Polar Capital Technology Trust: Investment Manager's Report For The Year Ended 30 April 2022

Ben Rogoff
Partner, Technology

An unexpected monetary *volte-face* by policymakers amid persistently high inflation weighed on equity markets and valuations during the year.

Market Review

An unexpected monetary *volte-face* by policymakers amid persistently high inflation weighed on equity markets and valuations during the year. However, losses were more than offset by pronounced US dollar strength which gained more than 12% on a trade-weighted basis and more than 9% against the British Pound (GBP). As a result, the MSCI All Country World Index over the year to 30 April 2022 gained 4.3% in sterling terms, aided by a strong first half characterised by economic reopening, upward earnings revisions, and rampant M&A.

The strength of the US dollar mirrored sharply higher US interest rate expectations following the revelation in November that the Fed no longer believed inflationary pressures were 'transitory'. Energy prices likely played a part in driving this *Fed Pivot* as oil and commodity prices rose 79% and 54% respectively during the year. Higher risk-free rates (10-year US Treasury yields increased from 1.6% to 2.9%) resulted in a much more challenging fiscal second half with negative headline returns failing to capture the magnitude of the correction experienced by the average stock. While the US, as measured by the S&P 500 Index, gained 10.2% (and 0.2% in local terms), drawdowns were significantly greater elsewhere, including Europe (Eurostoxx 600 +2.3%), Japan (Nikkei 225 -12.0%) and Asia ex-Japan (MSCI Asia ex-Japan -12.9%) (all returns in sterling terms, unless otherwise stated). Weakest performance was reserved for Chinese stocks (MSCI China -29.8%) where a deluge of regulatory changes and market unfriendly developments took their toll on investor sentiment and lockdowns in Shanghai towards period end reflected the challenge posed by the omicron variant to China's zero-COVID policy.

Small-cap indices meaningfully underperformed during the year, with the Russell 2000 (small cap) declining 9.6% while the Russell 1000 (large-cap) advanced by +6.2% (both in sterling terms). Breadth also continued to deteriorate with just c.25% of NYSE stocks trading above their 200-day average at year-end, compared to 58% a year earlier.

The first half of the year saw markets grind higher amid economic reopening, positive earnings revisions, and record equity inflows. This was possible due to worldwide vaccination programmes that succeeded in breaking the link between COVID-19 infections and deaths. Economic recovery was most evident in consumption trends and in labour market strength, the US unemployment rate falling below 5% by September before returning to pre-COVID levels by year end. The recovery trajectory was complicated by waning fiscal stimulus and labour shortages, exacerbated by the combination of limited improvement in the labour participation rate and early retirement (aka the 'Great Resignation'). However, the most significant headwind was commodity shortages and soaring energy prices with oil surpassing $80/barrel in November for the first time since 2014, while US producer prices rose 8.3% y/y in August, the largest year-on-year increase on record. The combination of shortages and a surfeit of freshly printed liquidity saw CPI increase 5% y/y in May – the fastest growth in consumer prices since August 2008. This led to the June FOMC 'dot plot' implying two rate hikes in 2023, up from zero in March, and, in October, the Fed signalled that it could begin scaling back asset purchases in November. However, equity markets were able to shrug off these negative developments largely due to the Fed maintaining its earlier 'transitory' stance and persistently negative real rates supporting equity multiples.

The reports and financial information are extracted from the published Annual Report and Financial Statements for the year ended 30 April 2022 and do not constitute the statutory accounts for that year.

The emergence of the highly mutated Omicron variant in November was an inauspicious start to what proved a very challenging fiscal second half. In the same month, recently re-nominated Fed Chair Jerome Powell performed a remarkable *pivot* regarding inflation, declaring "it's probably a good time to retire that word transitory".

While the milder variant of COVID likely contributed to a "more hawkish variant of the Fed", it was November's CPI print (+6.5% y/y) – the highest reading since 1982 – that likely forced Powell's hand. Hawkish monetary developments dominated the balance of the year, with the Fed first moving to double the pace of tapering in December. An inflation shock morphed into a rates shock as the release of FOMC minutes in January raised the spectre of rate hikes and quantitative tightening (QT) "sooner or at a faster pace than participants had earlier anticipated".

The first US rate hike since 2018 was also delivered in March, three months after the UK became the first G7 economy to raise interest rates since the pandemic began. By the end of April, markets had priced in Fed Funds at 250bps having anticipated zero rate hikes little more than a year earlier, and 10-year US Treasury yields had backed up to 2.9%, almost doubling during the first four months of 2022. The persistence of inflationary pressures saw other central banks adopt more hawkish positions too, forcing rates higher.

Long-duration stocks felt the full force of this monetary about-turn with the earlier tremor in weaker, more speculative names turning into a full risk-off episode across high growth and long duration names. This was particularly true within small caps where growth stocks trailed value by more than 20% during the year.

In addition to the human tragedy associated with the invasion of Ukraine, the conflict added untimely upside pressure to inflation and downside risk to global growth forecasts. Reflecting the elevated risk of so-called 'policy error' (the Fed tightening against this most uncertain of backdrops) the two-year versus 10-year Treasury yield spread briefly inverted during March, something often seen as a precursor to a recession.

Technology Review

Calendar year 2021 proved a strong recovery year with worldwide IT spending +9% y/y as compared to earlier estimates of +6%. Upside to 2021 forecasts saw the technology sector deliver revenue and earnings growth of 15.7% and 28.9% y/y respectively, well ahead of estimates this time last year of 10.1% and 17.5%. As a result, technology revenue growth ended up only narrowly behind the market (16.5%) although earnings trailed significantly as the market delivered 47.5% growth. This was unsurprising given more difficult comparisons and less incremental leverage in the technology sector. Despite better-than-expected IT spending, **technology stocks trailed the broader market during the fiscal year**, the Dow Jones World Technology Index declining 1% in sterling terms (total return) due to fading pandemic tailwinds, tough comparisons and extreme factor rotation following the shift in Fed policy. However, and even more extreme than in the broader market, returns were dominated by US stocks which increased 6.6% while non- US technology stocks (as measured by the W2TEC index) fell 22% during the year. Small caps also significantly underperformed, the Russell 2000 (small) technology index declining 10.1% while large-caps (as measured by the Russell 1000 technology index) advanced 6.9%, both in sterling terms. Moreover, US relative strength was driven by an even narrower group of megacap stocks that continued to deliver strong growth against a less uniformly positive backdrop while also enjoying strong ESG-related equity inflows. At year end, just 19% of NASDAQ stocks were trading above their 200-day moving average. Higher multiple, long duration stocks saw very significant multiple compression down from their November highs, as the most expensive quintile of the US technology sector fell -47% while the least expensive (value) quintile only declined -8% through our fiscal year end.

At the sector level, strongest performance was enjoyed by the semiconductor sector as demand remained strong amid chip shortages despite concerns about double-ordering and the durability of the cycle. Strong capex growth (+20% y/y) at the hyperscale public cloud companies led to continued strength in cloud data centre capex benefitting both AMD (+15%) and Nvidia (+36%). While most of the automotive industry struggled with the global chip shortages, Tesla (+35%) enjoyed a stellar period delivering a record number of vehicles and record margins in Q3 and Q4 against a supportive backdrop for electric vehicles.

Value-oriented sectors such as networking (aided by datacentre strength) and hardware also performed well, the latter benefitting from outstanding performance from Apple (+32%), which proved able to deal with ongoing supply constraints to fulfil steady consumer demand for its products. Software stocks trailed (IGV-9%), with average returns significantly worse than headlines due to Microsoft (+21%) as the sector suffered material multiple compression amid higher rate expectations. This trend accelerated into calendar year 2022, which saw software EV/NTM (Enterprise Value / Next Twelve Months) sales multiples compress by 42% by the end of April to an average of 8x. Private Equity buyers stepped in to take advantage of the weakness with Thoma Bravo bidding for Sailpoint (13.4x forward sales) and Anaplan (13.9x forward sales).

Weakest performance was reserved for Internet stocks (and other 'work from home' beneficiaries) which struggled with reopening, difficult comparisons, changes to user tracking, supply chain travails and (towards period end) consumer spending concerns. While the sector struggled (particularly in China, where a series of regulatory crackdowns weighed heavily) the average stock suffered far more than headlines suggest with NASDAQ CTQ Internet Index returning -37%, while Alphabet delivered positive returns (+5%). Softer ecommerce trends and the impact of waning fiscal stimulus checks put pressure on the ecommerce and payments space, including PayPal (-63%) and Shopify (-60%). Amazon (-21%) was not immune as strong AWS results were not enough to offset concerns around ecommerce pull forward and the profitability of its retail business.

Public cloud results remained very solid as the three major public cloud operators (Amazon AWS, Microsoft Azure, Google GCP) reached a collective annual revenue run rate of c.$140bn, up +41% y/y. Many of the bellwether WFH and lockdown beneficiaries more than reversed out earlier gains as companies such as Netflix, DocuSign, Peloton and Spotify broke below pre-COVID levels despite strong growth in their revenues and user bases in the intervening period. The most speculative areas of the market saw the largest drawdowns. The GS Non-Profitable Tech Index returned -47% and the ARK Innovation ETF delivered -57% during the year as investor enthusiasm for 'TAM' (Total Addressable Market) stories abated in the context of more persistent inflation and a higher rate outlook.

Portfolio Performance

The Trust underperformed its benchmark with the net asset value per share falling -7.7% during the fiscal year versus a decline of -0.9% for the Dow Jones World Technology index. The Trust's share price fell by 13.7% reflecting the additional impact of the discount widening from 5.3% to 11.5% during the period. We continue to monitor the discount and the Trust bought back 4.19m shares during the period.

The year was dominated by the reversal of fortunes in high growth / long-duration stocks that were challenged by the combination of reopening headwinds and supply chain travails as well as sustained valuation compression amid soaring energy prices, rampant inflation, higher risk-free rates, and increased risk of recession. As such, adverse stock selection (largely associated with our growth-centric investment approach) was responsible for most of the Trust's underperformance as investors rotated away from smaller, longer-duration assets in favour of more solid, lower-multiple assets. In addition, a handful of mega-cap stocks that explain a large part of our benchmark including Alphabet (+5%), Apple (+33%) and Microsoft (+22%) delivered strong positive returns while smaller-cap peers fell significantly. Given that we are underweight in these names compared to the benchmark, their relative strength dragged on our relative performance. More broadly, the underperformance of smaller companies, which we were overweight relative to the benchmark, during the period acted as a meaningful performance headwind. On the positive side, our average cash position of 5.3% added 95bps of performance (aided by USD strength) although our NDX puts dragged by -17bps for the full year, despite strong recent positive contribution. Asset allocation also benefited from an underweight exposure to China which underperformed following increasingly hostile government scrutiny of technology platforms and (towards period end) economic weakness due to lockdowns.

At the stock level, weakest relative performance was delivered by earlier COVID beneficiaries that suffered a stark reversal in fortune during the year. These included ecommerce companies such as Amazon (-21%) and HelloFresh (-31%) as well as digital payment platforms such as PayPal (-53%) and Square (-55%), which similarly struggled with the slowdown in online sales and the withdrawal of government stimulus.

The reports and financial information are extracted from the published Annual Report and Financial Statements for the year ended 30 April 2022 and do not constitute the statutory accounts for that year.

Two of our largest stock detractors were Internet stocks: Netflix (-59%) which struggled to maintain its earlier subscriber momentum growth amid reopening; and Snap (-49%) which was hurt by user-tracking changes made by Apple. Software companies that had previously enjoyed tailwinds associated with remote and hybrid work also experienced significant drawdowns typified by DocuSign (-60%) and Twilio (-66%). Other software stocks also struggled with valuation compression that more than offset fundamental progress, while a few were punished following more mixed execution including Okta (-51%) and Elastic (-30%). Long-duration stocks were particularly weak as sentiment reversed as risk free rates rose, which negatively impacted companies such as 10x Genomics (-73%) and Guardant Health (-57%). As ever, there were also a few genuine disappointments such as Chegg (-70%) Everbridge (-64%) and 2U (-72%), although these were mostly contained to the portfolio tail. However, the most significant stock level detractors were our underweight positions in Apple (+32%) and Microsoft (+21%) which combined cost nearly -240bps relative, despite strongly contributing to absolute returns.

In terms of positives, the Trust benefitted from the outperformance of cybersecurity stocks which enjoyed strong fundamentals and positive sentiment (buttressed by events in Ukraine) in contrast with software peers. Noteworthy performances were delivered by Tenable (+61%), Cloudflare (+12%) and CrowdStrike (+5%). Companies exposed to strong cloud capex /datacentre spending also performed well including Arista Networks (+61%), AMD (+15%) and Marvell Technology (+41%). Electric vehicle (EV) plays such as Tesla (+35%) and BYD (+60%) continued to benefit from strong adoption trends while managing to avoid too much supply chain disruption. The Trust also benefited from its underweight exposure to Chinese stocks with Alibaba (-54%) the largest individual positive contributor (c.88bps) to relative performance. Strong performance from E-Ink (+172%) is deserving of mention as the Taiwanese manufacturer delivered strong growth aided by Walmart's adoption of its electronic shelf labels.

Portfolio Changes

While our core themes (and our growth-centric approach) had previously mapped well to the pandemic, we continued to realign the portfolio to better position it for reopening. This resulted in us significantly reducing our exposure to earlier work-from-home (WFH) beneficiaries, many of which suffered spectacular reversals.

This resulted in us exiting positions in Adyen, Avalara, Delivery Hero, Fiverr, Kahoot!, ON24, Peloton, Shimano, Wise and Zalando during the year. We also significantly reduced exposure to longer-duration stocks post the Fed pivot in November, exiting Affirm, Pinduoduo and Sea. On the positive side, we continued to add to our semiconductor exposure reflecting myriad thematic drivers (including AI and EV) as well as the ongoing demand-supply imbalance. Changes to the portfolio made during the year meaningfully ameliorated underperformance with the Trust's actual return more than 4.5% ahead of what a static (i.e. unchanged) portfolio would have delivered.

Market Outlook

With the worst of the pandemic apparently behind us, investors could be forgiven for thinking that recovery might have been more straightforward. Instead, we are faced with a more uncertain macroeconomic backdrop than at any stage since the pandemic and – given the loss of policymaker support – arguably since the Great Financial Crisis (GFC). As recently as January, the IMF was forecasting **global growth** of 4.4% and 3.8% in 2022 and 2023 respectively – a deceleration from an estimated 6.1% in 2021 – reflecting higher interest rates, slower US growth and troubles in China. However, the **invasion of Ukraine** in late February has seen growth forecasts contract further while resultant soaring food and energy prices have led to inflation expectations of 5.7% in advanced economies and 8.7% in emerging markets this year, significantly ahead of earlier forecasts. Beyond the tragic humanitarian consequences of the war, the conflict has also highlighted Europe's reliance on Russian energy with the EU receiving nearly 40% of its gas and more than a quarter of its oil from Russia. With the war ongoing (and with systemic risk thus far avoided), higher commodity and energy prices will be the primary mechanism for how the conflict affects the global economy. While Russia only explains c.1.6% of global GDP, it is the world's largest exporter of natural gas (c.20% global share) and the second largest exporter of crude oil. Russia is also the largest exporter of wheat (c.20% share) and supplies c.10% of the world's copper and aluminium and 40% of palladium. **Consumer spending** is being challenged by higher energy costs with UK families said to face the biggest real income squeeze in nearly 50 years. In the US, a gallon of gas recently exceeded $5 – the first time ever – with negative implications for disposable incomes and consumer confidence which recently fell to a decade low.

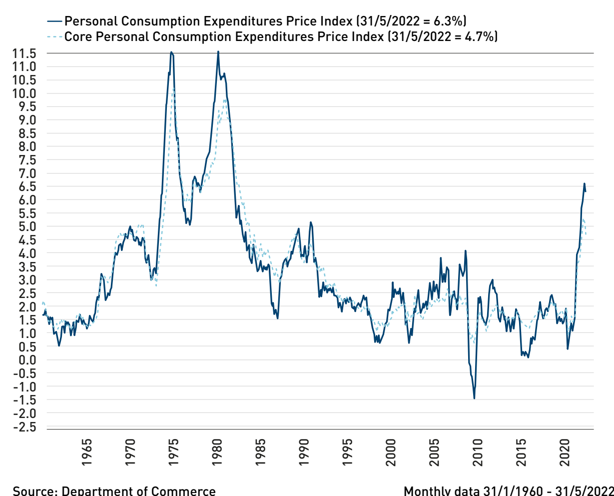
IMF World Economic Outlook, April 2022

(real GDP, annual percent change)	2021	PROJECTIONS 2022	2023
World Output	6.1	3.6	3.6
Advanced Economies	5.2	3.3	2.4
United States	**5.7**	**3.7**	**2.3**
Euro Area	**5.3**	**2.8**	**2.3**
Germany	2.8	2.1	2.7
France	7.0	2.9	1.4
Italy	6.6	2.3	1.7
Spain	5.1	4.8	3.3
Japan	**1.6**	**2.4**	**2.3**
United Kingdom	**7.4**	**3.7**	**1.2**
Canada	**4.6**	**3.9**	**2.8**
Other Advanced Economies	**5.0**	**3.1**	**3.0**
Emerging Market and Developing Economies	6.8	3.8	4.4
Emerging and Developing Asia	**7.3**	**5.4**	**5.6**
China	8.1	4.4	5.1
India	8.9	8.2	6.9
ASEAN-5	3.4	5.3	5.9
Emerging and Developing Europe	**6.7**	**-2.9**	**1.3**
Russia	4.7	-8.5	-2.3
Latin America and the Caribbean	**6.8**	**2.5**	**2.5**
Brazil	4.6	0.8	1.4
Mexico	4.8	2.0	2.5
Middle East and Central Asia	**5.7**	**4.6**	**3.7**
Saudi Arabia	3.2	7.6	3.6
Sub-Saharan Africa	**4.5**	**3.8**	**4.0**
Nigeria	3.6	3.4	3.1
South Africa	4.9	1.9	1.4
Memorandum			
Emerging Market and Middle-Income Economies	**7.0**	**3.8**	**4.3**
Low-Income Developing Countries	**4.0**	**4.6**	**5.6**

Source: IMF, World Economic Outlook, April 2022
Note: For India, data and forecasts are presented on fiscal year basis, with FY 2021/2022 starting in April 2021. For the April 2022 WEO, India's growth projections are 8.9 percent in 2022 and 5.2 percent in2023 based on calendar year.

Sharply higher energy prices also pose a new and substantial risk to an **inflationary backdrop that had already become problematic.** As previously discussed, **inflation has soared almost everywhere** with annual CPI growth rates in the US and Europe at multi-decade highs. Originally understood as a supply shock due to COVID-related disruption, the past year has seen higher prices become more pervasive and less transitory. As previously mentioned, US CPI reached +6.5% in November, while in the same month, Eurozone inflation came in at +4.9% y/y, way ahead of the ECB's earlier forecast of +1.5% for 4Q21. Tight labour markets have also led to **wage inflation**, with unit labour costs +6.3% y/y in 3Q21, the biggest increase since 1982. As a result, the narrative has shifted to inflation as a demand problem caused by stimulus, excess savings, and pent-up demand which, when paired with more inelastic supply, has created a "perfect storm of higher prices".

Consumer Price Indices (1960 – May 2022)



Source: Department of Commerce | Monthly data 31/1/1960 - 31/5/2022

Since the start of the pandemic, highly accommodative fiscal and monetary policy designed to prevent financial collapse has 'flooded the economy and financial markets' with unprecedented liquidity. Between February 2020 and November 2021, M2 rose $6trn to $21.4trn – equivalent to almost a year's worth of nominal GDP, a record. **Excess liquidity** was recently estimated at c.$3trn while fiscal support packages have seen government deficits balloon. In the US, the federal budget deficit reached c.$2.8trn, almost three times the 2019 level. The Fed's balance sheet has expanded by almost $5trn too, reaching a record $8.7trn

The reports and financial information are extracted from the published Annual Report and Financial Statements for the year ended 30 April 2022 and do not constitute the statutory accounts for that year.

by the end of the calendar year. While the Fed may have "greatly miscalculated" the inflationary impact of earlier stimulus, they could not have known the pandemic would result in a **labour supply issue**. Just two years ago the pandemic was said to have "triggered one of the worst jobs crises since the Great Depression". Instead, and despite the US economy being 1.4% larger than it was pre-pandemic, there are still 3.6 million fewer people in jobs and nearly 1.9 job openings per job seeker. This is largely the result of the 3m additional 'early retirees' equivalent to c.2% of the US workforce (aka the 'Great Retirement'), another pandemic-related twist which has accelerated the labour market recovery timeline. As a result, wages are rising, with the National Federation for Independent Businesses (NFIB) recently reporting a record net 48% of small businesses increasing worker compensation. Despite this, labour force participation remains subdued at 62.3% (as compared to c.63% pre-pandemic) leading to massive employee churn (aka the 'Great Resignation'). Labour shortages may persist which will put further upward pressure on wages and could presage a self-reinforcing wage-price spiral unless productivity growth improves significantly.

As such, a US tightening cycle was necessary to prevent inflation becoming more embedded in the labour market. While the Fed may appear behind the curve, **inflation expectations appear to remain relatively well-anchored**. The Fed will want to keep it that way; to fail to have pivoted after the November data "would have risked Powell's rhetoric degenerating into self-parody". Since then, **rate hikes have begun with further increases anticipated this year and next**. The decision by the ECB in early March to accelerate tapering despite events in Ukraine highlighted the fact that central banks will (and should) **always prioritise credibility over policy error risk.** As such, we expect Powell to "do whatever it takes" to becalm inflation but do not anticipate a Volcker re-run given the very different backdrop with one notable exception – soaring energy prices. Regardless, it is difficult to see how central banks can come to the rescue of markets with interest rates near zero. Moreover, reducing inflation has become an increasingly important political focus, and a more important consideration than bailing out equity investors. At some point concerns about **reflexivity** will resurface but there is no obligation for the Fed to act and, in any case, we know it failed twice to stop selloffs of as much as 50% in the bear markets that ended in 2002 and 2009.

> This malalignment of demand and supply is reminiscent of the post-war period

Until recently, our base case was slowing growth rather than stagflation or recession. However, we have to acknowledge the increasing risks posed to this relatively sanguine view by tighter monetary conditions, war, and soaring energy costs. For now, we are encouraged by earnings expectations that have remained relatively robust with growth in earnings and revenues this year forecast at 7.7% and 11.5% respectively. While these forecasts may prove stale and subject to downward revision, it is worth recalling that while GDP is measured in real terms, earnings estimates are nominal. As such, inflation currently represents a greater risk to multiples than to corporate earnings. Of course, much depends on the durability of cycle-high corporate **profit margins** given an increasing number of cost pressures. We continue to keep a close eye on the direction of operating earnings given its strongly positive (0.94) correlation with the S&P 500.

Following the recent market correction, **valuations** look less problematic today with the S&P 500 trading at c.15.8x forward earnings as compared to last year when we noted they were "somewhat extended" at c.23x. As a result, US stocks now trade below both five-year (18.6x) and 10-year (16.9x) averages. However, this year we are forced to consider valuations against a very different inflation backdrop. That said, we are somewhat willing to look through current elevated inflation because longer-term expectations remain well anchored and because the Fed is alive to inflationary risk. Equity valuations should also be somewhat supported by a paucity of alternatives. Compared to bonds, the **Fed Model** suggests stocks are c.50% undervalued compared to Treasuries, and c.20% undervalued versus investment-grade credit. **Cash** continues to look unattractive with negative real returns guaranteed in most major markets, although elevated levels of equity market volatility have added to its relative lustre.

Upside risk could manifest via the **cessation of hostilities in Ukraine** - unlikely in the very near term but possible in time. While a return to the prior equilibrium enjoyed between Russia and the West appears impossible, an end to hostilities could significantly ameliorate current market uncertainty, becalm energy prices, and meaningfully reduce the risk of escalation. **Structural inflation fears may also be overdone** with many of the imbalances that existed prior to the invasion of Ukraine appearing pandemic-related: pent-up demand boosted by household savings bloated during COVID, supply-chain challenges frustrated by uneven vaccine availability and draconian approaches to COVID containment, particularly in China. Heightened labour market churn also appears to be somewhat pandemic related with the pursuit of more flexible work and/or relocation important reasons for changing jobs. Reopened borders and easier international travel may also ameliorate labour shortages in lower-paid work where wage growth has been strongest. This malalignment of demand and supply is reminiscent of the post-war period when the end of price controls saw CPI leap from 1.7% in February 1946 to a peak at 19.7% in March 1947, before plunging to zero in 1949. The cause of this volatility was a combination of pent-up demand, as soldiers were demobilised, and plunging industrial production, as factories retooled from armaments to consumer goods. Two years later, production rebounded dramatically, helping to bring inflation down. A similar experience also occurred during the Korean War. **Both of these episodes revealed that inflation can rise and fall very quickly without inflation expectations being permanently altered**. Fed Chair Powell may have been alluding to this possibility when he stated that "appropriate monetary policy in this environment requires a recognition that the economy evolves in unexpected ways".

Other positive impulses include the so-called 'CFO put' with S&P companies sitting on $2.4trn in cash and other liquid assets. Leverage at public companies (as measured by net debt/EBITDA) is back at 2014 lows which should support capital spending, higher dividends and stock repurchases. It should also fuel greater M&A activity with private equity additionally said to have c.$2.3trn of 'dry powder' cash reserves. During 2022, we have seen private equity spend more than $34bn acquiring three software vendors - Citrix, SailPoint and Anaplan. A return of strategic M&A may also prove supportive too, with $95bn of gross transaction value announced in the videogaming industry alone this year following Microsoft's $69bn bid for Activision Blizzard and Take-Two's $13bn bid for Zynga. In early March, Google also announced the $5.4bn cash acquisition of cybersecurity company Mandiant. **We also see many of the conditions necessary for a rally falling into place**: the IPO market is essentially shut, and investor sentiment is at post-1992 lows (a recent AAII survey of US retail investors revealed that just 15% of investors are bullish). Small caps have underperformed considerably from highs and new issues have been smashed as the GS Recent Liquid IPO Index has halved from November highs, both of which have typically been preconditions of previous rallies.

The reports and financial information are extracted from the published Annual Report and Financial Statements for the year ended 30 April 2022 and do not constitute the statutory accounts for that year.

Market Risks

While COVID remains a wildcard, war, inflation, and recession represent the most significant interconnected risks this year. In terms of **COVID**, we continue to believe the worst of the pandemic is behind us thanks to vaccine rollouts that have broken the link between cases and mortality, as well as the link between cases and behavioural adjustments. Put differently, most people appear to have concluded that the health risks associated with COVID are no longer significant enough for them to change their behaviour. As long as *Omicron* remains the dominant strain, our base case is a continuation of the transition from pandemic to endemic disease. The main risk to this is a significantly different new variant that changes the trajectory of the virus. In addition, current lockdowns in China – where omicron is challenging the efficacy of local vaccines and the zero-COVID policy - are a pertinent reminder that COVID is likely to continue disrupting life and supply chains for the foreseeable future. We also **cannot know how the Ukraine conflict will evolve**. At the same time, China will be watching closely given its One-China Principle is similar to Putin's desire to rebuild a Greater Russia. There is also a real (if small) risk of escalation (evidenced by potential NATO enlargement) – a chilling prospect given Russia controls the world's biggest nuclear arsenal and has been unafraid to sanction the use of chemical weapons in Syria.

The conflict also poses additional risks to the prevailing investment backdrop. History says we should expect **higher inflation**: as the saying goes, "war is inflationary; peace is deflationary". Put differently, the pursuit of both "guns and butter" comes at an inflationary cost. In the US, inflation spiked during the War of 1812, the American Civil War, WWI, and WWII through the end of the Cold War. We might also do well to consider the implications of permanently higher **defence spending** and the potential for a **new arms race**. If so, this may coalesce around **hypersonic weapons** which reduce the effectiveness of existing ballistic missile defence systems. With the potential to derail the theory of deterrence based on mutually assured destruction (MAD), **higher defence budgets** look inevitable. Germany has already announced an immediate €100bn budget to modernise its army and an ambition to exceed a target of 2% of GDP in defence spending (from c.1.5% today). This pivot is significant, as was the recent decision by some ESG funds to allow defence stocks within their investment remits. During the Cold War, the US spent around 7% of GDP on defence which détente saw fall to c2.8% today. The war in Ukraine has drawn a line under that peace dividend with US defence spending already forecast to rise towards 3.5-4% over the coming years.

War in Ukraine has also highlighted Europe's dependence on Russian oil and gas, particularly in Germany where 65% of gas comes from Russia. Naturally, this has brought **energy security** to the fore and Europe's urgent need to reduce this vulnerability. While this should accelerate the **clean energy transition**, the reality is that it takes a lot of alternative energy to replace gas. The invasion has so shaken Germany that its economic minister from the Green Party is reviewing the possibility of keeping both coal and nuclear plants online to reduce dependence on Russian energy. We are excited about the opportunity to participate in another wave of environmental technology spending, but the climate transition also represents another "slow- moving negative supply shock" because it embeds the cost of carbon emissions in production prices. It is also another reminder we may already be past **peak globalisation.** This process arguably began with Brexit and Trump's tariff wars but stepped up a gear with COVID when the world's interdependence was tested. Vaccine nationalism was a particularly difficult moment, while post-pandemic challenges have further highlighted the risk associated with **global supply chains** built on hyper-specialisation and finely-tuned just-in-time (JIT) inventory management. The risks to US equities from a decline in globalisation are not insignificant: Bank of America estimates that globalisation has driven more than half of all margin expansion due to lower COGS on exports, taxes, and labour.

More significantly, the risk is that peak globalisation is part of **broader inflation regime shift**. In recent years we have seen a wave of populism presage significant minimum wage increases and social unrest, while a number of COVID policy responses in the developed world (such as massive transfer payments indirectly financed by central banks) represent a "generational shift in fiscal policy". The demand for more flexible work post-pandemic is also perhaps symptomatic of a recalibrated relationship between labour and capital that could persist. Taken together, these factors represent a significant challenge to the disinflationary era that has been in place since the early 1980s. Finally, we might highlight **the long-term risk posed to the dollar-based system** following the freezing of Russian US dollar reserves, described as "the weaponization of money". While a paucity of alternatives suggests limited immediate risk to the dollar's reserve currency status, so- called 'de-dollarisation' could become a key theme in an "increasingly multi-polar and potentially more contentious world".

Technology Outlook

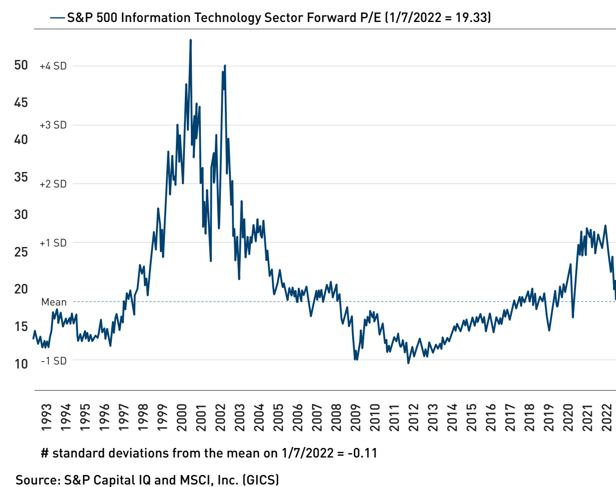
Earnings outlook

After increasing 9% in 2021, worldwide IT spending is expected to reach $4.4trn this calendar year representing an increase of 4.0%, in current dollar terms. However, this forecast has already been revised lower from +5% forecast in January reflecting deepening geopolitical and macroeconomic risks. For 2022, the technology sector is expected to deliver revenue and earnings growth of 11.2%/12% while the S&P 500 is forecast to grow at 9.8%/10.3% respectively. These forecasts do not look unreasonable, particularly after a solid Q1 results seasons that at the time of writing has seen the sector deliver 11.7% y/y revenue growth. However, guidance has been more mixed than usual, likely reflecting inflation, supply chain challenges, USD strength and the impact of the conflict in Ukraine. These headwinds come at a tricky time for the technology sector's net profit margins which are elevated at c.25% as compared to the five-year average of 21.8%. Sustained US Dollar strength could challenge revenue estimates given the sector's international exposure of 59% (the highest of any sector) vs. 41% for the market.

Valuation

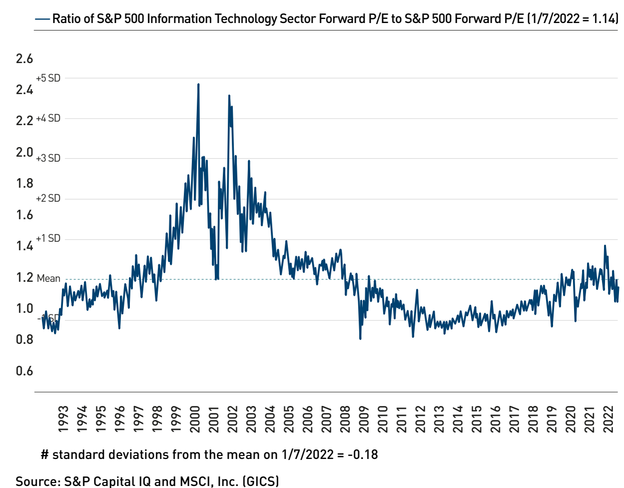
Having made a new cycle high of 28x ahead of the Fed Pivot in November 2021, technology valuations have been in retreat. Today, the forward P/E of the technology sector is c.19 – considerably less than this time last year (26x), below the five-year average (21.7x) but still ahead of the 10-year (18.2x) average. In addition, technology remains the best-capitalised US sector and the only one with net cash. The sector's relative rating has also contracted from post-2004 highs of 1.4x registered in late 2021. Today, technology stocks trade at 1.1x the market PE multiple, towards the middle of its post-dotcom bubble range of 0.9-1.4x and a far cry from levels seen during the dotcom bubble, when the sector traded at more than twice the market multiple. However, as we have long argued, aggregate valuations continue to be diluted by 'cheap' incumbents such as HP and Intel (and now arguably Meta / Facebook) that trade on P/Es of between 7-13x.

S&P Information Technology Forward PE, as at 1/7/22



Source: S&P Capital IQ and MSCI, Inc. (GICS)

S&P Information Technology Relative Forward PE as at 1/7/22



Source: S&P Capital IQ and MSCI, Inc. (GICS)

Last year, we highlighted how the technology story had hardly gone unnoticed, evidenced by next-generation valuations that had expanded to cycle highs, revisiting levels not seen since the late 1990s. While this group of stocks boasted unusual growth profiles, we cautioned that elevated valuations also reflected several late-cycle features – elevated retail participation, SPAC issuance, concentrated portfolios and 'classic late-cycle exuberance' that had coalesced around long-term 'total addressable market' (TAM) investing. Since then, those pockets of exuberance have been truly burst including ARK (a proxy

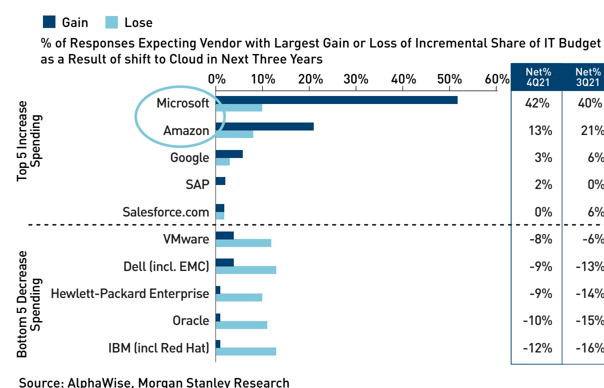
The reports and financial information are extracted from the published Annual Report and Financial Statements for the year ended 30 April 2022 and do not constitute the statutory accounts for that year.

for TAM investing) which peaked in February 2021 – a full nine months before our own benchmark made its highs– and has subsequently suffered peak-to-trough decline of c.77%. SPACs have fallen by c.50%. At time of writing, valuations across the SaaS space have more than halved across all growth groups. While we have been nervous about high-growth valuations, our own base case did not envisage a derating that would be as deep or dramatic as it is currently proving; what began as an overdue valuation reset has gathered momentum of its own as investors have begun to question the durability of growth and even the validity of some companies' non-GAAP profitability given high (and persistent) levels of share-based compensation. While macroeconomics and the Fed pivot have played a significant part in this, it has been the reversing fortunes of the working from home (WFH) and other pandemic beneficiaries that began this process.

Spending Priorities / Favoured Themes

Although next-generation valuations are currently under pressure, IT **spending priorities** are unlikely to change nearly as dramatically. Indeed, a recent JP Morgan survey of 142 Chief Information Officers (CIO) responsible for $114bn spend expect IT budget growth of +5.3% and +5.7% in 2022 and 2023 respectively, versus c.4.8% expected during the pandemic. The survey (and others like it) support the view that IT budgets continue to be reallocated in favour of new technologies. Cloud computing remains the number one IT priority, while other high priority areas include security, digital transformation, analytics, collaboration, and AI. Demand for IT services also remains strong due to accelerated digital demand and the constrained talent environment. In contrast (and at the margin) there does appear to be some levelling off in spend intentions for communications software likely due to reopening/WFH digestion. Hardware also remains one of the slowest growth areas, with PCs seeing a deterioration in CIO prioritisation post-WFH, while the cloud shift continues to represent significant longer-term risk.

Expected IT budget gainers / losers among select vendors



Source: AlphaWise, Morgan Stanley Research

More broadly, and consistent with previous years, legacy technologies, and vendors such as IBM, Oracle and Dell are expected to remain market-share donors despite their best efforts (and M&A) to reinvent themselves. At a time when growth stocks are under sustained pressure, this is a good reminder of why value investing within technology is something of a Faustian pact (and why we avoid it). Instead, we construct our portfolio around seven core themes: internet advertising / ecommerce, software-as-a-service, cloud infrastructure, cybersecurity, data economy / AI, digital entertainment and connectivity/5G. In addition, we have exposure to a number of secondary themes including fintech/payments, automotive, clean energy, and medical technology. We are also excited about the long-term disruptive potential of **emerging themes** such as blockchain and the metaverse.

Technology Risks

As ever, there are multiple risks to our constructive medium-term view. Many of these relate to **macroeconomics** (recession; inflation; war, and others) that are covered broadly elsewhere. In addition, we should highlight the risk to technology spending should CEO confidence meaningfully deteriorate. Despite survey results suggesting otherwise, there could be some risk to **cloud spending** should earlier-stage companies/unicorns spend less aggressively. Other 'big picture' risks include widespread **component shortages** and **labour market** tightness. **Valuation** is another risk because even after this atypical correction, technology stocks have retraced back to average, rather than cheap territory versus history. While **earnings progress** is expected to moderate this year, numbers look at risk of downward revision given the weaker global growth outlook and US Dollar strength while record **technology margins** could

be challenged by soaring input prices, tight labour markets and/or reopening (as companies give up or reinvest some of their pandemic savings).

As we warned last year, a **steeper yield curve** (noticeably absent at present) is unlikely to prove good news for technology stocks. **Regulation** remains a key risk with events in China after the aborted IPO of Ant a salient reminder of regulatory risk. That said, we are comforted by the existence of due legal process in liberal democracies painfully absent elsewhere. However, we would not be surprised to see a resurgence in regulatory scrutiny in the US post-COVID. While legislation will not be easy to pass, restrictive legislation has already been proposed by members of both parties that focus on app stores, first party/third party seller conflicts and responsibility for content on internet platforms (revising Section 230). We expect 'Big Tech' and their natural monopolies to continue to invite scrutiny and the drumbeats in Washington to grow louder over the coming year ahead of key lawsuits slated for 2023.

Concentration Risk

In addition to market and sector specific risks, it would be remiss of us not to remind our shareholders about the concentration risk both within the Trust and the market-cap weighted index around which we construct the portfolio. At the end of June, our three largest holdings – Microsoft, Apple and Alphabet – represented c.28.5% of our NAV and c.41.3% of our benchmark respectively. Five years ago, our top three positions (Alphabet, Apple and Microsoft) accounted for c.22% of NAV and c.30% of our benchmark. The higher concentration of both our portfolio and benchmark reflects the spectacular performance of a handful of stocks that captured the zeitgeist of this cycle. These are unique, nonfungible assets and their long-term success represents their dominance of their respective industries in an interconnected world where network effects are paramount, and the marginal cost of distribution is low. Their influence is not only felt within technology indices; at the end of June, the largest ten stocks (including these three) in the S&P 500 accounted for 28.0% of its market cap. While off recent highs, this level of concentration is commensurate with levels not seen since the early 1980s. Although this makes the portfolio (and indices) more sensitive to the performance of a few stocks, we are encouraged by the fact that the largest ten stocks also explained 29% of index earnings as at year end. Trading at/around a market multiple, these stocks dominate market-cap indices because of their earnings progress, rather than because they sport outlandish valuations as was the case in the late 1990s. We are very comfortable moving materially underweight them should we become concerned about their growth or return prospects, or should we find more attractive risk-reward profiles elsewhere in the market.

Conclusions

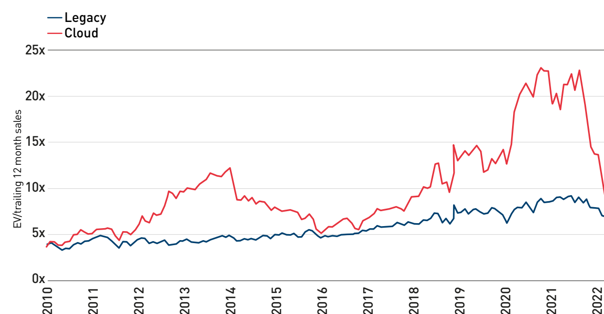
As one of the largest beneficiaries of the pandemic, reopening was always going to generate crosscurrents for the technology sector. E-commerce normalisation has led to significant retracements within the internet and payment subsectors which are likely to take time to recapture. However, we are confident that secular tailwinds will reassert themselves, supported by favourable demographics. Software spending growth remains robust as companies digitally transform, automate workflows, gain insight from AI, secure themselves from cyberattacks and apply technology to drive productivity gains. Gartner believe software spending will increase 9.6% this year; IDC size digital transformation as a $10trn opportunity through 2025. And then there's a myriad of other secular themes within technology to get excited about – AI, cybersecurity, electric vehicles (EVs), healthcare and clean energy to name a few, as well as optionality associated with autonomous vehicles, the metaverse and blockchain/distributed computing. With macroeconomics currently dominating equity markets and near-term volatility high, **it is easy to forget how good the long-term technology story is.**

Long-term returns ultimately reflect economic value added, even if market disruptions and cyclical impulses can overwhelm the powerful underlying drivers of longer- term technological progress in the short term. If the past year has shown anything, it is the enormous risk associated with hubristic and Panglossian investment approaches: TAM, growth at any price, disregard for liquidity, and high conviction trumping risk management as the basis for portfolio construction. None of these things, however, alter the underlying criticality of technology (via its contribution to total factor productivity) to future economic growth, especially as the other two inputs to growth (capital and labour) may contribute less as they become relatively scarcer. As the OECD puts it (quoting Krugman): *"Productivity isn't everything, but in the long run it is almost everything."*. Technology is the handmaiden to productivity improvement, and so long as the sector can continue to help the economy become more productive and create economic value, we expect value to continue to accrue to equity holders in the most impactful companies enabling this change.

The reports and financial information are extracted from the published Annual Report and Financial Statements for the year ended 30 April 2022 and do not constitute the statutory accounts for that year.

While valuations have now corrected back to medium-term averages, they are still susceptible to further downside given increased volatility, the growing influence of energy prices and real rates on equity markets as well as heightened recession risk. The **current drawdown** (c.21%) is already consistent with the average non-recessionary bear market (-18% over eight months). However, the average **recessionary bear market** has seen the market fall by c.33% over 17 months, suggesting the current correction may only be c. two-thirds complete in the event of a recession. That said, **technology valuations** have meaningfully corrected such that next-generation software stocks now trade broadly in line with incumbents on a forward EV/sales basis. The last time this happened was 2015/2016 when the market was also significantly concerned about a hard landing, suggesting that technology stocks have begun to meaningfully price in recession risk. As such, we have begun to rebuild our exposure to higher-growth stocks while maintaining a modest amount of Nasdaq put protection and cash to help ameliorate the impact of further market weakness while ensuring the portfolio remains highly liquid.

Cloud vs. Legacy Software Valuations, Forward EV/Sales (2010 – June 2022)



Source: KeyBanc, 8/7/22

Ben Rogoff

19 July 2022

Investment Manager's Core Themes

Cloud Infrastructure

Of the technologies that enjoyed a pandemic boost, few are likely to prove as durable as those that accrued to cloud computing. The past two years have seen an accelerated shift to the cloud to support digital transformation, remote work, and a plethora of new services "at a scale unprecedented in human history".

We're excited about…

Cloud computing continues to deliver strong growth at extraordinary scale, with the three dominant vendors (Amazon, Microsoft and Google) now running at a collective annual revenue run rate of $140bn, up +41% y/y. Strong cloud growth necessitates cloud capex growth which should underpin demand for semiconductors, memory and networking equipment in cloud data centres; Morgan Stanley have increased their expectations for hyperscaler capex growth in 2022 to +27% y/y. AI continues to be a major driver of cloud adoption as companies move from proof of concept to production use cases; Gartner expects AI software revenue to reach $62.5bn this year, up +21% y/y. Environmental tailwinds are also likely to support future adoption.

Current holdings

Amazon, Microsoft, Alphabet, Arista Networks, AMD, NVIDIA.

Representing 28.5% of net assets at 30 April 2022.

Cybersecurity

Cybersecurity plays a vital role in protecting the digital economy and has been elevated from an IT problem to a business imperative which has seen its share of IT budgets grow from c.4.8% in 2011 to 8.4% in 2021. We believe growth should be supported by cybercrime incidents that continue to grow in both volume and sophistication. The cost of cybercrime is estimated at $1trn, equivalent to c.1% of global GDP.

We're excited about…

Cybercrime incidents continue to grow alongside technological advances such as social media, cloud computing and digital transformation that expand the so-called 'attack surface'. This should support cybersecurity spending which also benefits from the shift in primary aim from data theft to business disruption as well as a growing regulatory imperative. In 2021, there was a ransomware attack every 11 seconds. We are particularly excited about cloud security spending with CrowdStrike estimating that today cloud security spend amounts to only 1% of the underlying infrastructure spend today. While we do not believe that cybersecurity has benefitted from significant pull-forward during the pandemic, strong recent results have not been rewarded due to macroeconomic uncertainty. Downside risk could also be ameliorated by M&A activity following a strong 2021 which saw McAfee, Mimecast and Proofpoint all acquired by private equity.

Current holdings

CrowdStrike Holdings, CyberArk Software, Tenable Holdings, CloudFlare, eMemory Technology, Okta.

Representing 3.7% of net assets at 30 April 2022.

The reports and financial information are extracted from the published Annual Report and Financial Statements for the year ended 30 April 2022 and do not constitute the statutory accounts for that year.

Cloud Software

Like infrastructure, the software industry has been migrating to a subscription model powered by the cloud. The trend to software-as-a-service (SaaS) models has greatly increased the software market by collapsing upfront costs. This has made it possible for smaller companies to access software previously reserved for enterprises as well as facilitating myriad new vertical applications. By 2025, almost two-thirds of spending on application software will be directed towards the cloud.

We're excited about…

Despite a more challenging macroeconomic backdrop, software results have remained solid with companies continuing to invest in digital transformation. Microsoft CEO Satya Nadella recently noted strength in demand for automation technology "because in an inflationary environment, the only deflationary force is software.". ServiceNow's CEO further highlighted how macro "challenges have underscored the urgency of investment in digital business". Unfortunately, these imperatives and generally sound results have been in contrast with a massive derating in sector valuations. While this correction was overdue (and influenced by waning growth in earlier work-from-home beneficiaries) we have begun to rebuild our portfolio exposure as the de-rating appears well beyond any fundamental change in sector outlook. On a medium-term view, we remain excited about ongoing SaaS penetration with the cloud explaining just 15% of the $2trn enterprise IT stack today.

Current holdings

Microsoft, ServiceNow, Salesforce.com, Adobe Systems, MongoDB, HubSpot.

Representing 16.0% of net assets at 30 April 2022.

Artificial Intelligence

AI can analyse and extract insight from huge quantities of data which could augment and potentially replace human decision making and allow a much tighter interaction between the physical and digital worlds. We are early and the opportunity is growing: more data is created per hour today than was captured in an entire year just 20 years ago and only 0.5% of all data captured is being analysed. AI could be a $734bn market by 2027.

We're excited about…

Before the advent of AI, companies could only analyse structured data which is very expensive to gather, store and process, resulting in just 3% of total data captured being tagged. The leading AI-specific applications today are image recognition and Natural Language Processing (NLP). NLP remains a key battleground for tech giants fighting for supremacy in AI given the easy adaption for a wide range of downstream tasks through transfer learning, whereas startups look more at machine vision because entry barriers are lower. We are seeing AI technology move from being proof of concept - beating humans at video games - to deployments by companies outside the technology space. We have seen this in credit underwriting, autonomous mining vehicles, machine-vision recycling sorting and myriad other applications including AI-based 'digital twins'; digital representations of a physical objects which mirror the physical object. We continue to regard the semiconductor and SPE industries as a levered way to play AI proliferation in addition to industry leaders Google and Microsoft.

Current holdings

NVIDIA, Synopsys, Applied Materials, Tokyo Electron, AMD, Alphabet, Microsoft.

Representing 27.5% of net assets at 30 April 2022.

Internet

The internet sector has been challenged by the reversal of trends which supported strong US ecommerce growth and multiple expansion during COVID, including stay-at-home orders, the impact of stimulus and consumer spending shift to goods versus services. Although growth has slowed against tough comparators, ecommerce spending in 2021 remains at levels c.70% higher than 2019 and subsectors more exposed to reopening trends continue to deliver strong growth. Social media continues to play a central role in our everyday lives, with the world set to spend more than four trillion hours using social media in 2022.

We're excited about…

Ecommerce penetration of total retail sales remains low, having steadily increased 0.4%-0.9% per year for the decade through 2019 to reach 10.5%, then spiking dramatically during COVID to reach 14.6%, before declining modestly this year. COVID forced a large group of consumers and some large sectors in the economy (e.g. grocery) online and, despite near-term headwinds, it still seems reasonable to assume ecommerce's share of incremental retail sales will be higher in the five years following the pandemic (c. 2/3) than in the five years before it (c.1/3). Online advertising suffered in sympathy with ecommerce and faced incremental headwinds from changes to Apple's user-tracking policies and the influence of TikTok increasingly felt across the landscape. There has been a blurring of the boundaries between social media and e-commerce with short-form video and social commerce continuing to take share.

Current holdings

Amazon, Alphabet, Snap, Shopify, Airbnb.

Representing 12.4% of net assets at 30 April 2022.

Digital Entertainment

The combination of smartphones, broadband and app stores have resulted in an explosion of internet applications and a reallocation of time spent on entertainment. We remain excited about the potential of over-the-top (OTT) video, streaming music, and video gaming to continue to grow entertainment wallet share. However, weaker recent trends amid reopening and waning consumer confidence have dampened our near-term enthusiasm for the theme.

We're excited about…

After a stellar 2020, reopening has played havoc with digital entertainment and videogaming stocks due to pandemic-related strength demand pull-forward and heightened competition, as well as slowing growth on tough comparisons causing valuation compression. For 2021, the video games software industry only grew 1% y/y having grown 23% in 2020. This slowdown (and associated multiple compression) more than offset sustained M&A activity that has continued into 2022 with the proposed acquisitions of Activision and Zynga representing the two largest gaming deals ever. While growth is expected to reaccelerate this year, there remains considerable uncertainty around consumer spending given elevated energy prices and weakening confidence. Recent disappointments for high-profile consumer facing stocks such as Amazon and Netflix have also been painful reminders that reopening headwinds and the shift from goods to services spending, may not yet be fully priced in. As such we have meaningfully reduced our exposure to this consumer-facing theme, maintaining a position in Nintendo and a collection of tail-names including ROBLOX (user created gaming platform) and Take-Two Interactive Software.

Current holdings

Nintendo, ROBLOX, Take-Two Interactive Software, Spotify.

Representing 1.2% of net assets at 30 April 2022.

The reports and financial information are extracted from the published Annual Report and Financial Statements for the year ended 30 April 2022 and do not constitute the statutory accounts for that year.

Connectivity / 5G

The 5G network rollout continues apace despite an air pocket in China and 5G handset penetration also tracked above earlier forecasts, reaching 39% in 2021. Apple had another strong year and proved more adept than most at handling supply chain challenges. In Electric Vehicles, EV sales penetration has grown from 1% in 2017 to 8% in 2021, with unit sales up +101% last year as automakers prioritised EV production to meet consumer demand and avoid emissions penalties in the face of widespread shortages.

We're excited about…

A hybrid workforce, more cloud-delivered applications and more data from digital customer interactions means the need for network speed and capacity upgrades. Architectural upgrades designed to enhance security posture as well as deliver efficiency. Apple has so far been less subject to WFH headwinds as the Services business continues to grow well and consumers have enthusiastically adopted Macs with the new M1 chip, which speaks to Apple's dominant position in smartphones and ability to monetize their billion-strong loyal user base ever more effectively. EV adoption remains early, as consensus expects EV sales to reach one third of new car sales by 2030, but some analysts have suggested the majority could be EVs by this point based on OEM targets, S-curve adoption models and government emissions mandates. We continue to believe the megatrends of electrification, autonomy and connectivity represent the biggest revolution in the automotive industry since Henry Ford unveiled the Model T in 1908.

Current holdings

Apple, Qualcomm, MediaTek, Taiwan Semiconductor, Tesla, BYD, ON Semiconductor.

Representing 16.3% of net assets at 30 April 2022.

Important Information: This is a marketing communication. Please refer to the Polar Capital Technology Trust plc offer document and to the KID before making any final investment decisions. This document is provided for the sole use of the intended recipient. It shall not and does not constitute an offer or solicitation of an offer to make an investment into any fund or Company managed by Polar Capital. It may not be reproduced in any form without the express permission of Polar Capital. The law restricts distribution of this document in certain jurisdictions; therefore, it is the responsibility of the reader to inform themselves about and observe any such restrictions. It is the responsibility of any person/s in possession of this document to inform themselves of, and to observe, all applicable laws and regulations of any relevant jurisdiction. Polar Capital Technology Trust plc is an investment company with investment trust status and as such its ordinary shares are excluded from the FCA's (Financial Conduct Authority's) restrictions which apply to non-mainstream investment products. The Company conducts its affairs and intends to continue to do so for the foreseeable future so that the exclusion continues to apply. It is not designed to contain information material to an investor's decision to invest in Polar Capital Technology Trust plc, an Alternative Investment Fund under the Alternative Investment Fund Managers Directive 2011/61/EU ("AIFMD") managed by Polar Capital LLP the appointed Alternative Investment Manager. Excluding the UK, in relation to each member state of the EEA (each a "Member State") which has implemented the AIFMD, this document may only be distributed and shares may only be offered or placed in a Member State to the extent that (1) the Fund is permitted to be marketed to professional investors in the relevant Member State in accordance with AIFMD; or (2) this document may otherwise be lawfully distributed and the shares may otherwise be lawfully offered or placed in that Member State (including at the initiative of the investor). As at the date of this document, the Company has not been approved, notified or registered in accordance with the AIFMD for marketing to professional investors in any member state of the EEA. However, such approval may be sought or such notification or registration may be made in the future. Therefore this document is only transmitted to an investor in an EEA Member State at such investor's own initiative. SUCH INFORMATION, INCLUDING RELEVANT RISK FACTORS, IS CONTAINED IN THE COMPANY'S OFFER DOCUMENT WHICH MUST BE READ BY ANY PROSPECTIVE INVESTOR. A copy of the Offer document and Key Information Document (KID) relating to the Company may be obtained online from [https://www.polarcapitaltechnologytrust.co.uk/Corporate-Information/Document-Library/] or alternatively received via email upon request by contacting Investor-Relations@polarcapitalfunds.com.

Investor Rights: A summary of investor rights associated with an investment in the Company can be requested via email by contacting Investor-Relations@polarcapitalfunds.com.

Statements/Opinions/Views: All opinions and estimates constitute the best judgment of Polar Capital as of the date hereof, but are subject to change without notice, and do not necessarily represent the views of Polar Capital. This material does not constitute legal or accounting advice; readers should contact their legal and accounting professionals for such information. All sources are Polar Capital unless otherwise stated.

Third-party Data: Some information contained herein has been obtained from third party sources and has not been independently verified by Polar Capital. Neither Polar Capital nor any other party involved in or related to compiling, computing or creating the data makes any express or implied warranties or representations with respect to such data (or the results to be obtained by the use thereof), and all such parties hereby expressly disclaim all warranties of originality, accuracy, completeness, merchantability or fitness for a particular purpose with respect to any data contained herein.

Holdings: Portfolio data is "as at" the date indicated and should not be relied upon as a complete or current listing of the holdings (or top holdings) of the Company. The holdings may represent only a small percentage of the aggregate portfolio holdings, are subject to change without notice, and may not represent current or future portfolio composition. Information on particular holdings may be withheld if it is in the Company's best interest to do so. It should not be assumed that recommendations made in future will be profitable or will equal performance of the securities in this document. A list of all recommendations made within the immediately preceding 12 months is available upon request. This document is not a recommendation to purchase or sell any particular security. It is designed to provide updated information to professional investors to enable them to monitor the Company.

Benchmarks: The following benchmark index is used: Dow Jones Global Technology Index (Total Return). This benchmark is generally considered to be representative of the Technology Equity universe. This benchmark is a broad-based index which is used for comparative/illustrative purposes only and has been selected as it is well known and is easily recognizable by investors. Please refer to www.djindexes. com for further information on this index. Comparisons to benchmarks have limitations as benchmarks volatility and other material characteristics that may differ from the Company. Security holdings, industry weightings and asset allocation made for the Company may differ significantly from the benchmark. Accordingly, investment results and volatility of the Company may differ from those of the benchmark. The indices noted in this document are unmanaged, are unavailable for direct investment, and are not subject to management fees, transaction costs or other types of expenses that the Company may incur. The performance of the indices reflects reinvestment of dividends and, where applicable, capital gain distributions. Therefore, investors should carefully consider these limitations and differences when evaluating the comparative benchmark data performance. Information regarding indices is included merely to show general trends in the periods indicated, it is not intended to imply that the Fund was similar to the indices in composition or risk. The benchmark used to calculate the performance fee is provided by an administrator on the ESMA register of benchmarks which includes details of all authorised, registered, recognised and endorsed EU and third country benchmark administrators together with their national competent authorities.

 The reports and financial information are extracted from the published Annual Report and Financial Statements for the year ended 30 April 2022 and do not constitute the statutory accounts for that year.

Regulatory Status: Polar Capital LLP is a limited liability partnership number OC314700. It is authorised and regulated by the UK Financial Conduct Authority ("FCA") and is registered as an investment adviser with the US Securities & Exchange Commission ("SEC"). A list of members is open to inspection at the registered office, 16 Palace Street, London, SW1E 5JD. FCA authorised and regulated Investment Managers are expected to write to investors in funds they manage with details of any side letters they have entered into. The FCA considers a side letter to be an arrangement known to the investment manager which can reasonably be expected to provide one investor with more materially favourable rights, than those afforded to other investors. These rights may, for example, include enhanced redemption rights, capacity commitments or the provision of portfolio transparency information which are not generally available. The Fund and the Investment Manager are not aware of, or party to, any such arrangement whereby an investor has any preferential redemption rights. However, in exceptional circumstances, such as where an investor seeds a new fund or expresses a wish to invest in the Fund over time, certain investors have been or may be provided with portfolio transparency information and/or capacity commitments which are not generally available. Investors who have any questions concerning side letters or related arrangements should contact the Polar Capital Desk at the Registrar, Equiniti on 0800 876 6889. The Fund is prepared to instruct the custodian of the Fund, upon request, to make available to investors portfolio custody position balance reports monthly in arrears.

Information Subject to Change: The information contained herein is subject to change, without notice, at the discretion of Polar Capital and Polar Capital does not undertake to revise or update this information in any way.

Forecasts: References to future returns are not promises or estimates of actual returns Polar Capital may achieve. Forecasts contained herein are for illustrative purposes only and does not constitute advice or a recommendation. Forecasts are based upon subjective estimates and assumptions about circumstances and events that have not and may not take place.

Performance/Investment Process/Risk: Performance is shown net of fees and expenses and includes the reinvestment of dividends and capital gain distributions. Factors affecting the Company's performance may include changes in market conditions (including currency risk) and interest rates and in response to other economic, political, or financial developments. The Company's investment policy allows for it to enter into derivatives contracts. Leverage may be generated through the use of such financial instruments and investors must be aware that the use of derivatives may expose the Company to greater risks, including, but not limited to, unanticipated market developments and risks of illiquidity, and is not suitable for all investors. Those in possession of this document must read the Company's Investment Policy and Annual Report for further information on the use of derivatives. Past performance is not a guide to or indicative of future results. Future returns are not guaranteed and a loss of principal may occur. Investments are not insured by the FDIC (or any other state or federal agency), or guaranteed by any bank, and may lose value. No investment process or strategy is free of risk and there is no guarantee that the investment process or strategy described herein will be profitable.

Allocations: The strategy allocation percentages set forth in this document are estimates and actual percentages may vary from time-to-time. The types of investments presented herein will not always have the same comparable risks and returns. Please see the private placement memorandum or prospectus for a description of the investment allocations as well as the risks associated therewith. Please note that the Company may elect to invest assets in different investment sectors from those depicted herein, which may entail additional and/ or different risks. Performance of the Company is dependent on the Investment Manager's ability to identify and access appropriate investments, and balance assets to maximize return to the Company while minimizing its risk. The actual investments in the Company may or may not be the same or in the same proportion as those shown herein.

Country Specific Disclaimers: The Company has not been and will not be registered under the U.S. Investment Company Act of 1940, as amended (the "Investment Company Act") and the holders of its shares will not be entitled to the benefits of the Investment Company Act. In addition, the offer and sale of the Securities have not been, and will not be, registered under the U.S. Securities Act of 1933, as amended (the "Securities Act"). No Securities may be offered or sold or otherwise transacted within the United States or to, or for the account or benefit of U.S. Persons (as defined in Regulation S of the Securities Act). In connection with the transaction referred to in this document the shares of the Fund will be offered and sold only outside the United States to, and for the account or benefit of non U.S. Persons in "offshore- transactions" within the meaning of, and in reliance on the exemption from registration provided by Regulation S under the Securities Act. No money, securities or other consideration is being solicited and, if sent in response to the information contained herein, will not be accepted. Any failure to comply with the above restrictions may constitute a violation of such securities laws.