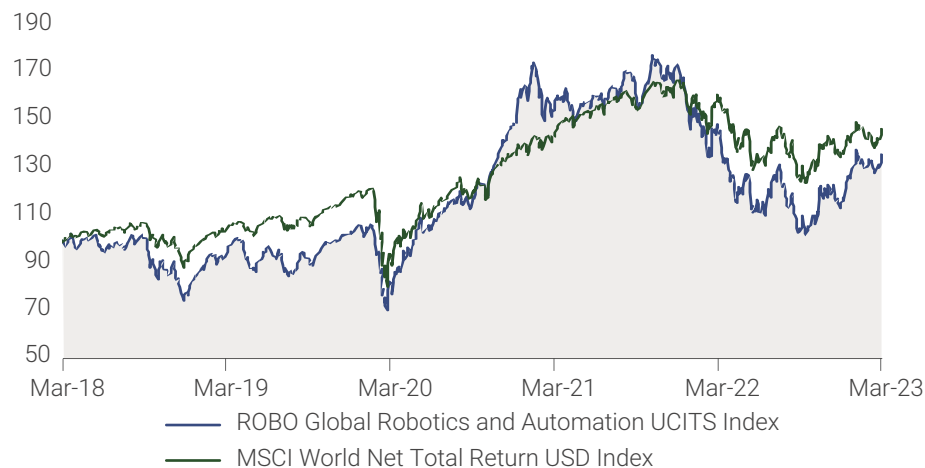
Robotics & Automation

Performance

Historical and simulated performance (1y)



Historical and simulated performance (5y)



*Source: Bloomberg as at 31 March 2023, all values are based in USD. The backtested index data has been sourced from the index provider and is based on what they perceive to be reasonable assumptions and objective data; The index data is gross of fees/costs but is net of withholding taxes. The effect of fees and charges would reduce the returns shown. Shaded area indicates live period of the index.

Index performance*

Index performance*	QtD	1 year	3 years	5 years
Cumulative return	17.71%	-6.22%	65.98%	36.21%
Annualized return			18.41%	6.37%
Volatility	16.72%	24.89%	21.66%	21.42%
Information ratio	552.80%	-25.01%	85.01%	29.75%
Max drawdown	-7.12%	-30.19%	-42.65%	-42.65%

Index total return contribution (QtD)

Top 5		Bottom 5	
Nvidia Corp	▲ 1.02%	Azenta Inc	▼ -0.30%
Samsara Inc-Cl A	▲ 0.70%	Globus Medical I	▼ -0.20%
Hiwin Tech	▲ 0.55%	Faro Tech	▼ -0.18%
Stratasys Ltd	▲ 0.54%	Qiagen Nv	▼ -0.10%
Global Unichip	▲ 0.54%	Ambarella Inc	▼ -0.07%

Portfolio composition

Latest additions	Latest deletions
Symbotic	Amano
	Shenzhen Inovance Technology

Fund information

Ticker	ROBO LN	ISIN	IE00BMW3QX54
TER	0.8%	Inception date	27/10/2014
Currency	USD	Index inception date	17-Jun-14
Securities lending	No	Replication method	Physical

Key risk

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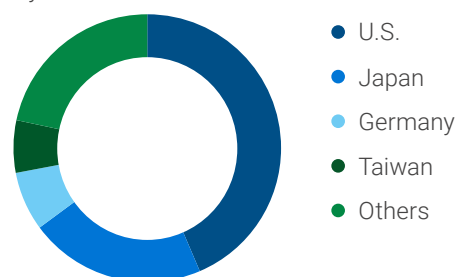


Robotics & Automation

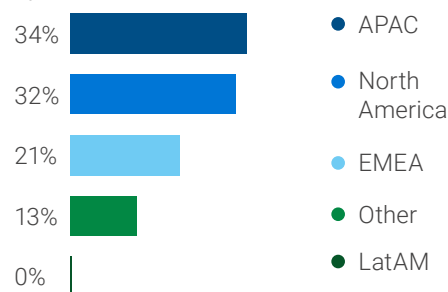
Characteristics

Geographical breakdown

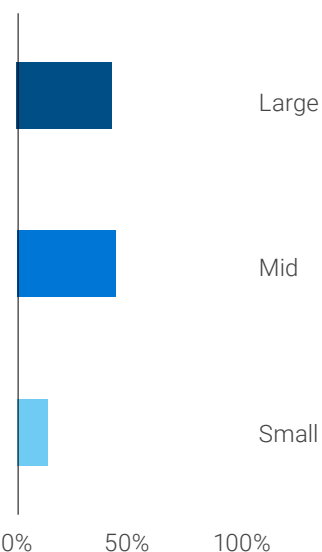
By domicile



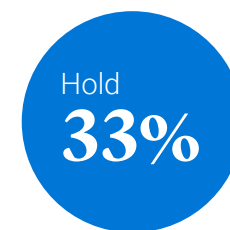
By revenue source



Market cap breakdown



Third party analyst stock consensus ratings**



Key ratios

	Current	Q1 2022
EPS	1.33	1.67
Price/Sales	3.08	3.93
BPS	15.37	14.68
P/E Positive	27.72	27.60
ROE	11.71	11.00
Price/Book	3.30	4.20
P/E (1y fwd)	40.77	34.93
P/E (3y fwd)	26.12	30.26
Sales (1y fwd)	5,652	6,122
Sales (3y fwd)	6,718	6,266

Constituents overlap

S&P 500	3.7%
MSCI World	3.8%
Nasdaq 100	4.7%
Total stocks = 79	

Source: Bloomberg, LGIM; All values are based in USD; As close of 31 March 2023. Please refer to end of this report for all definitions. **Consensus ratings are based on the average of recommendations for each underlying stock made by analysts on Bloomberg within the last 12 months.

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Key risk

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Glossary

Calculation methodology for performance statistics:

Cumulative Return: Total return of the index net of withholding taxes over the given period.

Annualized Return: Annualized total return of the index net of withholding taxes over the given period.

Volatility: Annualized standard deviation of daily returns over the given period.

Information Ratio: Annualized return divided by annualized volatility.

Max Drawdown: Maximum % loss from the peak to the trough in the given period.

Large Cap: Companies whose market cap is larger than \$5bn.

Mid Cap: Companies whose market cap is comprised between \$2bn and \$5bn.

Small Cap: Companies whose market cap is lower than \$2bn.

Third party analyst stock consensus ratings: Average of recommendations for each underlying stock made by analysts on Bloomberg within the last 12 months. Consensus ratings do not constitute a recommendation to buy or sell any security. The consensus ratings presented in this chart are not in relation to the L&G Thematic ETFs.

Calculation methodology for key ratios statistics:

EPS: Median of last 12 months earnings per share for each index component.

Price/Sales: Median of stock prices divided by sales per share of all index components.

BPS: Median of total equity divided by the number of shares of all index components.

P/E positive: Median of stock price divided by positive earnings per share for each index components.

ROE: Median of net income divided by the average total common equity for each index component.

Price/Book: Median of stock prices divided by the total equity per share for each index component.

P/E (1y fwd): Median of stock price divided by index estimated earnings next year for each index component.

P/E(3y fwd): Median of stock price divided by index estimated earning in three years for each index component.

Sales (1y fwd): Average of estimated sales next year for each index component.

Sales (3y fwd): Average of estimated sales in three years for each index component.

Contact us:

For any questions on this report, please contact your usual LGIM representative or email fundsales@lgim.com. All calls are recorded. Call charges will vary.



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