



Herald Worldwide
Technology Fund

Investment Manager's Report

July 20, 2023

Investment Manager's Report for the six months ended 30 June 2023

Introduction

The objective of the Herald Worldwide Technology Fund ("Fund") is to achieve capital growth while investing globally in information technology, communications and multimedia companies. The Investment Manager believes this area of the economy continues to offer growth greater than the world economy as a whole and presents attractive investment opportunities. In addition, the Investment Manager offers focused specialist management, with a 25-year history and an experienced team. The Fund was launched in April 1998 with an initial asset value per Class A share of £10.00. At the end of the period the net asset value per Class A share was £109.16. On the 10 June 2010, a Class B share was launched with an initial net asset value per share of £10.00. At the end of the period the net asset value per Class B share was £72.42.

Total return for six months to 30 June 2023

Herald Worldwide Technology Fund NAV (Class A)	24.6%
Herald Worldwide Technology Fund NAV (Class B)	24.5%

Global

Dow Jones World Technology	33.8%
Dow Jones World Technology (Net Total Return)	32.9%

United States

Russell 1000® (Large Cap) Technology	41.4%
Russell 2000® (Small Cap) Technology	16.6%
S&P 500	11.2%
Russell 2000® Small Cap	2.8%

United Kingdom

iShares Core FTSE 100 UCITS ETF	3.1%
Numis Smaller Companies plus AIM (ex Investment companies)	-2.2%

Europe

DAX	12.5%
Deutsche Bourse TECDEX	6.4%
CAC 40	13.9%

Asia Pacific

NIKKEI 225	11.1%
KOSDAQ IT Composite Index	13.3%
Taiwan Electronics Index	21.1%

All percentage returns are in GBP.

Source: Herald Investment Management Limited (HIML) and Bloomberg. ® Russell Investment Group

The Fund is not managed by reference to any benchmark and the indices above are shown for comparative purposes only.

Past performance is not a reliable indicator of future returns.

Summary

The fund has had a strong start to the year, with returns of 24.6% (B share) in this reporting period. This compares with a return of 32.9% for the Dow Jones World Technology Index and low double digit returns for broader indices such as the S&P 500, the DAX, the CAC 40, and the Nikkei 225. In H1-2023, the major US and global technology indices largely benefitted from the strong rally in the biggest technology companies, namely Apple, Microsoft, Alphabet, Amazon, NVIDIA, Tesla, and Meta. Over two years the return of the fund is 15.4% (B shares) versus the Dow Jones World Technology Index of 9.8%, and over five years, the return of the fund is 115.1% versus 123.2% for the Dow Jones World Technology Index.

During the period H1-23, on balance, economic data remained steadier than feared. China has remained weaker than expected but the US consumer has been more resilient. This is shown in the strong payroll data reported by the US Bureau of Labour Statistics for the US in H1, and the low unemployment rate of 3.6%.

Two key events in H1-2023, were:

- (1) The collapse of Silicon Valley Bank and Credit Suisse, two iconic financial institutions. The immediate effect was a reduction in monetary tightening by policy makers. Other ripple effects included greater focus on cost cutting and capital preservation by companies across sectors.
- (2) The fascination with Generative Artificial Intelligence (which is a class of machine learning technologies that can generate new content such as text, images, music and videos) causing a race in the equity markets to position investments in perceived “winners” and away from the perceived “losers” of AI (artificial intelligence).

During H1-2023, our team met with over 550 companies in the TMT sector. We visited companies across the world, from the West Coast of the US to Taiwan, Korea, Japan, Australia and across Europe which has been particularly useful after the travel constraints of Covid. The majority of the Fund remains invested in North American companies, but we believe it is important to engage with management teams across the world and seek their insights into trends, be they political, economic, or technological, local or global while being open to companies worldwide that offer an attractive risk/reward.

Overall, we find valuations in the sector still compelling. Based on Bloomberg data, the estimated P/E (price-to-earnings ratio) of the portfolio is 24x 2023E. This compares with 18x and 25x at the end of 2022 and 2021, respectively.

The current enthusiasm about the transformative nature of AI has again driven some companies in the technology sector to valuations which are difficult to justify. We do believe the long-term potential of AI is immense and applications of it can cause fundamental changes in business processes and productivity across different sectors. We have been investing in companies which are enabling and/or benefitting from the developments in AI. As of the end of June, over 60% of the investments in the Fund could be categorised as either enablers or beneficiaries of AI. AI is not a new concept. By many accounts, it has been gestating for nearly 80 years and the Fund's exposure is due to purposeful positioning over time.

At the same time, based on our experience of prior disruptive technology cycles such as the internet and smartphones, we believe it is necessary to maintain focus on the entire supply chain of AI and its evolution as well as be cognisant of the “Hype Cycle.” Regardless of a company's differentiated assets or intellectual property or a management team's embrace and enthusiasm for AI, ultimately incorporation of advanced AI is disruptive to many companies' existing operations. Execution is what matters and challenges associated with changing processes and business models tend to be underestimated by managements and markets. In 2000, at the height of the internet bubble, it would not have been possible to identify Alphabet and Meta as top winners of the internet space. The telecom companies, such as AT&T, BT, and Vodafone were far better positioned with differentiated assets, large resources, and key intellectual property (IP). However, they failed to capitalise on those unique assets.

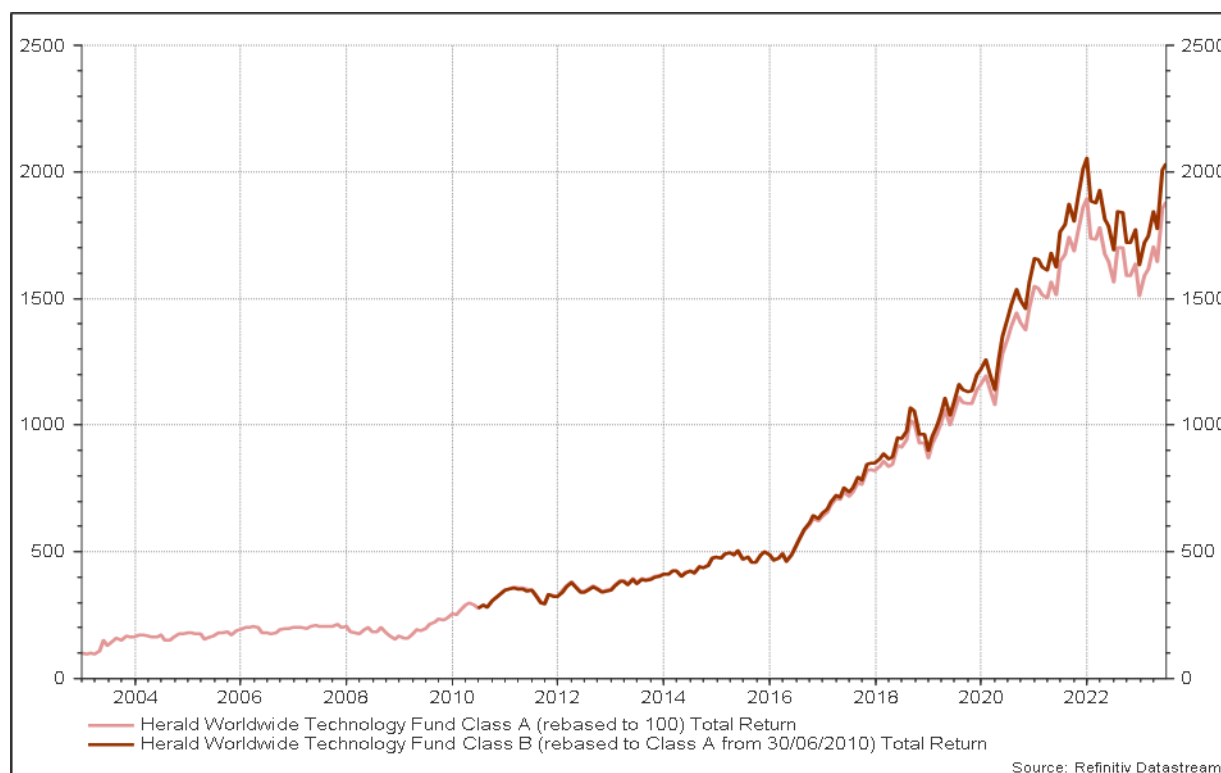
While “AI Mania” has taken over, the excitement about other disruptive trends such as the Metaverse, self-driving cars, 3D printing, distributed ledgers, personalised medicine and telehealth to name a few has abated. Just as AI was making strides under the surface, the other technologies are also continuing to progress meaningfully even though they are not currently front-page news. Many of those technologies and applications, at their core, have been and will continue to be propelled by the progress in AI. These combinatorial developments all create attractive long-term investment opportunities, and we remain optimistic about finding investments which can generate sustainable growth for shareholders.

In summary, our strategy remains consistent with the past. We recognise the myriad of complex economic, geopolitical, environmental, and social challenges. Many of these challenges can be addressed with technology-based solutions and the progress in AI is an element of the solutions. The TMT sector is sufficiently diverse and dynamic that throughout our 25+ years of investment in the sector we have always found attractively positioned, reasonably valued, well-managed companies to invest in. Our investment process is anchored in fundamental analysis. The Fund has a higher weighting towards midcap companies relative to most global technology indices.

Total Return: 31/12/2022 – 30/06/2023



Total Return: 31/12/2002* – 30/06/2023



*The date the existing fund manager took over the management of the portfolio.

North America

The total return for the US portfolio was 30.6%. Although we are pleased with the strong returns, this lags the Russell 1000 (Large Cap) Technology Index total return of 41.4%, an exceptional H1-return in the history of the Index. The performance of the US mega cap technology companies has been so extreme that the Nasdaq has made the exceptional decision to rebalance the weights of the Index in July to reduce the concentration of the Index. The US portfolio comprises the majority of the Fund (82.7%).

The strong performers in sterling terms were Arlo Technologies, Super Micro Computer (SMCI), and Advanced Micro Devices (AMD), which appreciated 194.0%, 187.2%, and 66.4% respectively. SMCI, Microsoft, and AMD were also the largest contributors to positive returns. The key negative contributors to returns were Tower Semiconductor (TSEM) (-19.8%), Fabrinet (-4.2%), and SolarEdge Technologies (-10.2%).

Three of the holdings in the North American part of the portfolio, namely, TSEM, Silicon Motion Technologies (SIMO), and iRobot remain subject to takeover bids. All three await approvals from different regulatory authorities. Decisions of the Chinese regulator on TSEM and SIMO are expected in Q3-23. Regardless of whether the Chinese authorities approve the takeovers, we believe both companies remain strongly positioned and attractively valued. We have therefore retained our position in these companies.

Not surprisingly M&A activity was muted in H1-23. This is due to a combination of (1) increased regulatory hurdles across jurisdictions, (2) higher costs of capital and (3) the natural disconnect which occurs between notions of fair value prices between buyers and sellers during periods of market volatility. We expect M&A to recover gradually.

During the period, we reduced our positions in Microsoft and Cadence. The reduction in Microsoft was largely due to UCITS rules, which restrict the Fund's maximum holding in one security to 10%. Microsoft remains well positioned to generate long-term sustainable top and bottom-line growth. Its launch of Co-pilot (Microsoft's recently launched AI helper) and partnership with Open AI, services which demonstrably increase user productivity, are accelerants of sustainable growth for the next 5+ years.

Cadence has been a long-term holding in the portfolio and consistently among the Fund's top 10 holdings. We remain convinced of Cadence's unique position in the semiconductor value chain and continue to see upside potential, from both revenue growth and on-going margin expansion. However, with the shares trading on a free cash flow yield of 2.3%, we see better opportunities to deploy part of the capital elsewhere. Since adding the current position to the Fund in 2010 the price appreciation has been 34x demonstrating the power of unearthing unique companies within the technology sector.

During H1-23 we increased the Fund's position in Micron as market expectations had become too pessimistic and valuations were underestimating its long-term growth opportunities. Two other additions to the portfolio were Five9 and Cogent Communications, two companies which we have held in the Herald Investment Trust and with whose management teams we have had regular engagement over a number of years.

The P/E of the North American portfolio on Bloomberg forecasts was 24x2023E compared with 19x on 30th June 2022, and 18x, 39x, and 31x at the end of 2022, 2021, and 2020 respectively. The expansion in P/E has been mostly due to the reratings of the Fund's holdings as opposed to any substantial changes in the holdings.

Europe

The European portfolio comprises 2% of the Fund. The total return for the European portfolio was 9.6%. There are only two European holdings in the Fund namely SAP and Nordic Semiconductor, with weightings of 1.7% and 0.4% respectively. SAP shares appreciated 27.8% in the first half of 2023 and Nordic Semiconductor declined 30.7%.

We expect SAP to continue to perform well as its transition to a cloud-centric model drives acceleration in both revenues and margins. Its competitive position in the large Enterprise Resource Planning (ERP) market is virtually unassailable. Its business is now largely transitioned to recurring revenues, with licence fees expected to account for less than 5% of revenues in 2023. SAP is therefore well positioned to generate strong, sustainable, free cashflows. The management team is bullish on the outlook for growth and committed to shareholder returns.

Nordic Semiconductor is a company which we have been following for many years and have held in the Herald Investment Trust. We initiated a position in the shares in 2022. Nordic is strongly positioned to enable “smart” applications in the industrial and healthcare domains as well as its traditional consumer markets. Nordic has been suffering from a combination of supply shortages for some products and at the same time suffering from low demand and excess inventories in other products. These imbalances should abate over the next couple of quarters allowing the company to resume sustainable long-term growth and profitability.

UK

The Fund’s only UK holding is Herald Investment Trust which is 1.8% of the Fund and declined 1.8% in the period.

The performance of Herald Investment Trust was largely a reflection of the weak performance of the small cap sector which is deemed to be more sensitive to macroeconomic slowdowns. Its net asset value per share decreased by -0.2%. We continue to find the valuation of the Trust attractive but are reluctant to add to the Fund’s holdings due to liquidity concerns. It is interesting to observe that among the Trust’s holdings, the 26 holdings with a market value in excess of \$3bn returned 43.0% whereas the 300+ smaller holdings returned -8.5%.

Asia

The Asian portfolio comprises 4.6% of the Fund and the total return was 20.8%. The Asian holdings consist of four companies, Alibaba, Kulicke & Soffa Industries (KLIC), Samsung Electronics, and Taiwan Semiconductor Manufacturing Company (TSMC).

Samsung Electronics (+18.8%), TSMC (+29.4%), and KLIC (28.0%) were all positive contributors to performance. The strong performance in these investments is largely due to expectations that inventory corrections will be behind us by H2-2023 and therefore cyclical recovery will ensue. All three have strong competitive positions in their respective markets, strong balance sheets, and attractive valuations.

Alibaba, the Fund’s only Chinese holding, was the only negative contributor to performance, declining 10.5% during the period. We remain concerned about investing in domestic Chinese companies due to corporate governance issues and the lack of protection for shareholders. We have maintained the Fund’s holding in Alibaba, as it is a leader in ecommerce and cloud computing in China as well as many foreign markets. We believe the company’s announcement in March 2023 of a move to a holding company structure and its divestiture plans will unlock value for shareholders.

Market Outlook

The current macroeconomic and geopolitical backdrop is undoubtedly challenging: escalating tensions between the West and China, the ongoing war in Ukraine, sovereign debt burdens, sticky inflation, unfavorable labour force dynamics, and risks of social unrest. Each is an onerous problem to solve. Combined, they form complex interdependencies and are almost intractable.

Monetary tightening and concerns about economic slowdown have shifted spending emphasis within companies and governments. Companies are rebalancing some of their investments in technology away from a focus on revenue and growth to a focus on cost reduction and cash flow. But fundamentally, technology spending is largely non-discretionary. Technology underpins nearly every facet of the operations of most organisations. Revenue growth, cost savings, working capital management, supply chain optimisation, and human resource management all rely on efficient technological systems.

We do not believe we have any edge on calling out macroeconomic factors. However, we do believe that most of the disinflationary forces of the last 10 years have largely reversed and we expect inflation to remain sticky. Technological solutions will be necessary components of broader solutions targeted at addressing demographic, environmental sustainability, and geopolitical issues which are currently all increasing costs for companies and governments.

Therefore, despite adverse and uncertain macroeconomic circumstances, we continue to believe that investing in the broader TMT sector, using a framework of fundamental bottom-up analysis with a focus on valuation and companies positioned for long-term sustainable growth, will generate long-term capital appreciation.

Sector Outlook

Ever since ChatGPT was released to the public in November 2022, AI has become the dominant discussion point in the sector and much of the broader equity markets. International Data Corporation estimates the size of the AI market to reach \$900B by 2026, while PwC estimates AI can boost global GDP by \$16 trillion (i.e., nearly 16%) by 2030.

It is too early to fathom the implications of AI. The US National Security Commission on Artificial Intelligence, which included leading academics and industry veterans such as Eric Schmidt, the long-term CEO of Google and Andy Jassy, Amazon's current CEO and long-term AWS CEO, produced a 756-page report in 2021. The following are a few noteworthy excerpts from the report:

"AI is an inspiring technology. It will be the most powerful tool in generations for benefiting humanity. Scientists have already made astonishing progress in fields ranging from biology and medicine to astrophysics by leveraging AI. These advances are not science fair experiments; they are improving life and unlocking mysteries of the natural world. They are the kind of discoveries for which the label "game changing" is not a cliché.

No comfortable historical reference captures the impact of artificial intelligence (AI) on national security. AI is not a single technology breakthrough, like a bat-wing stealth bomber. The race for AI supremacy is not like the space race to the moon. AI is not even comparable to a general-purpose technology like electricity. However, what Thomas Edison said of electricity encapsulates the AI future: "It is a field of fields ... it holds the secrets which will reorganise the life of the world."

AI systems will also be used in the pursuit of power. We fear AI tools will be weapons of first resort in future conflicts. AI will not stay in the domain of superpowers or the realm of science fiction. AI is dual-use, often open-source, and diffusing rapidly."

AI is not a new concept. By many accounts, it has been gestating for nearly 80 years. As per the National Security Report, we believe AI is a constellation of technologies that depend on interrelated elements e.g. hardware, data, algorithms, and applications.

We have been seeking, and will continue to seek companies which are positioned to benefit from the growth of AI and meet our fundamental investment framework. As of the end of H1-23, over 60% of the investments in the Fund could be categorised as either enablers or beneficiaries of AI. These include consensus beneficiaries such as Microsoft and Alphabet as well as lesser-known companies, such as Arlo Technologies and Dynatrace. The Fund's exposure is due to purposeful positioning over time.

IT Spending Outlook

In June 2023, Gartner published their revised outlook for overall IT spending for the next 5 years. The outlook has minor changes compared to their projections in December 2022. Gartner expects overall IT spending to grow 5% in 2023, and the growth to accelerate to an annual rate of c9% between 2024 and 2026.

The excess inventories that were built up in 2022 have taken a longer time to clear. This is most notably reflected in the outlook for spending on devices. Devices comprise desktop computers, notebook computers, tablets, and smartphones. Spending on devices is expected to decline by 9% in 2023. This compares with expectations of a 2% decline at the start of 2022.

The decline in the PC market is expected to be 27% between 2021-2023. This is the sharpest decline in the last 20 years. According to Morgan Stanley's estimates, there is an installed base of 1.2 bn PCs and 40% of the PCs will be eligible for refresh by 2024. The declines of 2022 and 2023 and the large installed base of PCs paves the way for high single digit annual volume growth from 2024 to 2027 for the hardware ecosystem, including semiconductor companies, assemblers, and PC vendors. Revenue growth is likely to be a few percentage points higher.

Semiconductors

Gartner forecasts semiconductor revenues to fall 12% in 2023 and reach \$526bn. This is a significantly larger fall than the decline of 6% which had been expected at the beginning of the year. This is partly due to the decline in PCs and smartphones as they account for c30% of the semiconductor market. Memory revenues are expected to decline 41% in 2023, while non-memory revenue is expected to decline by 3% in 2023. Semiconductor revenue is expected to bounce back to \$633bn, i.e., up 20% in 2024 and continue to grow mid-single digits in 2025 and 2026.

Semiconductor stocks, led by Nvidia, have been performing very strongly in 2023. Semiconductors are key enablers of AI applications. The shares have been propelled by a combination of the anticipation of the cyclical trough in the sector and the secular growth of infrastructure needed to support AI applications. We sold the Fund's position in Nvidia in 2021 because of concerns about valuation, clearly a mistake in hindsight. Nevertheless, we remain optimistic on the outlook for secular growth in certain semiconductor companies, especially those exposed to Cloud, AI, and automotive end markets.

On the regulatory front, the semiconductor sector continues to be a focal point for the US and its allies and China as they try to balance the tension between their respective economic and security interests. This is reflected in the complex and sporadically evolving export control systems of the two sides. It seems every couple of weeks new restrictions are imposed by one side or the other. The most recent was China banning the export of germanium and gallium, key elements needed in the design of advanced communication systems, electric vehicles and power systems. China dominates the supply of both elements. So far, despite the headlines, it seems many of the restrictions of both sides can be bypassed with special permissions. Even though efforts have been in place on both

sides to de-risk and decouple supply chains, by most experts' estimates it will still take well over five years before this can be achieved.

Software and Cloud

We continue to appreciate the strength and durability of the cloud business models. Over 70% of the Fund is exposed to enablers of cloud-based services. The growth of spending on both cloud infrastructure and applications has remained steady in 2023 at 20% compared to 21% in 2022. These lower growth rates compared to the past were expected due to a combination of the law of large numbers and a focus on cost cutting and cost optimisation by companies across sectors and geographies.

The long-term outlook for cloud spending remains robust as business processes built on cloud architectures tend to benefit from greater efficiency and agility than those built on traditional on-premise architectures. McKinsey estimates that cloud could generate \$3trn of EBITDA value by 2030 for the Global 2000 companies. Gartner estimates the cloud market will continue to grow at a compound annual growth rate of 19% from \$597bn in 2023 to \$1.2trn in 2027.

The growth of AI is likely to change aspects of the competitive dynamics of the cloud companies. For example, Nvidia is proposing new computing architectures using its hardware and software systems.

Regulation and the Megacaps

Various segments of the technology sector remain in the crosshairs of different governments. The pressure to curb the power and reach of the large technology companies also remains. In earlier reports we have commented on European regulation, such as the European Digital Markets Act which came into effect on 2 May 2023 and The Digital Services Act, which is expected to come into effect on 1 January 2024. The rise of generative AI systems such as ChatGPT, and their use by the large technology companies is inducing further angst among regulators and content creators about the balance of power between the large companies and smaller ones.

Regulation will continue to be a headwind for the semiconductor sector due to geopolitical complexities with China, and for those large companies deemed to have dominant market positions. Attempts at M&A will continue to be fraught with burdensome and politically motivated regulatory investigations and extensive delays.

Nevertheless, the fact remains that the large US technology companies continue to invest aggressively in research and development as well as in infrastructure. These investments enable growth, productivity improvements, and innovation across global economies. Governments understand this value.

Concluding Remarks

Spending on IT is largely non-discretionary. Although macroeconomic factors can cause temporary headwinds, IT underpins the operations across many facets of most organisation and across different sectors. The transition to cloud computing is a platform change which like prior ones creates cost saving opportunities as well as new operational capabilities. We remain in the early innings of the transition. Moreover, for companies to benefit from Artificial Intelligence / Machine Learning and Internet of Things applications, they need robust cloud capabilities and will have to invest to maintain them.

IT spending has been growing at mid-single digit growth rates for many years and is expected to continue to do so. Within the broad c\$3trn IT market, there are always segments which are growing faster while others are declining. That is the nature of the sector.

Although markets and economies are challenged by interest rates normalising now that they are not being suppressed by widespread central banks purchasing of bonds, we are encouraged that trading has generally been sound. The new focus for many companies on cost control is a benefit to shareholders, and growth opportunities continue to abound. Through the 1,200+ meetings which our experienced team has each year with companies in the sector, we seek to identify those companies with strong management teams, strong competitive positions, and attractive valuations which are positioned to benefit from higher growth segments in the IT market. We rely on a combination of fundamental analysis and a valuation-sensitive, growth framework to assess the attractiveness and sustainability of companies. We believe that our disciplined investment philosophy of the last 25+ years remains a sound basis for navigating through the uncertainties in the markets.

Important Information

Please note that past performance is not a reliable indicator of future returns. Market and currency movements may cause the value of shares, and the income from them, to fall as well as rise, and you may get back less than you invested when you decide to sell your shares. Certain statements in this report constitute 'forward-looking' statements. Such statements, including the intended actions and performance objectives of the Fund, involve unknown risks, uncertainties and other factors which may cause actual results, performance or achievements of the Fund to differ materially from those implied by such forward-looking statements.

Any opinion expressed whether in general or specifically on the performance of individual securities and/or in a wider economic context represents the investment managers views at the time of preparation. Prospective shareholders should not treat this report as advice relating to legal, taxation, investment or any other matters and are recommended to consult their own professional advisers concerning the acquisition, holding or disposal of shares in the Fund.

This report is a marketing communication. Please refer to the Herald Worldwide Technology Fund prospectus and to the Key Investor Information Document (KIID) before making any final investment decisions. A copy of the English version of the prospectus of the Fund and the KIID relating to the Fund may be obtained online from www.heralduk.com or alternatively received via email upon request by contacting the management company TATeam@MJHudson.com.

A summary of investor rights associated with an investment in the Fund is available online in English at <https://bridgefundmanagement.mjhudson.com/disclosures/> or it may be received upon request via email by contacting TATeam@MJHudson.com.

The figures in this report are not audited.

This report has been issued and approved by Herald Investment Management Ltd, the investment manager, which is authorised and regulated by the Financial Conduct Authority.

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