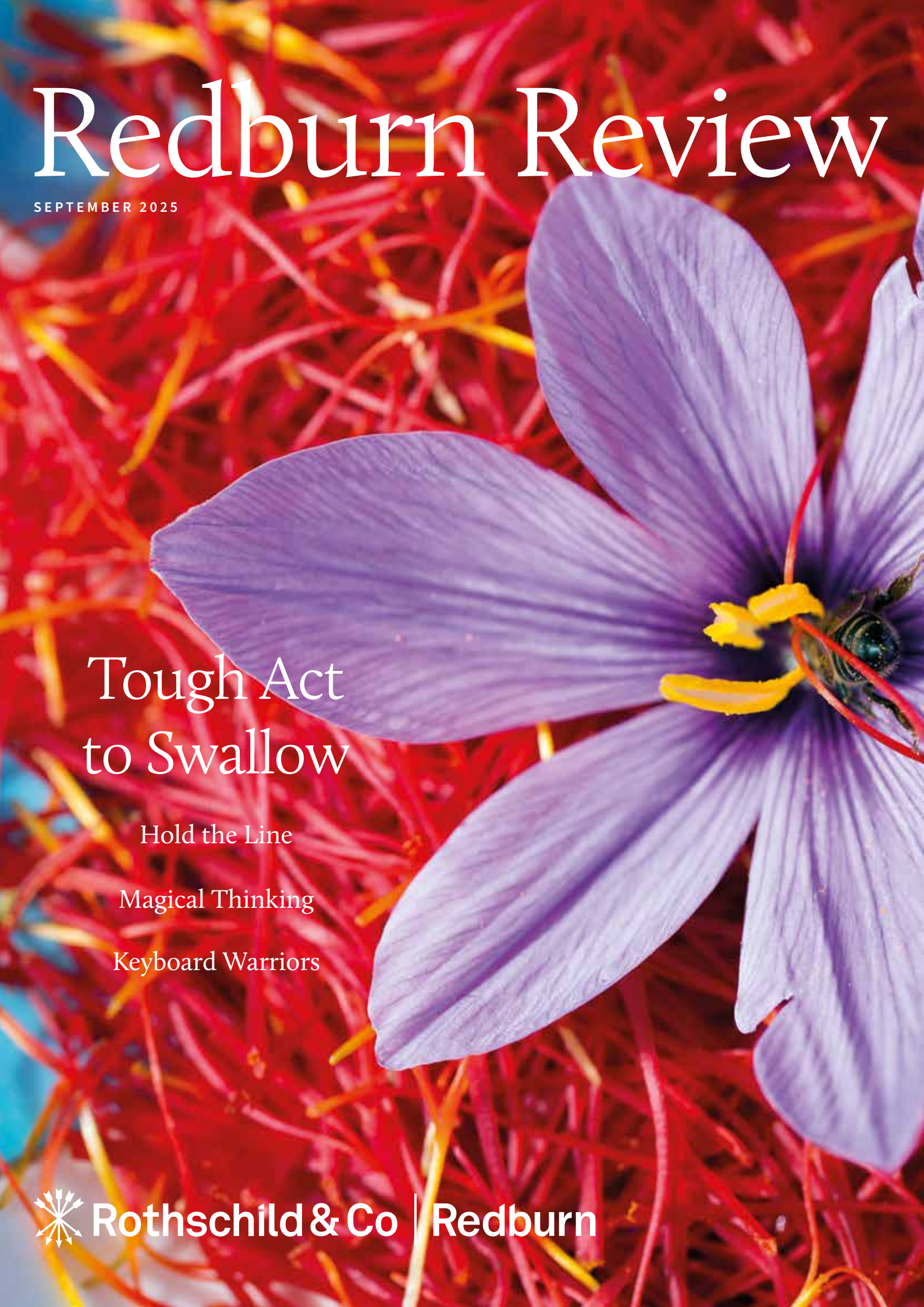
Redburn Review

SEPTEMBER 2025



Tough Act to Swallow

Hold the Line

Magical Thinking

Keyboard Warriors

Rothschild & Co | Redburn

SEPTEMBER 2025

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Editor Archie Cotterell **Production Editor** Jon Sever
Digital Director Joe Shadafza **Sub-Editor** Georgia Martin
Design Consultants Phable **Photos** Getty Images

Editor's Letter

While researching my essay into the IMF bail-out of the UK in 1976, I came across a bizarre footnote. Apparently, the IMF delegates sent to London to negotiate checked into Brown's Hotel in Mayfair under false names. It is near-impossible to conceive why this was necessary. Did they really believe a team of faceless bureaucrats might be in danger in a country they were trying to help?

The problem was one of self-awareness. They were tasked with an important role, but they mistook that for being important people.

Several contributors touch upon this theme, though – IMF delegates aside – in the context of having the self-awareness to address changes in the status quo. Max Findlay discusses the Ukraine telco Kyivstar, which has managed an extraordinary situation superbly. Chris Luyckx examines the response of the US limited-service restaurants to their fundamental offer of convenience and affordability being threatened. Hamilton Faber assesses the pros and cons of gaming, which he has loved for many years. Steve Malcolm acknowledges his prejudices in being an AI sceptic. And Alex Brignall argues people are drawn to padel because they appreciate that, compared to tennis, it is a great leveller.

Self-awareness is a serious problem today. Its lack is most evident in those who cancel public figures or fellow students while professing to be supporters of increased kindness; in those who extol free speech but do not allow the other side a hearing; and – a consequence of our echo chamber age – in those who only see one side of the story.

Ice and a Slice

The Great British Bailout

Archie Cotterell
Editor

My oldest daughter recently qualified as a teacher after completing two years of Teach First. This involved four weeks' online training before being thrown into the deep end in a vast school near Heathrow. The class size was 34. English was the first language of ten children. The number with special educational needs was less easily calculable.

Qualification earned her a pay rise of £4,000 pa. This took her salary from the low- to mid-thirty thousands. One night, apropos a conversation about her finances – she has ballooning student debt – I asked how much of that £4,000 made it to the bottom right-hand corner of her monthly payslip. The answer was £160, or £1920 pa. So, a £4,000 pay rise from the early thirty thousands – hardly a queen's ransom for someone renting in West London – is taxed at a marginal rate of 52%.

The reasons are familiar: fiscal drag and being nudged into a higher student tuition repayment bracket. As such, my daughter's situation is a neat metaphor for the state of the UK. Rising taxes, out-of-control debt and a spiralling cost of living (£4+ for a coffee? £8+ for a pint?) are demolishing spending power. My daughter at least offers high productivity, albeit in a way unmeasurable economically.

At the time of writing – this is a moving target – UK debt stands at 94% of GDP, its deficit at c5.7% of GDP. As a result of almost 25% of its debt being index-linked, the rise in bond yields since the pandemic means borrowing costs have risen dramatically. They are now the third highest among advanced economies. The UK is running budget, current account and balance of payments deficits, all of which apply downwards pressure on sterling.

The option of cutting vertigo-inducing welfare expenditure was considered by the current Labour Government but rejected by its backbenchers, leaving higher taxes as the only realistic alternative.

This means health- and disability-related welfare spending alone is on a trajectory to reach £100bn by 2030, never mind the amount needed to sort everything from potholes to the police, schools to social care. Given higher taxes in parallel with employee National Insurance and minimum wage hikes, and pro-employee legislation, are unlikely to ignite productivity or increased employment, the country finds itself in a fiscal bind that is beginning to look suspiciously like a debt (or death) spiral.

There are echoes of a previous high tax, low growth era under a Labour government that did not end well. While the symptoms are different, the causes are similar.

On that occasion, the roots of the crisis lay in the 'Barber Boom'. This was Tory Chancellor Anthony Barber's ill-conceived growth-oriented 1972 budget, which ignited old-style inflation peaking at 27% – inflation exacerbated by the oil price spike accompanying the 1973 Yom Kippur War, untamed trade unions and ravenous wage demands. It was barely contained by the 1974 recession. Industry withered, exports weakened, borrowing soared, the current account deficit widened. A National Institute for Economic & Social Research report concluded, 'It is not often that a government finds itself confronted with a possibility of a simultaneous failure to achieve all four main policy objectives: adequate economic growth, full employment, a satisfactory balance of payments, and reasonable, stable prices.' Throw in a yawning budget deficit and a declining currency and, unsurprisingly, domestic institutions and foreign investors proved reluctant to buy gilts.

Faced with a teetering economy, Labour Prime Minister James Callaghan proposed a white paper designed to cut the budget deficit. But, in a move analogous to parliament today, Michael Foot and assorted left wingers opposed it.

As the post-war Bretton Woods System of managed exchange rates collapsed in slow motion between the 'Nixon shock' of August 1971 and 'Jamaica Accords' in 1976, so Callaghan's wobbling government sought to 'manage' sterling in an increasingly floating-rate era. Despite its efforts, between 1972 and 1976 the pound fell 20%, a collapse leading to crisis.

Denis Healey, the then Chancellor, was enjoying a gin and tonic at Heathrow prior to boarding a plane to the IMF annual meeting when he received the call telling him the currency was in freefall and he must return to Whitehall to seek a bailout from the IMF.

On 1 November 1976, an IMF team checked into Brown's Hotel in

Till the pips squeak

Mayfair. They used false names, a subterfuge which feels unnecessary if not self-delusional (would anyone really be interested in the members of an IMF delegation?). In return for a handout, they demanded tighter monetary policy, a cut in the Public Sector Borrowing Requirement, as the budget deficit was then known, and wage restraint. The left wingers in the Cabinet refused to accept reality and rejected the deal. 'Goodbye, Great Britain' sang the headline in the *Wall Street Journal*.

Under extreme pressure, the refuseniks fell into line. A £3.9bn loan was agreed. Most was used to repay central banks, which had loaned money to support sterling during its decline. Although Denis Healey later claimed it hadn't been needed, and an economist was "a man who when you ask him for a telephone number gives you an estimate", no one was listening. Yet the government did only ever draw down half of the loan, which was finally repaid on 4 May 1979, symbolically the day after Margaret Thatcher came to power.

Today, we have a Labour government similarly constrained by its left wing from taking essential spending decisions. The pandemic and Russia–Ukraine energy shocks were inflationary events akin to the oil crisis of 1973. There are hefty current account and budget deficits. The country is caught in a debt spiral. Gilt yields are uncomfortably high.

Fortunately, there are differences too. Compared to the 1970s, inflation is quiescent if resilient. Sterling is not in freefall – it is benefiting from the machinations and unpredictability of President Trump. Capital markets and currency flows are deeper than in the mid-1970s. And an independent Bank of England offers some defence against spendthrift politicians, though it is not impregnable.

There is no room for complacency. As the Labour government pays off doctors and railwaymen, stands by the unaffordable Conservative pork barrel of the 'triple lock', and floats the possibility of a 'wealth tax', one is reminded of another parallel with the mid-1970s.

In 1975, under Denis Healey, the top rate of tax on earned income was 83% and on unearned income 98%. In certain circumstances, it was possible to pay 102%. Given the outcome - IMF bailout, Winter of Discontent, industrial decline, electoral evisceration – it could be argued Healey proved categorically you cannot tax your way to growth.

While these levels have not (yet) been broached by the current government, frozen thresholds and national insurance mean more people are paying more tax on lower income than ever before. The effective rate for middle earners such as my daughter – who may or may not conform to the government's absurd contortions over the definition of 'working people' – is rising remorselessly. This is in addition to hikes in council tax, residents' parking, ULEZ zones and the endless fines for minor vehicle infractions that act as *de facto* addenda to local taxes.

Each time Rachel Reeves raises taxes she narrows the pathway to growth, undermines her chances of adhering to her own fiscal rules and renders the possibility of an 'IMF event' more likely. If that occurs, my daughter may look back fondly at the days when she was only taxed at 52% on a four grand increase on a salary of thirty-odd thousand.

Tough Act to Swallow

Repositioning Limited-Service Restaurants

Chris Luyckx
Transport & Leisure Research

For decades, America's limited-service restaurants have built their appeal on convenience and affordability. But the economics of that promise are under strain.

There has been much discussion around the persistent weakness of the lower- and middle-income consumer, yet the bottom 40% of households represent roughly 20% of all restaurant spending. This group is acutely sensitive to absolute price points, especially when grocery remains a ready substitute. Since 2019, limited-service menu prices have risen c38%, full-service restaurants are up 34% and grocery prices have climbed 30%. While the one-year gap between restaurant and grocery pricing has narrowed, back towards its long-term average of around 1%, the two-year 'stack' gap remains 5%. That is below its peak of 7%, but well above the historical norm of c2%.

This has left the value proposition of eating out on shakier ground. A $7 or $8 combo meal that once felt routine is now $10 or more and increasingly feels like an indulgence. After years of leaning on price increases to protect margins, the industry finds itself at an inflection point. If customers are to return, operators must rethink not just what they charge, but how value itself is constructed and delivered.

McDonald's epitomises both the challenge and the emerging response. Long celebrated as the industry's paragon of affordability, the chain has in recent years suffered a value perception issue. This summer, the company moved decisively to reclaim its ground. After striking an agreement with franchisees, McDonald's announced it would cut prices on eight popular combo meals by roughly 15%, bringing them below the cost of ordering items separately. Beginning in September, 'Extra Value Meals' will feature $5 breakfast bundles and $8 Big Mac or McNuggets deals. What makes this move notable is not simply the pricing, but the structure: McDonald's itself will subsidise operators for any revenue shortfalls. For the first time in years, the company is treating value not as a tactical promotion but as a coordinated, system-wide investment in traffic.

The echoes of history are loud. During the last downturn, McDonald's deployed its Dollar Menu with similar vigour. In 2008, as the US economy weakened, it began promoting $1 cold drinks in some markets, extending the deal to beverages of all sizes by 2010. Customers responded enthusiastically. Between 2008 and 2011, McDonald's sales grew faster than the broader fast-food industry. For families squeezed by recession, the promise of a reliable $1 indulgence proved irresistible.

But success came at a cost. Inflation pushed input prices higher, and franchisees struggled to maintain margins. By 2012, consumer goods prices had climbed 28% compared with a decade earlier. What had been traffic driving became profit draining. Burger King experienced similar drama. Its attempt to compete with a $1 double cheeseburger sparked a lawsuit from franchisees in 2009, who argued they were being forced to sell sandwiches at a loss. The company raised the price in 2010. Wendy's, which had built its reputation around a 99-cent menu, followed suit three years later, nudging prices upwards. Even McDonald's eventually retreated. In November 2013, it rebranded its Dollar Menu as the 'Dollar Menu & More', with items priced between $1 and $5. "We knew we couldn't maintain the $1 price point," then–CFO Peter Bensen admitted in 2014.

That history arcs over the industry today. Anchoring value in absolute price points can work in the short run, but without structural support it collapses under inflationary pressure. The lesson of the $1 era is that value must be sustainable for operators as well as attractive to consumers.

McDonald's' decision to subsidise franchisees today marks an effort to avoid the destructive conflicts of the past. It is also recognition that with inflation expectations elevated, cheap anchors cannot be maintained without corporate backing.

Yet pricing is only part of the solution. Consumers are attuned not only to what they pay but to what they receive. In recent years, "skimpflation" has entered the vocabulary, amplified by viral videos showing lighter Chipotle bowls or smaller servings of fries. Whether accurate or not, the perception is corrosive. Customers now judge value by sight as much as by receipt. Rebuilding that trust requires portion integrity: standardised scoop sizes, clear visual communication, and a willingness to make things right when expectations are not met. A simple promise – six ounces of protein per bowl guaranteed – can

'M'ore than just price

do more to restore credibility than a coupon ever could.

Menu design plays a complementary role. With beef costly, chicken has become the workhorse protein, enabling chains to deliver hearty meals in the $5 to $9 range while preserving margins. The key is to market chicken not as compromise but as indulgence, letting beef-led products hold premium ground. Taco Bell's tiered Luxe Cravings Boxes, spanning $5, $7 and $9, illustrate how customers can self-select value without feeling forced downmarket. The barbell approach – everyday entry points one end, crave-worthy premiums the other – provides flexibility without undermining economics.

Operational speed is equally central. In limited-service dining, time is the second price customers pay. A slow, error-prone drive-thru undermines even the sharpest deal. Studies show that clear intercoms, order confirmation boards, and streamlined processes improve both speed and accuracy. Chains that invest in throughput gain more than happier customers; they gain capacity. Chick-fil-A's two-story drive-thru prototypes and Chipotle's 'Chipotlanes'. demonstrate how infrastructure changes can drive double-digit sales lifts. Unlike discounting, these improvements endure.

Loyalty programmes, too, need recalibration. Most major chains now have apps and rewards, yet data shows loyalty members still patronise around twenty brands a year – the same as non-members. Enrolment alone is no moat. What matters is whether programmes drive incremental visits at targeted times. Starbucks has begun shifting its programme towards operational perks and curated offers, rather than blanket discounts. Quick-service peers could follow suit, using weekday breakfast streaks, app-only fast lanes or snack-time incentives to smooth demand across the day. By focusing on time saved rather than dollars off, loyalty can reinforce convenience while protecting margins.

Geography complicates the picture. Return-to-office remains uneven, with downtown lunch traffic subdued. Office occupancy in many US cities remains around half pre-pandemic norms, with peaks midweek and troughs on Mondays and Fridays. Suburban drive-thrus and commuter corridors remain stronger. National campaigns that ignore these shifts risk missing the mark; localised offers and staffing strategies following the new rhythms of demand are essential.

Dinner occasions represent another underleveraged opportunity. Grocery has regained its relative advantage, but family bundles priced around $20 to $25 can still compete if presented boldly. A chicken bucket with sides and drinks, prominently marketed, can recapture the weeknight family dinner from the supermarket. Positioned correctly, it reframes limited-service not as an individual indulgence but as a convenient, affordable group solution.

Labour pressures round out the challenge. California's $20 minimum wage for fast-food workers illustrates the new normal of higher operating costs. Passing these directly to customers is tempting but unsustainable. Smarter scheduling, simplified menus and throughput improvements can absorb part of the impact. The rest must be justified by visible service improvements. Faster lines, better accuracy and more consistent experiences make higher prices easier to swallow.

The industry thus finds itself in a familiar but more urgent place. In the last cycle, the Dollar Menu proved sharp anchors can bring traffic but collapse without sustainable economics. Today, with menu prices nearly 40% higher than in 2019 and inflation expectations sticky, the risk of repeating history is real. The difference is McDonald's' willingness to share the burden with its operators. That alignment may prove decisive.

Ultimately, value is not defined by the cheapest possible meal. It is defined by fairness – by the sense the price matches the portion, speed and convenience. The combination of credible entry-level bundles, portion transparency, throughput investment, smarter loyalty design and targeted family offers provides a path to regain traffic without sacrificing sustainability. History suggests price cuts alone will not suffice. They must be embedded in a broader structure of trust and operational excellence.

Traffic responds quickly when customers believe they are getting a fair deal. In an industry where volume drives profitability, traffic is the difference between stagnation and growth. The last five years taught limited-service restaurants to survive by raising prices; the next five will test whether they can thrive by restoring value.

HOLD THE LINE

The Challenges Facing Ukrainian Telcos

Max Findlay
Telecommunications Research

In Ukraine, you are alerted to an impending airstrike when a loud disconcerting air raid siren erupts from your phone. If you are far enough from the front, you scroll online to establish what caused the siren and establish how much time you have to find a shelter. If you do need shelter, after an indeterminate amount of time, a second, more reassuring, sound from your phone will announce the passing of danger, allowing you to resume your day.

The importance of a functioning mobile network cannot be understated. If a network goes down, it can get scary, very quickly.

In October 2022, I had arranged to meet a surgeon in Lviv to hand over medical mannequins to help him teach paramedics about traumatic injuries, preparing them for what they would face on the front line. However, several hours before our rendezvous, the phone network in Lviv went down as the city was hit with its first serious airstrikes since the start of the war. Hunkered in a bomb shelter with some friendly Ukrainians, it was painfully evident the lack of signal meant no one could receive the message alerting us to the end of the strike. In the end I made a dash for it. Fortunately, the mannequins were handed over safely as planned.

At the time, as a budding accountant, I gave little thought to the telcos responsible for keeping Ukraine's mobile networks operational. However, Rothschild & Co's role as lead financial advisor to Veon during the listing of its Ukrainian subsidiary, Kyivstar, provided a second opportunity to consider the challenges. Learning about Ukrainian telecoms has reinforced the sobering consequences of war but also offered insight into the resilience of the Ukrainian people, albeit through a telco lens.

Warzone or not, telcos aim to sell mobile and broadband subscriptions to as many customers as possible. A successful telco gradually raises the price of subscriptions (P) and grows its customer base (Q). Given the high fixed costs associated with a telco business, telcos operate with high operational leverage meaning small changes to the P or Q have outsized impacts on profits.

For the three wireless operators (Kyivstar, Vodafone, Lifecell), the Q suffered most following the invasion as millions of Ukrainians fled the country. The population living in Ukrainian-controlled territories is estimated to have declined by roughly eight million, or c15%, of the pre-war mobile customer base. The mass exodus had obvious ramifications, as roaming charges meant those who left opted for telco providers in their host countries, reducing the Ukrainian customer base.

The changing population dynamics had an unequal impact on wireless operators. Vodafone Ukraine, operated by Azerbaijani wireless operator Bakcell, lost 20% of its base in the first year of the war. This was considerably more than Kyivstar's 5.5%, as Vodafone Ukraine's customers were predominantly in the south and east where the fighting was taking place.

The emigration continues. Kyivstar lost 600,000, or 3%, of its customers in 1H25. This is not a consistent percentage as quarterly 'net adds' fluctuate with expectations for the war and seasonal variations, swinging far more than for typical telcos. The summer quarter, Q3, tends to show lighter net losses as Ukrainians return to visit family. It is also generally considered to be a slightly safer time as Russian missile strikes lean towards winter to target energy infrastructure.

Should hostilities end one would expect telcos to be among the early 'winners' as Ukrainians return. However, the timing and quantum are near-impossible to predict given uncertainties over the post-war settlement and how many Ukrainian refugees will want to leave their host countries.

Faced with a rapidly declining core market, Ukrainian telcos have modified their products to reduce the decline. They have done this primarily by offering emigrants the opportunity to continue using their existing plan (the minutes and data they have paid for) in other European countries for no extra charge. There is a cost to the telcos in doing this, as they are losing out on high margin roaming revenues, but it makes sense to forgo these to defend the customer base. Given Ukrainian tariffs are the cheapest in Europe, there is an incentive for Ukrainians not to switch to a local operator. The measures appear to have had some success. Kyivstar estimates 1.2 million, or 5%, of its customers have taken its 'Roam Like at Home' service.

Kyivstar has also innovated its product portfolio. Its acquisition of Uklon, essentially the Ukrainian Uber, allows it to profit from the digitalisation of Ukrainian society in a way no other Western telco can

replicate. Its digital services segment now comprises c15% group revenues and is growing at 40% per annum. Any Western telco CEO seeking inspiration for product innovation need look no further than Kyivstar.

The price (P) of telco services was also hit by the war but in less obvious ways. The after-effects of COVID combined with the impact of the war led to 20% domestic inflation in 2022. Much of this was passed on through higher prices for customers. As phone bills are small ticket items (the average monthly cost is c$3.50) telcos could increase prices in Ukrainian hryvnia without causing major churn in their customer bases. They have continued to raise prices at an average of c12.5% per annum since the beginning of the war.

Whilst pricing held up, a cocktail of domestic inflation, burgeoning budget deficits, the loss of investor confidence post-invasion and a host of other factors led to the depreciation of the Ukrainian hryvnia against the US dollar. This caused a double-digit percentage FX problem with ARPU growth of 11.8% in local currency in 2022 translating to -6.5% in dollar terms. Given Kyivstar reports in US dollars, this has meant solid domestic topline performance (9.5% CAGR since 2022) has translated into a declining top line, albeit remarkably impressive given the circumstances at a -2.5% CAGR.

Beyond the top line, costs have increased owing to direct and indirect consequences of war. Some would expect, for example the increased maintenance and repair of sites destroyed by airstrikes, but there have also been less obvious costs, such as the fall-out from Kyivstar network disruption following a Russian sponsored cyber-attack.

The changes to Kyivstar's power costs illustrates the indirect consequences of war. For a wireless network to operate, each cell tower needs an uninterrupted energy supply to power the hardware that enables wireless communication. Before the war, Ukrainian telcos powered their networks with some of the cheapest electricity in the world as they had access to Russian energy and plentiful domestic power.

When comms are down

Since then, energy supplies from Russia have been cut and some Ukrainian power resources have been rendered inoperable or are occupied (e.g. the Zaporizhzhia power plant). As a result, energy prices have increased one-third since 2022. Not only have electricity prices increased but telcos have been forced to invest to increase the resilience of their networks. As the Lviv locals found, a disruption to a telco's energy supply will disrupt the network. And if your customers don't trust you to maintain service, they will find a provider who will.

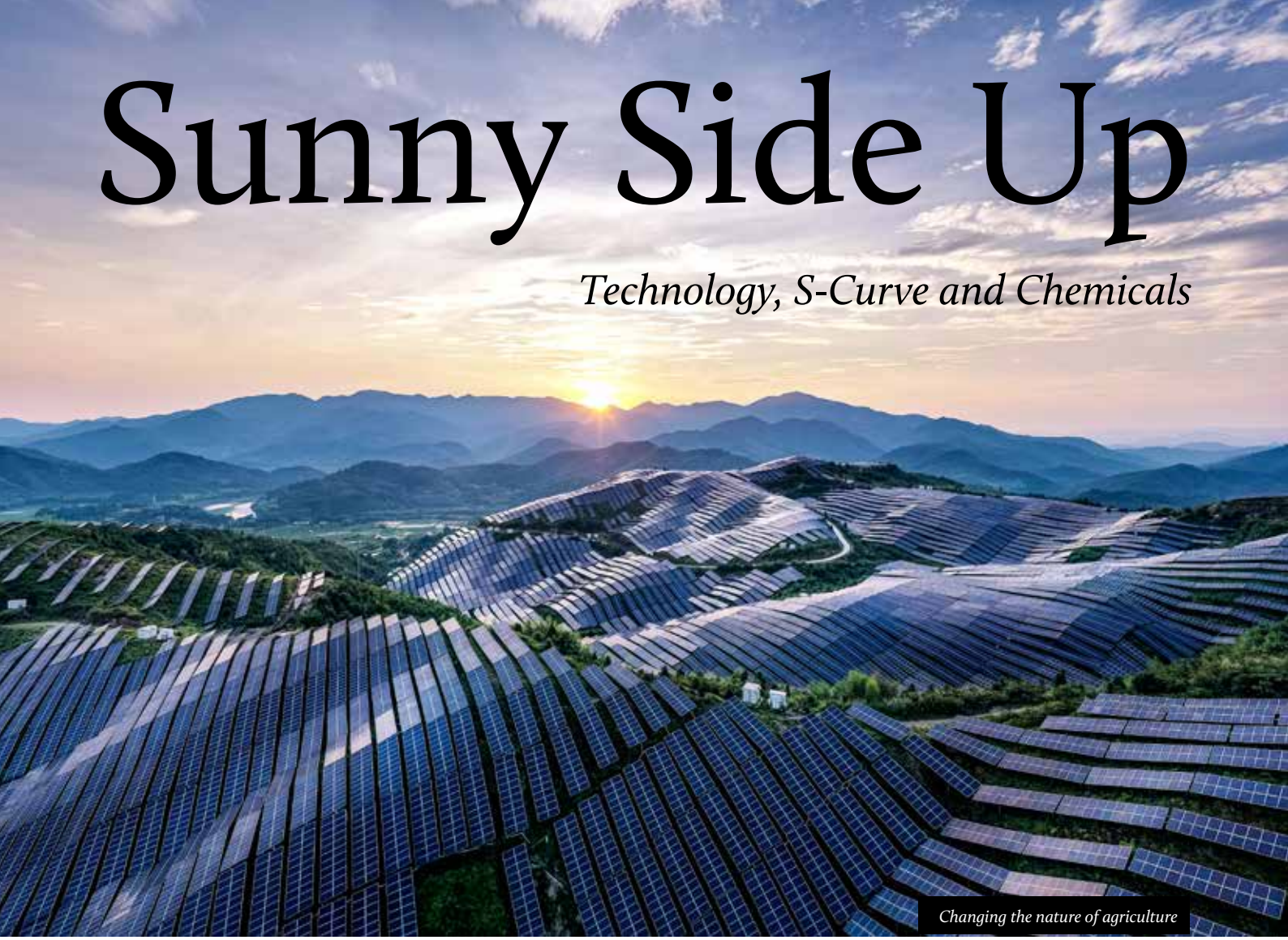
To prevent this, operators have invested substantial amounts into secondary energy sources such as diesel generators and electric batteries which can be utilised in the event of grid failure. Kyivstar has installed an astonishing 176,000 batteries and 2,600 diesel-fuelled generators meaning it can run its entire network for ten hours in the event of a main grid outage.

The Russian invasion has created serious challenges to Ukrainian telco operators. Their customer bases have declined, their costs have increased and capex has been elevated. These challenges have largely been met. Impressive product innovation and revenue diversification have largely limited the financial impact although, as is the norm for companies operating in frontier markets, it has been very difficult to offset the FX decline.

Investors will have their own views over how the war will play out and their own risk appetite, but Kyivstar looks well placed in the event of an end of hostilities. As the only Ukrainian pure play company listed in the US, it is an interesting equity, one offering a unique opportunity to benefit from post-war reconstruction.

Sunny Side Up

Technology, S-Curve and Chemicals



Changing the nature of agriculture

Mazahir Mammadli
Chemicals
Research

There are few occasions when an article changes one's outlook on the future profoundly. For me, *The Sun Machines* in *The Economist*'s 22 June 2024 edition was such an essay. My first reaction was: 'Did we just innovate ourselves out of the climate crisis?'

Subsequently, I have thought about the topic almost daily, and the implications for the future of our economies and geopolitics, the enormous change it could bring to industries ranging from food to transportation to manufacturing and, closer to home, to chemicals. The more I think about the consequences, the lower my jaw drops. Becoming a part-time futurist is fun, it turns out. More fun than putting a terminal growth rate in your model and overlooking the long-term future of the industry you are analysing.

The article has a powerful thesis. It argues solar power is becoming so cheap, so fast, that by the mid-2030s it will be the world's largest source of electricity, and by the 2040s it will be the largest source of energy. Learning curve mechanics makes further cost declines almost an inevitability. The higher the cumulative production of solar panels, the lower the cost per unit. Lower costs combine with demand elasticity to unlock further demand and thus more solar deployment, which leads to even greater cost declines. For example, the yet-to-be-unlocked air conditioning demand in Africa alone is estimated at 2TWh. Given 40% of the cost of production of polysilicon, the most important input of solar panels, is energy, which will become cheaper on account of the same solar panels it goes into, the positive feedback loop is obvious. We are entering an era of cheap energy globally.

Energy costs are critical for a huge chunk of the chemicals industry, so the potential is transformative. Take industrial gases. Air separation units are energy-hungry beasts. The standard practice is to pass through energy costs to customers, so a fall in power prices would not have a direct impact on the likes of Linde, Air Liquide or Air Products. But that is to look though too narrow a lens. Because cheap energy's real contribution is to unlock demand for industrial gases.

The clearest case is hydrogen. Today, green hydrogen produced by electrolysis is a government-supported infant industry, dependent on subsidies and offtake guarantees. Yet if the cost of both electricity and electrolysers falls sharply in the coming decades, hydrogen can

transition into the mainstream and become a stable part of the revenue mix, not unlike oxygen and nitrogen.

The implications go far beyond fuel cells used in transportation. Hydrogen is a key feedstock in refineries, steelmaking, fertilisers and synthetic fuels. For industrial gas companies, the market could be many multiples larger if hydrogen economics shift decisively.

If industrial gases represent a straightforward demand unlock, agriculture is a web of competing first-, second-, and third-order effects. Continuing the hydrogen theme, green hydrogen can be used to produce cheap ammonia, the backbone of nitrogen fertilisers. That in turn lowers the cost of food production. Lower fertiliser costs could render previously marginal land economically viable, boosting agricultural output worldwide and driving higher demand for inputs. On the flipside, cheap green hydrogen can also be used to produce synthetic fuels, potentially replacing bioethanol made from grains and oilseeds.

For example, more than 35% of corn demand in the US derives from bioethanol. Globally, the figure is 25%-30%. If that demand disappears by the middle of the century, it is a serious potential challenge for agricultural input demand. Corn growers are the biggest customers of fertilisers, pesticides and genetically modified seeds.

Then there is vertical farming. High energy bills have long been the biggest barrier to scaling vertical farms beyond niche vegetables and herbs. With cheap solar, the economics improve drastically. Sealed and controlled environments in vertical farms mean minimal pest pressure, potentially slashing demand for pesticides. If vertical farming extends even into mid-scale crops, the hit to traditional agrichemicals could be substantial.

Irrigation, too, will be transformed. Desalination is essentially an energy problem. With cheap energy, irrigation costs will plummet, bringing millions of acres of currently barren land into production. On one hand, this can boost demand for agricultural inputs; on the other, it has the potential to reshape the global agricultural cost curve. If large tracts of new land enter production, previously marginal but chemically intensive farms may be displaced. The net effect on demand could go either way.

Given the potential challenges the agrichemicals industry faces, is it all doom and gloom? The short answer is no. The long answer involves the *acronyme du jour*: AI. Agrichemicals is an industry where the transformative role of AI is most promising.

New molecule discovery is a costly and time-consuming aspect of agrichemicals R&D. Over the past decades, we have seen a slowdown in R&D productivity, with expenditure rising every year but the number of new molecules and seed traits introduced to the market falling. Failure rates are high, and the regulatory process cumbersome. With AI, these processes can be streamlined, both in terms of time and cost. Whoever leverages AI successfully will reap huge rewards.

Again, the price of electricity is critical. With the cost of model training reduced by cheaper energy, more sophisticated AI models can be developed. In twenty to thirty years, our understanding of biochemistry will have evolved so dramatically that, looking back, the body of knowledge we have today will appear rudimentary.

Bioethanol is not the only feedstock that risks being replaced by cheaper hydrogen-based alternatives. Today, the vast majority of olefins and aromatics – the building blocks of plastics – are produced from oil and gas. But with cheap hydrogen and captured CO_2, pathways such as synthetic methanol or Fischer-Tropsch processes could scale competitively. Oil's role as a chemical feedstock could be eroded. Production costs of plastics may fall sharply as fossil fuel dependence diminishes. The potential for a seismic change in the petrochemicals industry is huge.

As an equity analyst, I wonder to what extent this potential transformation is reflected in stock valuations. Implied long-term growth rates baked into the current stock prices indicate little is priced in.

Richard Foster's S-curve model explains why this might be the case. New technology adaptation invariably follows an S-curve trajectory, broken down into three phases. In the emergence phase, we are at the flat part of the curve. Technological improvement is slow, and the novel technology looks expensive, clunky and unreliable compared to the incumbents. As improvements occur, the technology progresses and its adaptation rises fast. This is the rapid improvement phase, which corresponds to the steep middle section of the curve. Most analysts are oblivious to the transition from the emergence to the rapid improvement phase. By the time they realise it has happened it is too late, and stock valuations have adjusted. Analysts can be equally oblivious to the transition from the rapid improvement to the maturity phase, which corresponds to the flattening top of the curve. This occurs when technologies hit their physical, economic or practical limits, and further improvements are merely incremental.

There is sufficient evidence to suggest solar technology has entered the rapid improvement phase. However, corresponding energy price deflation is yet apparent, and the adjacent technologies we discussed are still in the early stages of the emergence phase. Progress looks slow, but you need to zoom out to see where we could be heading.

For more than a century, energy has been the constraint around which industries were forced to optimise. Remove that constraint and the consequences ripple through every value chain. The possibilities are endless.

Instrumental

The Proteomics Toolbox

Natalya Davies
Medical Technology Research

Proteins – intricate assemblies of amino acids – form the molecular scaffolding of life. During my undergraduate studies, a memorable tutorial involved an unconventional pedagogical tool: each student selected a favourite amino acid, studied its physicochemical properties in depth and participated in a 'drinking game' whereby we took a sip each time our chosen molecule matched a described reactivity or behaviour under varying pH conditions. I selected histidine, a logical choice given its pivotal role in the catalytic triad that underpins enzymatic activity. Ironically, in a subsequent exam, I failed to recall its structure. My tutor, equal parts amused and appalled, circled the blank space and wrote in bold: 'This is meant to be your favourite amino acid'. Needless to say, I have not forgotten the structure since.

This early encounter with amino acid biochemistry was, in hindsight, a primer for the vast and complex field of proteomics – the large-scale study of the proteome, or the full complement of proteins expressed by a cell, tissue or organism at a given time. Unlike the rather more static blueprint of the genome, the proteome is dynamic, context-dependent and intricately regulated through post-translational modifications, conformational changes and interaction networks.

The instruments involved in proteomics are just as labyrinthine. Decoding this biochemical flux requires analytical tools of exceptional sensitivity and resolution. The broader life science tools market is expected to grow at a 4-6% CAGR, albeit policy-related headwinds in the US raise questions around achievability. Within this market, proteomics remains a notable area of burgeoning growth with estimates pointing to a low-teens CAGR. With biological therapeutics dominating pipelines and AI drug design relying on molecular data, proteomics is becoming less of a luxury and more of a necessity.

So how has proteomics evolved? In just a few decades, the field has leapt from characterising single proteins to decoding entire proteomes. At the heart of this renaissance lies mass spectrometry (MS), a century-old invention that began life as the 'parabola spectrograph' and first proved the existence of nonradioactive isotopes. Today, it's the analytical workhorse of proteomics.

MS works by ionising molecules, sorting them by their mass-to-charge ratio via electromagnetic fields, and detecting them at a now unprecedented sensitivity. Two decades ago, low-resolution ion traps were limited to identify only 500-1,000 proteins.

Today, high-resolution platforms routinely quantify over 10,000 proteins in cell lysates and c2,000 in plasma, despite the latter's higher complexity, with protein concentrations spanning ten orders of magnitude. Paired with liquid chromatography (LC-MS) to pre-separate complex protein mixtures, these systems form the backbone of modern proteomics, enabling high-throughput, quantitative analysis of biological samples.

The c$7bn MS market is growing at a 5-7% CAGR, underpinned by continuous innovation in resolution, sensitivity and speed. Thermo Fisher Scientific leads the field with over 25% market share, anchored by its high-resolution Orbitrap platform, which remains the gold standard in proteomics. Orbitrap systems determine mass by capturing ions in stable electrostatic orbits around a central spindle-shaped electrode. As ions oscillate along the electrode's axis, they induce image currents in detector plates. The frequency of these currents enables precise mass determination of biomolecules with ultra-high resolution.

In mid-2023, Thermo launched its Orbitrap Astral MS. This has seen exceptional demand at c$1m per instrument. Astral achieved the highest publication volume of any high-resolution mass spectrometer in its launch year, with a study demonstrating the quantification of over 122,000 unique peptides (short chains of 2-50 amino acids) and 38,000 protein groups (sets of proteins distinguished due to shared peptides) within a thirty-minute run, a quantum leap for metabolic pathway analysis. In 4Q24, Thermo reported strong MS growth, a critical contributor to the above-market 8% organic revenue increase in its Analytical Instruments division.

With demand for deep proteomic insight surging across oncology, neurology and precision medicine, Orbitrap's unrivalled resolution cements its role as a bedrock of next-generation drug discovery

and a strategic lever in the evolving biopharma toolkit.

Thermo's deepening conviction in the proteomics landscape was evidenced by its $3.1bn acquisition of Olink in July 2024. Olink's proprietary Proximity Extension Assay technology enhances Thermo's mass spectrometry capabilities, offering a library of 5,000+ protein biomarker assays detectable from just 1µL of blood plasma. Thermo projects mid-teens organic growth, bolstered by a burgeoning demand for personalised medicine. The acquisition should yield cost synergies within Thermo's Life Science Solutions (LSS) and Analytical Instruments divisions, benefiting margins, with management forecasting $125m adjusted operating income for Olink by year five, implying a margin of c30%, versus the Thermo group 23%.

Bruker, a pure-play proteomics specialist, is gaining share through its proprietary Trapped Ion Mobility Spectrometry Time-of-Flight (timsTOF) MS platform, increasingly integral to next-generation, high-throughput discovery workflows. The addressable market for timsTOF across proteomics, metabolomics and lipidomics is estimated by Bruker at $1.2bn. MS constitutes the bulk of revenue within its BSI CALID division, which has compounded at 12% (2019-24) and accelerated to mid-20% at a constant exchange rate in 1Q25 with double-digit growth cited in life science MS driven by timsTOF. While timsTOF lacks the ultra-high resolution of Orbitrap for granular post-translational modification analysis such as phosphorylation or methylation, its exceptional speed and sensitivity position it as a leading tool for large-scale protein identification, particularly in applications such as biomarker discovery and the profiling of complex biological systems such as the tumour microenvironment, where depth and throughput are paramount.

Within mass spectrometry-based proteomics, liquid chromatography (LC) columns are critical to peptide separation, with formats spanning nano to microflow, reverse-phase to ion-exchange – each shaping sensitivity and thus biological insight. While Agilent and Waters lead in LC-MS for quality assurance and quality control applications in pharmaceutical manufacturing (circa one-third of the market each), both have carved out a strong niche in chromatography for proteomics workflows, leveraging decades of technical leadership.

Agilent's AdvanceBio and Waters' Acquity UPLC M-Class System column technologies are embedded in high-sensitivity workflows where separation quality directly impacts discovery outcomes. This is a classic razor-and-blade model: columns degrade, workflows expand and high-margin consumables drive recurring revenue (c60% of Agilent and Waters' revenue is recurring), while instruments follow a predictable five-to-seven-year replacement cycle – a quietly compounding annuity within the broader proteomics market.

Reagents are integral to proteomics. They enable sample preparation, digestion, enrichment and quantitation. Prime categories include enzymatic digestion kits (trypsin, Lys-C) and affinity reagents for phosphopeptide enrichment. As workflows scale, demand for standardised, high-performance reagents drives one of the industry's most attractive growth areas. According to BioSpace, the $28bn proteomics market (2024) derives nearly 75% of its value from reagents and consumables. Thermo Fisher dominates, with flagship offerings like its SMART Digest kits and Tandem Mass Tag reagents capturing high-margin, recurring revenue within a rapidly expanding consumables ecosystem.

Given the geographic distribution of clinical trial activity, the US remains the most important market. According to IQVIA, US-headquartered companies have led global trial starts every year since 2013, accounting for 35% in 2024, ahead of China (30%), Europe (21%) and Japan (3%). Mass spectrometry developers, JEOL and Shimadzu, exhibit strong domestic reliance: 38% of Shimadzu's Analytical and Measuring Instruments divisional revenue and 71% of JEOL's revenue derives from Japan.

Thus, proteomics is emerging as a high-growth frontier for mass spectrometry. It remains in its infancy, trailing its more established counterpart, genomics, albeit we expect it to undergo a similar inflection as occurred in genomics two decades ago.

Genomics, the study of an organism's complete set of DNA, was propelled by sustained platform investment from the likes of Illumina, BGI and Oxford Nanopore, which drove sequencing costs down from c$100m to under $1,000 per genome, enabling unprecedented scalability and clinical adoption.

By contrast, proteomics continues to face bottlenecks related to sensitivity, throughput and quantification, particularly at the single-cell level. Today, even the best mass spectrometry workflows identify c10,000 proteins per sample – a fraction of the dynamic proteome in a human cell (c100,000+ proteoforms). These constraints define the frontier and the opportunity.

The complexity of the proteome dwarfs that of the genome – 20,000 genes yield hundreds of thousands of dynamic, post-translationally modified proteins. Future gains in instrument sensitivity, sample preparation and data acquisition speed could double or triple proteome coverage per experiment.

Life science tools stocks have taken a beating year-to-date with the S&P Life Sci down high double digits. With the looming biotherapeutic patent cliff overhang and concurrent strength of the burgeoning proteomics market, it appears a prime time to re-evaluate the sector.

A Big Deal

M&A in Beauty

Kyriaki Koutta
Food and HPC Research

Imagine this: you have a beauty brand idea; you launch it, and in under three years it generates more than $200m in annual revenues; then a major player in the industry offers to buy the brand for $1bn. This may seem unimaginable, but Hailey Bieber accomplished it with rhode.

In May 2025, e.l.f. announced the acquisition of rhode in one of the most talked-about brand deals in recent years. More than just a success story, this signals something bigger: the resurgence of beauty industry M&A.

A decade ago, the industry looked very different. The market was dominated by multinationals and indie brands were only starting to gain traction.

Today, social media has allowed challenger brands not only to gain collective market share but to become an integral part of the industry, driving trends and innovation often followed by bigger names. This has led to heightened acquisition activity. On one hand, multinationals have been after a piece of the higher growth pie, looking to take small brands with big potential and scale them through their established platforms; on the other, indie brands aspire to scale and to take advantage of larger marketing and development budgets and are keen to access distribution channels beyond direct-to-consumer and digital.

In the lead up to, and early stages of, the pandemic, beauty acquisitions such as Charlotte Tilbury (Puig), Drunk Elephant (Shiseido) and Kylie Cosmetics (Coty) were grabbing headlines. These were highly sought after targets at the time, with Charlotte Tilbury bringing Hollywood glamour via A-list ambassadors to a wider audience, Drunk Elephant leading the clean beauty movement, and Kylie Cosmetics revolutionising the lip game and social media marketing.

The evolution of these brands has varied. Charlotte Tilbury has continued its international expansion to become a multi-category trend-setter. However, Drunk Elephant is currently seeing sharp declines and Kylie Cosmetics has had moderate progression since acquisition.

During the latter stages of the pandemic, M&A activity slowed. Companies were grappling with post-lockdown reality and adjusting to the new channel and category dynamics. Moreover, while multinational companies were benefitting from the post-pandemic spike in beauty demand, there was less urgency in finding alternative areas of growth through acquisition – but not for long.

rhode's acquisition is not an outlier. Since late 2024, beauty M&A intensity has been elevated across categories, from haircare and fragrance to skincare, and even the more challenged make-up segment. We count at least 18 deals between December 2024 and August 2025. L'Oréal alone has been involved in five major deals since December 2024.

We could even see larger deals. In June, there was unconfirmed press conjecture about a transformational deal involving a split of Coty's portfolio. As reported by WWD, discussions revolved around a sell-off in two parts, separating the brands between Prestige and Consumer.

So clearly, M&A activity has picked up. The questions are why, and why now?

With growth in some of the largest beauty markets globally – the United States, China, Western Europe – faltering following a period of acceleration, beauty companies are looking for alternative growth avenues.

Worldwide, L'Oréal expects the beauty industry to grow 4% in 2025, 50bp below 2024 and less than half the rate in 2023. For the global prestige beauty industry, Estée Lauder assumes +2-3% organic sales growth in the year to June 2026. This is overlayed with heightened macroeconomic, trade and geopolitical volatility. In an uncertain environment, acquired growth is therefore highly sought after.

Indie brands flourished in the mid-2010s, initially as a US and Western European phenomenon. The accessibility of third-party manufacturing coupled with the ease of marketing through social media and selling through digital and direct-to-consumer channels meant start-up brands could quickly scale production and consumer reach.

The indie brand phenomenon has reached a global scale, with start-ups gaining popularity in important geographies such as China and Emerging Markets, further complicating the competitive landscape for multinational players.

However, the ease of creating a new brand has been both a blessing and a curse for the start-up names.

In the eye of the beholder

While it allowed founders to launch their brands rapidly, lower barriers to entry and market access meant others could do the same, leading to a crowded and competitive market.

This means, although most indies will probably not survive the test of time, near term the large number of new brands creates a lot of noise and consumer fatigue. Hence, being tactical in acquisition selection is ever more critical.

The scale of M&A ambition has differed across companies. Some have historically leaned towards transformational deals, others towards bolt-ons that increase their exposure to a certain category, region or channel.

The market leader, L'Oréal, has leaned toward the latter. Its recent two acquisitions, Medik8 and Color Wow, at a collective price tag of €2.3 billion cost only c1% of L'Oréal's market cap. Even Aēsop, L'Oréal's largest ever single acquisition in absolute terms, only constituted c1% of its contemporaneous market cap.

Conversely, Coty has historically, and specifically prior to Sue Nabi's tenure, followed a transformational M&A strategy with the acquisitions of Procter & Gamble beauty followed by the Hypermarcas Brazilian brand cluster.

Transformational deals, not only for Coty but for Consumer companies more broadly, have inevitably required longer integration and deleverage processes. In a world that is increasingly volatile, the ability to predict the trajectory of larger combinations has become ever more complex.

As such, larger deals were the trend in the mid 2010s, for example the soon-to-be-unwound Kraft/Heinz, Coty/P&G beauty, AB InBev/SAB Miller and Reckitt/Mead Johnson Nutrition. Today, the trend has shifted towards bolt-ons. We expect this to continue, albeit the increased investment behind beauty by luxury houses such as Kering and LVMH, coupled with share price weakness relative to historical levels in leading prestige beauty names such as Estée Lauder and Coty, could create more substantial opportunities.

So where does the industry go from here? Clearly, as underlying beauty market growth normalises, the ability to acquire faster growing brands is a critical competitive advantage for multinationals. As indies rise in popularity, they will often seek a new home and owners with deeper pockets for marketing, innovation and distribution, and relationships and connections with important retailers. Therefore, from a multinational perspective, maintaining healthy balance sheets to enable acquisitions is critical.

In a highly crowded industry, with the speed at which new trends rise and fall, accelerated by social media, M&A is a way to shift control back to the multinationals.

Indeed, as larger players like L'Oréal have often highlighted, beauty portfolios are predominantly built through acquisition, the focus being on brand building rather than brand creation. In short, M&A is no longer merely opportunistic, it is central to strategy.

By way of example, of L'Oréal's portfolio of 37 global brands, only three were built internally, L'Oreal Paris, L'Oréal Professionnel and Kérastase. Its strategy is to acquire smaller brands where opportunities lie and scale them to span the beauty industry by price point, category, region and channel. Or, as the L'Oréal CEO observed, "The way we make our acquisitions is meant to occupy as many of these spaces… which allows us to adapt to any changes in purchasing power, in trends. And that's what allows L'Oréal to always over-perform the beauty market, and that's how we build our brand portfolio".

L'Oréal's strategy highlights the fact that even the well-invested and diversified market leader still seeks new growth opportunities through M&A to deepen its reach across the vectors. The ability to acquire growth is essential in an environment where social media has increased the turnover of beauty trends. As such, while M&A activity may be cyclical, remaining competitive is a never-ending struggle and companies need to invest behind both organic and inorganic growth continuously. In this context, M&A has been – and will remain – an integral part of beauty growth stories.

Homeland

US Universities Under Pressure

Steve Chesney
Biopharmaceuticals Research

As twenty-year American expats with children who have essentially no experience of living in their native land, we enrolled our sixteen-year-old in a pre-college summer programme in the US. This, we believed, offered him opportunities not only to connect with the homeland but also to exchange with students from over ninety countries. Prior to his arrival, we attended an online seminar that addressed the practicalities and parental anxieties of independent university life for teenagers. This covered everything from what time class would start (could he possibly wake up on his own?) to how to go about doing his laundry (yes, there's now an app for that).

To our surprise, in the Q&A session, where my son's primary concern was how late breakfast was going to be served, the question on the minds of dozens of parents was around the visa situation. Should they continue to plan on their children attending the programme given fears their child could be denied entry to the US, or worse, deported? The anxiety was understandable in the context of a disturbing drumbeat of headlines about the Trump administration's threat to ban foreign students at this particular institution.

Beyond the specific ideological battles with Ivy League and other top universities, the current administration has vowed to crack down on student visas. Policy-related barriers now include stricter visa vetting, social media screening and, more recently, pauses on student visa interviews.Ultimately, aside from the laundry app not working, the programme was a success, with my son acquiring a new appreciation for parentally funded freedom. However, if a fear of deportation is the prevailing perception among international families considering US colleges, then the reputation of American higher education has already suffered substantial damage.

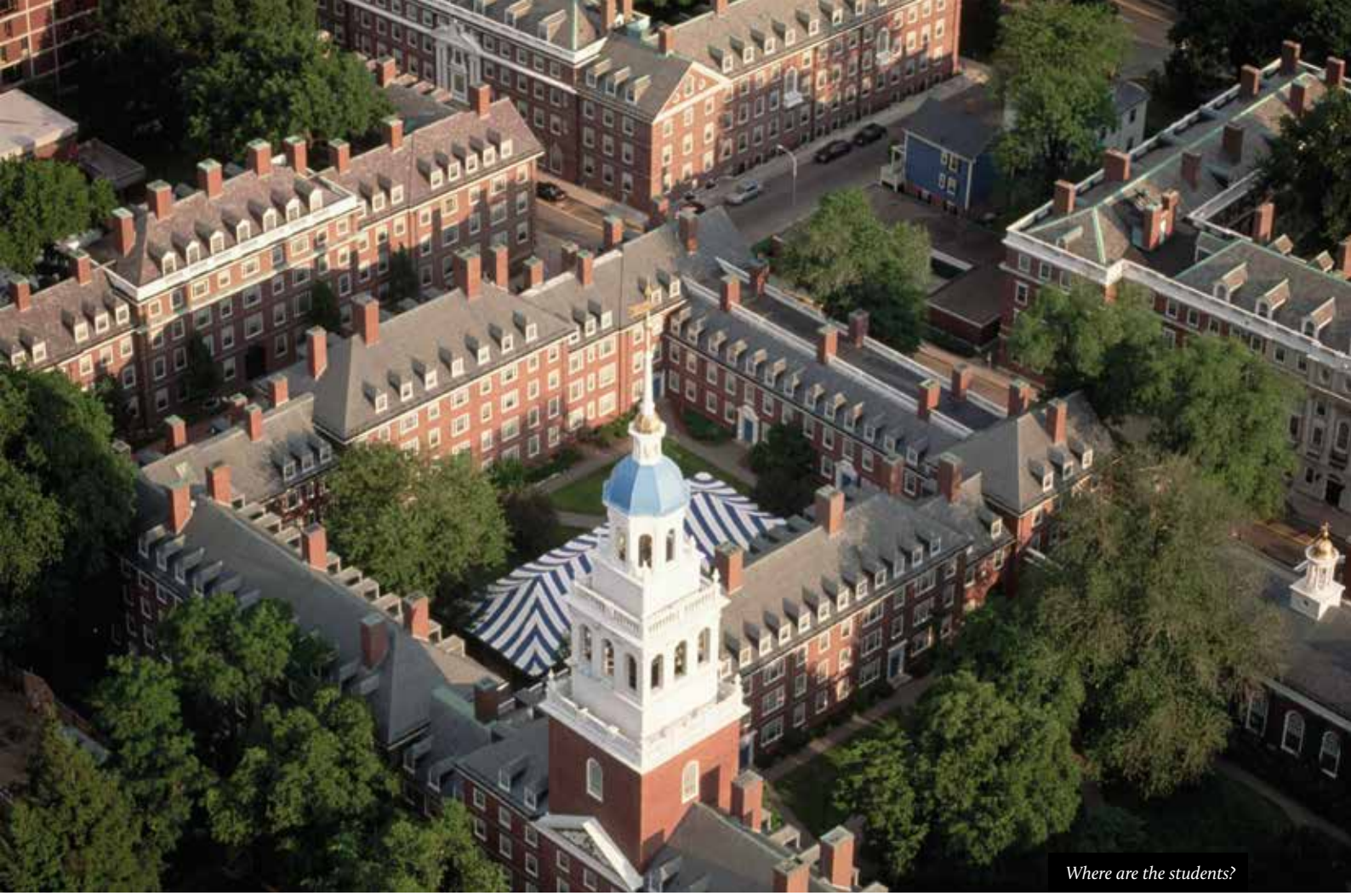
Indeed, the early data for the 2025-26 academic year tells a chilling story, with 35% of US institutions reporting a decline in international student applications. Acceptance levels appear to be worse, with 40% of institutions expecting declining international enrolment in the fall. This data suggests the intent to attend is trending below the willingness to apply and speaks to a deteriorating climate of uncertainty. As families begin to consider applications for the 2026-27 academic year, how far will international enrolment fall?

One might think that if these students do not go to the US, they will probably opt for the UK or another English-speaking advanced economy. But the US towers over these peers in terms of university capacity, enrolling nearly nineteen million students across its sprawling higher education system. This is more than six times the number in the UK, and over ten times that in Australia or Canada. So perhaps students from India, who make up nearly a third of US international student enrolment, and those from China, nearly a quarter of the total, will opt to attend a local university instead.

For decades, international students have been a quiet engine of American higher education, bringing not only significant tuition dollars, but also a steady infusion of talent into US research labs, tech firms and hospitals. But as immigration tensions rise and the war on academia intensifies, this pipeline is beginning to narrow. Many institutions, particularly public universities, rely heavily on the higher tuition fees paid by international students to balance their budgets.

To take a typical example, the University of California, Berkeley's annual international student fees are $60,000, more than double the rate for residents. Further still, international students will be needed to backfill the coming enrolment cliff in the US. A sharp drop in birth rates since 2008 combined with declining university attendance rates for native-born Americans portends a crisis in university budgets.

A sustained decline in international enrolment could ripple far beyond the classroom. Without international students, university programmes and faculty hiring may shrink, potentially stalling innovation. Such innovation goes far deeper than just the well-known immigrant-to-founder stories such as Elon Musk, Vinod Khosla and Noubar Afeyan (one of the founders of Moderna). American employers, particularly in STEM fields, could face rising recruitment costs as the domestic talent pool fails to keep pace with demand, forcing companies to look abroad for skilled labour and navigate increasingly complex visa barriers. In losing its appeal as a destination for the world's brightest minds, the US risks undercutting not just its academic prestige, but also its long-term economic competitiveness.



Where are the students?

It is not just students that are considering going elsewhere. Faculty members are also leaving the US due to growing unease around the country's political trajectory. In an alarming move, Yale professors Marci Shore, Timothy Snyder and Jason Stanley, leading voices on authoritarianism and historical memory, relocated to the University of Toronto in 2025. Anecdotally, friends in US academic leadership positions have suggested that employment offers for the 2025-26 academic year, even in less politically sensitive areas such as business, were quietly declined over the summer.

The exodus is about more than just politics. Universities now face the twin budgetary threats of declining enrolment and of reduced research funding from proposed cuts to the National Institute of Health (NIH). NIH funding plays a central role in supporting US research universities, covering not only basic research, but salaries, graduate education and related infrastructure. In President Trump's FY 2026 budget proposal, a proposed $18bn cut, about forty percent of NIH's total funding, would materially reduce the resources available to academic institutions that rely on federal grants for their research operations. At many top research universities, NIH funding accounts for twenty-to-forty percent of total research budgets, making it a cornerstone of the academic research enterprise. Fields such as biomedical engineering, neuroscience, molecular biology, epidemiology and public health would be particularly affected, as they depend heavily on NIH support for both basic and applied research. While the proposal may reflect budgetary priorities, such a move further endangers the positioning of US universities.

Across disciplines, American scientists are increasingly looking abroad as federal support dries up and political interference escalates. Countries like Germany and Belgium have responded with offers of refuge, even coining terms like 'scientific asylum'. Meanwhile, Chinese-American researchers, wary of racial profiling and investigations under the now-infamous 'China Initiative' designed to combat economic espionage, are quietly returning to China. At the same time, China has been implementing its 'Thousand Talents' programme to woo overseas Chinese academic talent back with generous funding and research resources. The result is a subtle but growing brain drain, one driven by dollars and dread.

The Trump administration has intensified its assault on US institutions central to its domestic stability and global credibility across healthcare, economics and international affairs. Turmoil at the Centers for Disease Control and Prevention, pressure on Federal Reserve independence and State Department funding cuts, are often cited as evidence of the erosion of US soft power. Yet, the efforts to denude US universities of essential talent and financial resources could trigger a landslide collapse in US competitiveness.

Magical Thinking

The AI Sceptic

Steve Malcolm
Telecommunications Research

Since ChatGPT launched in November 2022, heralding artificial intelligence (AI)'s latest 'new dawn', the NASDAQ has risen 87%, and NVIDIA, Microsoft, Meta, Alphabet and Amazon have added a combined $10trn of market capitalisation – equivalent to 60% of the entire Eurostoxx 600. This is not solely down to AI. Large tech has been taking an axe to opex as it eats its own automation. However, the combined capex budget of these five companies is expected to increase 170%, from $150bn in 2022 to more than $400bn in 2026; this almost exclusively reflects the hope of future AI-driven returns.

Being Scottish, having lived through the dot-com crash and the Global Financial Crisis (GFC), and covered the telecoms sector for 27 years, you may not be surprised to hear I am a little sceptical about the market's reaction. Full disclosure: I admit to luddite tendencies and am invariably wary around all technology excitement.

Grudgingly, I admit the internet has changed the way we live our daily lives. Shopping has become easier, as has annoying your friends by posting smug pictures while sunning yourself on holiday. iPhone and the subsequent smartphone revolution (or plague) has fundamentally changed our lives, if not always for the better as social media ensnares our youth, attention spans decrease and we are unable to exist more than ten metres from a power source.

To my mind, an iPhone launch stopped being interesting years ago. In a straw poll of my three late teens/early twenties children and three similarly aged nephews, none had any real interest in which iPhone version they had and two confidently told me the Pixel is a better device.

While the internet and smartphone revolutions have profoundly changed the way we conduct our daily lives, there is no compelling evidence I can find that points to sustained improvements in productivity and GDP growth. In general, global growth has slowed since the turn of the century. The counterfactual is it would have slowed even more without the efficiencies afforded by the internet. However, we will never know for sure. My suspicion is that while there have been some underlying productivity gains, these have been offset by the productivity cost of the constant distraction we have from an always-on digital world.

So, if the evidence suggests the arrival of the internet and smart devices has failed to boost growth, why should this latest technology 'discontinuity' and incarnation of AI be different?

What does artificial intelligence even mean? A quick skim through Wikipedia reveals our species has been excited about the application of 'artificial intelligence' since the 1950s, following the invention of the programmable digital computer (Enigma, etc) in the 1940s. The idea of

an 'electronic brain' is nothing new. Interest and investment in AI waxed and waned for the next sixty-odd years, with the nadir being the AI winter of the 1990s (coincidentally my favourite decade).

The rise of the internet and adoption of broadband internet access through the noughties helped to spur machine learning in academia and industry. This gave way to deep learning, which in turn was turbo-charged by the development of transformer architecture, the bedrock of all large language models (LLMs) underpinning today's 'generative AI' excitement. I will admit transformer architecture is a tad complicated for me, but I understand it allows computers to add context and, dare one say, nuance to human requests. So far, so sci-fi.

I admit my eyes glaze over when the conversation turns to neural networks, dimensionality reduction and co-occurrence matrix (thank you, Wikipedia.) But why did our collective interest in AI go parabolic in 2022 when ChatGPT launched? Well, apart from mine, obviously. I can remember my tech-enthusiast brother-in-law asking if I had used it while on a ski holiday in early 2023. Naturally I wrote it off, pointing out machine learning had been around for decades and what could possibly be so great about this latest iteration that it could change the world. Another superb stock call. But why did the world buy in so completely to technology's 'next big thing' in what already seems like a decade ago but was in fact only November 2022?

I have my own thoughts on the timing. I suspect when historians and sociologists look back at the early 2020s, they will be struck by how easily groupthink took hold in large parts of our society. The financial seeds were sewn by a decade of incredibly lax monetary policy, when the idea of negligible interest rates became ingrained in our psyches. The world's financial markets effectively had a put to central banks, and an ever more complex series of alternative asset classes took full advantage. In essence, all one had to do was buy the S&P. And then came COVID.

With hindsight, our collective response to COVID feels bizarre. We allowed politicians and epidemiologists, often with little real-world experience or perspective, to change our social charter fundamentally. Of course, the initial news and images were terrifying. Yet total societal compliance, when it became evident the risks to most were minimal, feels strange. This is not an article designed to analyse our response to COVID, but in the seeds of our compliance to rules which often made little or no sense I believe groupthink became more firmly embedded. And, of course, the pandemic was a gift to the digital part of our economy as accelerant was poured into the engine of our collective move online.

It may be that this combination of groupthink and online herd migration has provided a perfect and potentially dangerous backdrop for the latest 'big thing' in tech. I am not suggesting machines operating in the shadows of human consciousness do not have the potential to drive profound societal change. My personal fear is that a growing reliance on ever more 'intelligent' (for want of a better word) machines has the disastrous unintended consequence of making its current masters less capable and intelligent.

There are lots of studies pointing towards the deterioration of basic skills. Many core skills are developed through the repetition of basic tasks. However, many of these, for example data entry for a software engineer, can now be replaced by an AI 'agent'. But without this basic training, how will tomorrow's senior IT managers develop the skills needed to oversee the human replacements?

Another concern we should all share is the role our governments have in simultaneously using AI to try to wring efficiencies out of sclerotic public services while being responsible for its regulation. My sense is that western governments weighed down by colossal sovereign debt have resorted to 'magical thinking'. They believe AI can somehow vaporise deficits, because there are simply no other electorally palatable alternatives. And who wants to be left behind in the AI stampede? But are these politicians and civil servants, who often lack 'real-world' experience or any technology background, properly equipped to protect the public's interests against the obvious self-interest of a collection of mega-rich, highly influential, ferociously ambitious, often eccentric technology leaders? And where politicians 'lead', CEOs are invariably forced to follow.

Moreover, is it wise to embrace a technology whose principal *raison d'etre* is to replace human endeavour when most western governments are sitting on such immense and growing debt burdens? Never in our post-industrial history have we been less well-equipped to support high unemployment rates and a reduced tax take. History is littered with examples of over-exuberance around technology revolutions creating debt bubbles that pave the way for recession. The British 'Railway Mania' of 1847, the US 'Panics' of 1873 and 1893, the Japanese economic collapse of the 1990s after a decade of technology leadership, and the more recent GFC following the dot-com crash all have parallels. In none of these cases were public sector finances as stretched as they are today, or the risks to tax-paying white-collar workers so acute.

If human replacement is not the primary justification for the NASDAQ's $19trn appreciation since November 2022, what is the business case for AI? Are we all going to pay $10-20 per month to subscribe to ChatGPT or Groq or Claude? Outside the rarefied world of financial services, none of my friends and family pay for an LLM, although many use it. There are

Last interesting smartphone

some interesting consumer use cases, but on closer inspection, I tend to find them at the mundane end of the spectrum, akin to a 'Siri+' service.

Is ChatGPT planning your itinerary for a long weekend in New York a game changer? How does this create economic value? It saves me an hour or two of research on or offline that can be spent in other ways, playing golf perhaps, or gardening. Should we expect a boom in garden equipment sales? Will my New York experience be so much better than it would have been that it entices me to go there again? Or travel more? But how do I fund this extra travel? And if I have the money anyway, what am I sacrificing to travel abroad more often? UK minibreaks? Or are UK hotels full of all the extra tourists living their best travelling lives? I digress, but the point stands: it is hard to understand the case for economic value creation.

And how do we measure the costs, aside from a rising tide of human replacement? Our children taking ever shorter cuts to complete their homework? An increasing incidence of cheating in exams? Creativity outsourced? These cannot be positive developments for the future prosperity of the West.

Should we not be a little sceptical that most companies when they discuss AI only see opportunity, few fear any collateral damage? Of course, professional service firms are concerned that well-trained and possibly some not so well-trained machines might supplant them. However, I look at my beloved telecoms sector and consider events such as the T-Mobile Capital Markets Day where Sam Altman was one of the guests of honour. AI was eulogised as a powerful tool to profile customers to ensure they were deriving as much value as possible from the 'UnCarrier' (i.e. buying more services). But might a consumer-friendly AI tool not help customers switch carrier more often or highlight when they become eligible for device upgrades when previously they had bumbled along with an old phone for months after they qualified for a free alternative? No, don't worry about that.

Of course, the number of use cases for AI is almost limitless and my own prejudicial view has barely scratched the surface. If we can harness its data-processing superpowers to improve the way we provide health services to our ageing populations, freeing up resources for education and defence, that would be great.

Yet I hope we can entertain reasoned debate about its potential applications and question technology masters of the universe such as Sundar Pichai, CEO of Alphabet, when he states, "the risks of under-investing in AI are greater than the risks of over-investing." How does he know that?

Since 2022, the combined growth in capex of Microsoft, Meta, Google and Amazon almost exactly matches the growth in net income. Can any AI provider ever match the dominance that Google enjoys in search?

My sense is the "next big thing" is rarely as widely discussed and disseminated as AI is currently. Beware the multi-billionaire tech leader who believes he (for it is invariably he) can predict the future.

The Big Chill (1983)

The 1980s were the age of Margaret Thatcher and Ronald Reagan, a shiny hollow decade dedicated to the pursuit of wealth and economic growth. For those who graduated from college amid the flower power and idealism of the late 1960s and early 1970s, it could be a tricky transition.

The Big Chill, an ensemble piece propelled by laconic wit and a legendary soundtrack, probes the psychology and weaknesses of seven such graduates, reunited after the suicide of Alex, a university friend. They are Harold, a sneaker magnate, and his wife Sarah; Michael, a journalist; Nick, a drug dealer wounded in Vietnam; Meg, an unhappy lawyer yearning for a baby; Karen, a bored housewife married to an advertising executive; and Sam, a TV cop. It has a soon-to-be starry cast, including Kevin Kline, Glenn Glose, Jeff Goldblum, William Hurt and Kevin Costner, though the latter, playing Alex in flashback, never made it beyond the cutting room floor.

After the funeral, Michael, Nick, Meg, Karen, Karen's older husband Richard, and Sam decamp to Harold and Sarah's spacious house where Chloe, Alex's recently acquired girlfriend, has been staying. There they eat, drink, take drugs, laugh, cry, argue and reflect on the people they have become. They have all pursued the economically rich yet idealistically barren lives typical of the Reaganite Eighties, and are uncomfortably aware they personify the existence they railed against as 'radical' undergraduates.

The director, Lawrence Kasdan, minutely delineates their characters and skewers their pretensions, allowing them sufficient rope to hang themselves. Unable to see how their spoilt hedonistic younger selves have morphed via drugs, infidelity and restlessness into spoilt hedonistic thirty-somethings, they fail to understand how the student was father (or mother) of the adult.

Infidelity, that free love-born child of the sixties, and its close cousin adultery, are the dark side of the mirror in which they see themselves. Sarah cheated on Harold because "I was just sick of being such a good girl"; Michael, who has a girlfriend in New York, packs condoms and is flirting with Chloe before Alex's body is laid to rest; Sam confesses he left his wife out of "boredom" and snuggles up to an all-too-willing Karen; Sarah loans out Harold as a surrogate father without contemplating issues of paternal responsibility.

Yet for all the introspection, for all the questions about whether they have made the 'right' choices or lost some vital part of themselves as they became creatures of commerce, no one broaches the idea that possibly, just possibly, infidelity, an incapacity for boredom or, in Nick's case, persistent drug abuse might be part of the problem.

In other words, life – growing up and accepting responsibility – is the problem. Only one character understands this: Richard. Karen's husband only stays one night, departing early to leave the graduates wallowing in self-delusion, but in that time – drinking milk as the others get high – he dispenses the life lesson they missed. "The thing is nobody said it was going to be fun. At least, nobody said it to me."

His words fall on deaf ears. For the self-styled "revolutionaries", whose university careers were defined by the March on Washington and Civil Rights, the idea that "life isn't exactly the way you want it to be" was anathema. "I hate to think it was all a fad," says Sarah, unconsciously giving vent to the truth.

The sixties were an extraordinary period. Love and optimism coexisted with fear of cultural change, violent protest and war in Vietnam, all disseminated by the latest technology, television. There are parallels today. Social consciousness and innovation coexist with fear of cultural change, violent protest and war in Ukraine and in Gaza, all disseminated by the latest technology, online.

We must avoid the fate of Alex. As the minister asks at his funeral, after recounting his increasingly desperate, increasingly despairing journey through life, "Where did Alex's hope go?".

Re-engineering Engineering

Agentic AI in Design Software

Lachlan Brown
Software & Cloud Research

Over the past couple of decades, design engineering software has followed the same digital workflow of designing then optimising the object through physics simulation. However, we believe we've reached an inflection point, which will see digital design workflows redefined, a process fuelled by the incorporation of agentic AI.

Agentic AI is a new paradigm offering a shift from AI systems that simply offer recommendations, such as assistant tools and copilots, to ones capable of autonomously making decisions and acting upon them. While we acknowledge there is a fair bit of 'AI washing' in the market, we see a tangible benefit from the technology in design software, which should deliver meaningful productivity benefits.

Traditionally, engineering teams geometrically built out their product on a computer-aided design platform in isolation and then optimised it in a simulation environment. An example would be Jaguar Land Rover designing its next-generation vehicle in Dassault SolidWorks before optimising the design for aerodynamics, structural integrity and power efficiency in Ansys' multiphysics portfolio. This optimisation process may include virtual testing such as finite-element analysis and computational fluid dynamics.

For engineers, issues and improvements are identified in the simulation environment; they can then return to the design flow and improve its geometry or layout. The problem with this process is it is iterative. For example, fixing an issue for aerodynamics may compromise the structural integrity of the vehicle. Moreover, each iteration is a lengthy process, with multiphysics simulations taking anything between hours and days. This is because the vehicle, or component(s) of the vehicle, needs to be discretised into smaller elements, in what is known as 'meshing'. These are the thousands or millions of cells on which numerical analysis can be performed to capture the true behaviour of the entire system. The quality of the mesh directly impacts simulation accuracy, and engineers must find a balance between mesh density and computational resources to achieve reliable results.

The simulations performed on each mesh cell are not simple either. In fluid mechanics, Navier-Stokes equations, which describe the motions of fluids, are non-linear. They also need to address the complexity of fluids, including viscosity and turbulence, which is a chaotic and unpredictable fluid motion. While Navier-Stokes solutions exist for certain scenarios, a general solution that works for any initial conditions and boundary conditions remains unsolved. It is one of the seven unsolved mathematical solutions in the Millenium Prize Problems, which highlights how complex multiphysics simulations can be.

PhysicsX is an interesting AI-native engineering startup founded in 2020, which is seeking to revolutionise the way products or vehicles are designed through engineering workflows. The London-based company is already making inroads into the Aerospace & Defence, Hi-Technology, Materials, Automotive and Energy markets with its AI-driven, real-time multiphysics simulations. The platform recently raised $135m in a Series B funding round in June 2025, which saw participation from industrial heavyweight companies Siemens and Applied Materials. Other notable startups in the AI-native multiphysics space include BeyondMath and MonolithAI.

These startups are training deep-learning models on multiphysics simulation data to create large physics models (LPMs) in the same way that large language models have been trained on text and images. For example, PhysicsX's LGM-Aero is trained on more than 25 million geometries and their associated physics simulations. The training data contains tens of billions of mesh elements and tens of thousands of computational fluid dynamics and finite element analysis simulations. This was undertaken in partnership with Siemens Digital Industries Software.

Underpinned by the multiphysics simulation datasets they are trained on, LPMs can generate physical geometry, or layouts, based on their assessment of physics performance. Shapes can be formulated in seconds to minutes. PhysicsX claims it can achieve this inexpensively, with its LPM only needing to inference on Nvidia A100 chips over a timeframe of a few seconds to minutes. This compares to multiphysics simulations that typically require a high-performance computing setup and tens-of-thousands CPU hours. It is an extremely costly and time-consuming process to perform simulation, which is why it is often a source of product delays.

The old way

Effectively, these LPMs change the engineering workflow from design first to simulation after, to using simulation data to generate design. Ultimately, an engineer needs to configure the parameters of an object through human language (i.e. shape size, weight, material) in the design environment, and with support from AI, the engineer can generate an optimised design based on AI's scientific knowledge. It also means the number of iterations through the simulation phase of engineering design can be materially reduced as the object is already optimised.

Changing engineering workflows is not only occurring within the startup space. Synopsys alluded to transforming engineering workflows through agentic AI at its March 2025 SNUG conference. CEO Sassine Ghazi commented, "Engineering is undergoing an unprecedented transformation, and Synopsys is seizing the opportunity to re-engineer engineering".

With its AgentEngineer technology, Synopsys sees the opportunity for chip design tasks (i.e. floorplanning, formal verification) to be orchestrated, with the engineer defining a target or goal and passing it onto the agent to deliver an outcome.

In this context, the timing of Synopsys' acquisition of multiphysics platform Ansys is interesting. When the merger agreement was announced in January 2024, the strategic rationale was to leverage Ansys' multiphysics solutions for multi-die chip designs and to accelerate Synopsys' push into more design segments, including holistic systems. Given Ansys' exposure to the Aerospace & Defence, Automotive and Industrial end markets, this also created a lucrative cross- and up-sell opportunity to push Synopsys' chip design solutions into Ansys' customer base, as participants in these markets increasingly enter chip design.

However, the agentic AI opportunity wasn't pitched at the merger announcement given agents were not a concept at the time. Post the merger integration, we anticipate Synopsys's agents will be underpinned by Ansys' multiphysics data, which understands how different layouts affect the electrical and mechanical performance of the silicon chip. With these agents orchestrating, and eventually automating, the design of the chip from early on in its design life cycle, we expect a meaningful productivity benefit for engineers.

It's worth noting this is not the first time we have had a seminal moment in design engineering. Before multiphysics simulation software, everything was undertaken manually. Vehicle crash testing, for example, traditionally used dummies with sensors placed on the seats as the car was sent flying into a cement wall. This mode of testing was replaced by software to reduce the extensive costs of writing-off vehicles and to improve the time-to-market. Nevertheless, physical crash testing still occurs, the regulators using it as part of the final signoff for a vehicle.

We expect this dynamic to repeat, with multiphysics simulations still performed. However, rather than numerous iterations, we anticipate they will be used at the end of the design lifecycle as a final signoff before manufacturing. As design software moves closer towards autonomy, the role of engineers may change. Yesterday, they were crashing vehicles into walls; today, they are simulating crashes in a virtual environment; tomorrow, they may be expertly training and perfecting LPMs on crash test data and simulations.

Drug Attributes

When is a Rare Disease not a Rare Disease?

Joshua Smith
Biopharmaceuticals Research

The answer to the titular question is not as cryptic as one might suspect. Despite widespread assumptions to the contrary, no formal criteria exists to define rare diseases. Rather, they are generally defined as those affecting fewer than one in two thousand people in any given region, e.g. fewer than two hundred thousand people in the US. Despite this lack of prevalence for an indication, rare diseases are not particularly rare. The National Organisation of Rare Disorders lists more than ten thousand in its database. These impact more than thirty million people in the US, with a suspected 80% having an underlying genetic cause, the majority unfortunately manifesting in childhood.

These conditions have long been subject to high unmet need. Today, c95% of all rare diseases lack a specific treatment as opposed to symptom management. However, as a small number of these indications contribute an outsized proportion of patients, thankfully, a greater percentage of patients can receive a treatment-specific therapy. With the historical lack of focus by Biopharma on these diseases, starting in the 1980s regulators began to incentivise companies to develop therapies.

The Orphan Drug Act of 1983 was a landmark that aimed to lower development costs and boost revenue potential for drugs attempting to treat these previously ignored illnesses. It worked wonders for the space, with over 650 orphan drugs approved by the Food and Drug Association (FDA) since the act was passed, and over 1,300 when including multiple indications.

Part of the incentive is that companies can charge far higher prices for these drugs, as payers (managed care organisations or government schemes in the US) have no option but to reimburse the high costs, despite sometimes onerous pre-authorisation and medical exception administration for patients, their family and physicians. Given the genetic component, the industry has been forced to be creative with the science behind combating the diseases, leading to some of the most cutting-edge modalities: RNA silencing, gene editing and gene therapy all have their roots in the fight against rare genetic diseases.

When considering the range of diseases included within the category, at the smaller end of the spectrum we find the rarest of ultra-rare diseases (fewer than one in ten thousand sufferers), Fields Disease. This affects three people globally, two of whom are identical twins. At the other end of the spectrum there is transthyretin amyloidosis (ATTR) with cardiomyopathy, with conservative estimates of around five hundred thousand sufferers worldwide. We will examine this condition in greater depth, given it is one of the most prevalent rare diseases – a statement of truth despite its oxymoronic nature.

ATTR is caused by a misfolding in the transthyretin (TTR) protein, which breaks down to its constituent parts and then reassembles incorrectly. Over time, the misfolded TTR aggregates into larger structures called amyloid fibrils, which build up in various organs and tissues and cannot be natively broken down effectively. The main sites of amyloid build-up are the cardiac muscle and peripheral nerves, leading to its two main forms: with cardiomyopathy (ATTR-CM) and with polyneuropathy

(ATTR-PN). ATTR-PN is the less prevalent manifestation, with around five times lower prevalence than ATTR-CM, and is characterised by painful neuropathy in the hands and feet, muscle weakness and motor function issues.

ATTR-CM is by far the larger indication, although 20-30% of people with the disease also exhibit some polyneuropathy symptoms; these are labelled mixed phenotype patients. The disease generally presents as progressive heart failure, with the amyloid deposits restricting the elasticity of the heart walls and preventing the organ from pumping blood effectively. Approximately 90% of cases are age-related, with the balance genetic. Prior to recently available therapies, the life expectancy at diagnosis was around three years, effectively a death sentence, and current standard of care merely extends this, doubling it if patients are lucky. Part of the cause of this was the traditional lack of understanding, and recognition, of the disease. As the disease presents similarly to myriad other cardiac disorders, various other disorders would have to be ruled out before an accurate diagnosis could be belatedly made.

Novel diagnostic techniques have contributed to increased recognition of the disease, with the traditional echocardiogram being supplanted to an extent by TTR serum tests and bone scintigraphy, a radiological technique which accurately visualises the build-up of amyloid in the heart. In contrast, traditional techniques only portray the thickening of the cardiac wall.

When all else has failed

Historically the only definitive treatment available, beyond symptom management, was removal of the liver, with the liver being the site of TTR genesis. Evidently, this is not ideal. Patients who are often already severely ill are unlikely to survive a liver transplant.

The landscape changed in 2019, when Pfizer released its drug Vyndaqel (or Vyndamax, depending on formulation). This works by stabilising the TTR protein, to prevent degradation into its constituent parts and reaggregation as amyloid fibrils. It has no doubt been a life-changing therapy for those unlucky enough to receive a diagnosis, but the problem remains twofold: the drug slows the rate of deterioration but cannot halt it, and those unlucky enough to receive a diagnosis remain a small minority of all sufferers.

Vyndaqel blazed a trail. It has been responsible for a huge increase in diagnosis rates and far wider recognition of the disease as the killer it is. Since it was approved, two other drugs have recently come to market. The first, BridgeBio's Attruby, works via the same mechanism as Vyndaqel, but appears to stabilise TTR more effectively, theoretically leading to better outcomes. The second, Alnylam's Amvuttra, utilises a completely different mechanism – RNA silencing. This drug prevents expression of the TTR gene, cutting the problem off at source, which may underlie a potentially more efficacious effect, although the silencing does not result in a 100% blockade of TTR expression.

The pace of change in the field has been outstanding. Less than ten years ago, an ATTR-CM diagnosis was a death sentence if you were ineligible for a liver transplant; today, three therapies are available, with a handful of other novel modalities in the pipeline.

Considering the available and pipeline therapies, how does the space look? For patients, there is only upside from a wider selection of drugs. They do, however, come at a cost. Earlier, we noted the prices companies can charge for drugs in rare disease and, despite the higher prevalence in ATTR, this space is no exception.

List prices range from c$250,000 to c$500,000 and although rebates and value-based agreements will cut these substantially, they still represent an enormous potential cost to healthcare systems if the prevalence is anything like we expect. Companies, justifiably, point to the innovation required to develop these compounds, but this is likely to encounter resistance from payers, especially government payers, if the current debate on drug pricing continues to rage for any length of time.

For our part, we do not expect near-term challenges on pricing for existing therapies (excluding patent risk), given the early stage of the most recent drug launches. But we cannot say with certainty the next generation of ATTR drugs under development will enjoy such favourable dynamics, if approved early next decade. This, combined with well-publicised questions over the FDA leadership's view on the biomarker and surrogate endpoint data the many rare disease medications rely on for approval, could well make for uncomfortable conversations over future trial design and pricing strategies for rare disease players.

Circling back to our initial question: when is a rare disease not a rare disease? It appears it may not be when payers say that it isn't, although that remains to be seen.

Oil and Water

The Falklands Frontier

Fergus Neve
Oil & Gas Research

It is fifty years since my grandfather Colin Phipps, then a Labour MP, visited the Falkland Islands and Argentina as part of a Commonwealth parliamentary delegation. On his return, he wrote a report for the Foreign Office, in which he referenced the potential for large offshore oil deposits around the islands. In 1996, almost twenty years later, the Falkland Islands' first competitive licensing round was completed, but we are yet to see a commercial development in the British Overseas Territory.

However, this could be on the verge of change if Rockhopper and Navitas Petroleum can finally take final investment decision (FID) on the long-awaited Sea Lion project. The story of Falkland Islands oil development has been turbulent, not least from the perspective of Anglo-Argentine relations over the disputed territory. This is how the play developed.

The initial licensing round saw several large players win exploration blocks, including Shell, LASMO and Amerada Hess. Six exploration wells were drilled in 1998, although the finds were limited. Of the six, four showed signs of oil, one was a gas discovery and one a dry well. None showed commercially viable resources. The results, combined with oil prices falling to close to $10 per barrel in late 1998, convinced the companies to put the Falklands to the back of their minds.

It would prove another twelve years before a seventh exploration well was drilled. While the larger-cap players slowly distanced themselves, a spate of listings of small independent E&Ps focused on the region occurred between 2004 and 2005. Desire Petroleum, Falklands Oil & Gas (FOGL) and Rockhopper each raised capital and increased efforts towards a new campaign.

As oil prices recovered through the noughties, further drilling activity became more plausible and in March 2010, Desire found gas and condensate in the Liz well. In May 2010, Rockhopper struck oil in its Sea Lion well, encountering a 64 metres net pay with flow rates in excess of 2kb per day. This was the first commercial discovery in the region. Share prices rocketed, the combined market cap of the three players mentioned above rose to a peak of $2.6bn in October 2010 (having been $0.18bn in 2009). Oil and gas in the Falklands was having its moment in the sun.

It proved to be short-lived. Desire announced it had discovered oil in the Rachel North well, only for further tests to show the mobile fluid was water. A series of subsequent abandoned wells saw the share price tumble and in 2013 FOGL acquired the company, valued at close to $1bn three years earlier, for c$100m. FOGL itself was subsequently taken over by Rockhopper in 2016 for $81m, and so three became one. Rockhopper was valued at $0.19bn, not dissimilar from the pre-drilling campaign valuation of the three, now consolidated, pioneers.

Rockhopper had farmed down its position in Sea Lion in 2012, selling a 60% stake to Premier Oil, ceding operatorship. At the time of the transaction, FID had been expected in 2Q13 with first oil anticipated in 3Q17. However, this didn't transpire as planned. Premier never took FID on the project, despite spending c$700m on engineering, exploration and other studies between 2012 and 2021.

A series of delays meant the project never took off and in 2021 Premier, which had become Harbour Energy, decided to offload the asset. Navitas Petroleum, the Israeli E&P, farmed into the field, taking a 65% stake, providing Rockhopper with pre-FID loan financing which would cover all Rockhopper's Phase 1 project costs and agreeing to provide a post-FID loan. Both would be repaid from Sea Lion cash flows which demonstrated Navitas' commitment to the project.

As operator of the project, Navitas set a target of FID in 2024, with first oil by the end of 2026. The target inevitably slipped but Navitas and Rockhopper were unperturbed. FID remained firmly in focus despite the timeline shifting, and late 2024 saw some positive updates. Upstream reported in November 2024 that front-end design and engineering studies for the project had started, with the targets for FID and first oil shifted to mid-2025 and 4Q27 respectively.

The Sea Lion development is located 220km offshore to the north of the Falklands. The field has estimated 2C resources of 1.25 billion barrels of oil equivalents. 2C are the best estimate of contingent resources, the hydrocarbons potentially recoverable from a field not yet mature enough for commercial development. This makes Sea Lion the fourth largest pre-FID deepwater oil discovery worldwide, according to Navitas.

Wild West

Navitas plans to develop the project over five phases, targeting 727 million barrels of oil equivalent. Phase 1 is planned to consist of eleven wells tied back to a floating production, storage and offloading (FPSO) vessel, producing 55kboe per day of oil and gas. The further phases would see a second FPSO added to the region and gross production could rise to 150kboe per day when all 64 wells from the five phases are tied back, according to press reports.

However, we're still awaiting that elusive FID, which is now expected in 2H25. First oil has also been delayed to 1Q28. Those of you who have made it this far in the article will probably be thinking, haven't we seen this before? Questions over whether this is feasible or indeed if the project is likely to happen given the track record are valid. There have, however, been recent developments which suggest 'this time could be different'.

The markets certainly believe FID is imminent. Rockhopper's shares have risen c200% year-to-date, and more than 450% over the past year since the project began regaining traction. The delays through 2024 and 2025 have been largely shrugged off. This could be a repeat of the share price boom we observed during the 2010-12 drilling campaign or a sign investors believe we may finally see barrels produced in the Falklands.

On 31 July 2025, Rockhopper announced it had received firm commitments to raise up to $140m through a conditional placement. The funds would be used for its capex commitments for the Sea Lion Phase 1 development. Navitas currently estimates post-FID funding will total c$1.66bn. Under the previously discussed loan agreements, Rockhopper's share would be c$100m including contingencies. The raise therefore more than covers Rockhopper's share of project capex.

The equity raise is contingent on FID being taken, with the funds held in escrow pending financial close. But this is as clear a sign as any we have seen in the past decade that FID is likely. As part of the announcement, Rockhopper reiterated the FID was expected by the end of the year.

It seems to me the Falklands could see meaningful oil production in the medium term. A basin opening development would be in keeping with the recent resurgence in the relevance of exploration and appraisal activity across the sector.

Alongside Sea Lion, TotalEnergies took FID on the GranMorgu project in Suriname last year and is widely expected to take FID on its Namibian Venus project by the end of this year or in early 2026. We could therefore feasibly see at least three new countries become oil-producing nations before the end of the decade.

It has been quite a turnaround. Not long ago, the narrative was for 'peak oil' this decade and the idea of developing assets in new regions was considered absurd.

Pivot

How 3i Reinvented Itself

Ashton Olds
Retail
Research

By market capitalisation, 3i is among the top twenty companies listed on the London Stock Exchange. It is larger than such notable businesses as Haleon, Tesco and Vodafone. The ascension of 3i, a mid-market private equity investment company, has been a surprise for benchmark-aware investors. Its rise has been meteoric – the shares have risen 300% in the past five years – its structure as an investment company is unique, and the engine behind its share price appreciation, a 58% stake in the Dutch discount retailer Action, is by no means a household name.

Pre-dating 3i's recent rise to prominence is a fascinating history. For many years, it carried out a function of national importance for Britain, mediating between SMEs, the City and the government.

3i's origins can be traced back to the 1931 Macmillan Committee, which highlighted a shortage of long-term capital for smaller businesses, colloquially known as the 'Macmillan Gap'. This gap reflected the absence of reasonable funding options for smaller businesses, which lacked the scale to list on public exchanges. As ministers and the Bank of England planned for post-war reconstruction, aware the Macmillan Gap could widen further, proposals crystallised into the formation of two new bodies in 1945: the Finance Corporation for Industry (FCI) to support larger firms, and the Industrial and Commercial Finance Corporation (ICFC) to supply medium- and long-term capital to smaller ones.

The then 'big five' clearing banks (Barclays, Lloyds, Midland, National Provincial and Westminster) were seen as the logical source for the ICFC's capital given a sharp increase in assets during the war. At the time, the banks were reluctant to provide the required seed capital given divided opinions about the existence of the Macmillan Gap and reservations over replicating the continental banking system. However, they eventually conceded and supported the establishment of the ICFC, if only to prevent Whitehall from intervening in their activities further.

Led by a small, highly motivated team, the ICFC had sufficient independence to survive the conflicting interests of the government and its own sceptical shareholders. For the first twenty years, it was led by its Chairman, Lord William Piercy, who had held senior private and public roles after beginning work in the City as a timber broker at the age of just twelve.

In its early years, the ICFC required sound judgement when allocating funds. Many companies had grown on the back of war production while others did not have an established profit record. The ICFC was ahead of its time, building in-house due-diligence capabilities with greater detail than traditional bankers, utilising technical knowledge, examinations of factories and operating accounts, and personnel audits.

By the 1950s, a regional network had been established to spread the geographic base of its investments and pave the way for its specialists to become locally informed investors. The ICFC generally provided investment via long-term, fixed-rate loans which offered certainty and were carefully priced so as not to overstretch firms. Equity investment was also provided to lessen the risks posed by leverage.

Over the latter part of the century, considerable change would occur. The ICFC's success would help to normalise professional investment in unquoted British companies, paving the way for new competition. In the 1970s it merged with the FCI to establish Finance for Industry (FFI), and by the 1980s had been renamed 'Investors in Industry', or '3i'.

The gap

As capital markets in the UK and Europe evolved, 3i's model followed, transitioning from an SME funder into a modern private equity house which targeted fewer but larger buyouts. In 1994, 3i listed on the London Stock Exchange with a £1.5bn market capitalisation. It was then that the company broadened the scope of its fundraising, raising its first external fund totalling £225m.

The venture capital industry in the UK soared in the late 1990s and early 2000s, but the fallout from the dot-com boom saw the number of firms collapse. 3i had also grown rapidly, opening offices across North America and Asia. The considerable returns it made in technology companies over 1999 and 2000 were quickly lost, but its geographic diversification, portfolio mix and strong balance sheet provided a partial buffer.

Over the following years, economic recovery underpinned recovery in the business. Impressive investment returns and fundraising propelled the group forward and fuelled chunky distributions to shareholders.

However, the upswing was fleeting, with the Global Financial Crisis causing a deterioration in conditions for private equity firms. By December 2008, 3i's shares had fallen below its 1994 listing price and were trading at a 75% discount to their net asset value. The leverage carried by the group into the crisis forced new management to raise £732m via a rights issue to recapitalise, and catalysed a strategic shift that prioritised streamlining, including exits from existing investments.

The 3i investors recognise today started to take shape in 2011. Simon Borrows, an ex-banker who had advised on the 3i IPO in 1994 while at Barings Bank, joined as CIO and became CEO in May 2012. In June 2012, he announced a bold strategy for the company, which he noted was "too decentralised and lack[ing] focus and consistency".

Under his plan, 3i would reduce staff, magnify its geographic focus and cut its number of investments. His approach offered several advantages. The smaller team and narrower portfolio helped to improve sharpness in asset allocation, and its focus on exits raised enough funds to ensure the company could deploy its own balance sheet capital rather than external funds. The benefit of proprietary capital is 3i can let winners run, rather than exiting investments on the typical five-to-seven-year private equity cycle. It also no longer needs to deploy capital when market valuations become frothy or exit investments when conditions are poor.

The past decade has seen 3i develop a phenomenal track record. This is illustrated by its share price, which on a total return basis has delivered 30% growth pa since Borrows announced his strategic shift in June 2012.

While this change in fortune reflects a focused investment company which has executed admirably, a large part pertains to the incredible performance of Action, a leading European non-food discount retailer.

In 2011, 3i and third-party investors acquired Action from its founders. At the time of acquisition, Action operated 250 stores across three countries and generated c€80m in EBITDA. Through 3i's ownership and involvement, Action today operates more than 3,000 stores across fifteen countries and generates EBITDA above €2bn pa. While 3i has lifted its stake in Action over time – mostly self-funded from the proceeds of Action's dividends – the prevailing valuation of 3i's 57.9% stake in Action is £19.2bn, a sum many leagues higher than its initial investment of £134m. Today, Action comprises 71% of 3i's portfolio and is the primary reason it trades at a c45% premium to net asset value.

While Action has undeniably been an incredible investment, it must be acknowledged that without the 2012 pivot and restoration of the balance sheet, 3i would have not been afforded the opportunity to hold its stake over the long term and generate the gains it has.

From plugging the post-war Macmillan Gap to funding Europe's fastest-growing discounter, the 3i of 2025 is a very different beast to the ICFC of 1945. However, at its core, the principles which define 3i are largely unchanged: it manages patient proprietary capital and is fortunate enough to have the freedom over when to act.

Playing with Ideas

The Possibilities of IDEAS

Joseph Worsley
IDEAS

Whenever anyone asks me what I do, I reply, "I work in the IDEAS team". As you might expect, this invariably elicits a quizzical response, my counterpart being simultaneously no closer to understanding what I do and intrigued by the idea of an 'ideas' team and wondering what it entails. When I explain the team provides systematic equity analysis to help investors make sound decisions, often they are still none the wiser but concerned that if they press the point they might receive an overly complex explanation. Here, however, I can provide some insight into the IDEAS process and show how it can usefully inform investments.

Available to all Rothschild & Co Redburn clients, the IDEAS analysis and website (**ideas.redburn.rothschildandco.com**) provides an opportunity and risk model by distilling each company into a set of fundamental factors. Using accrual-based accounting metrics and a systematic, non-'black box', model creates an intuitive process free from human bias. For discretionary managers, this 'man + machine' approach can be additive to the investment process, helping to test investor conviction and counteract behavioural bias, such as confirmation, anchoring or loss aversion.

In its primary form, the process stems from the factor-based models originally described by Eugene Fama and Kenneth French. These studies, and abundant subsequent research, have shown that different characteristics of a stock can drive long-term price performance. The usefulness and rigour of this type of analysis was demonstrated when Fama shared the 2013 Nobel Prize in Economic Sciences.

As individual factors can be cyclical, a multi-factor approach can improve the results of the analysis, combining multiple characteristics to help to reduce the short-term underperformance of each factor. Although this type of research is not new, investing based on the style characteristics of a stock continues to produce long-term outperformance, while combining these factors, measures or characteristics is a proven way of mitigating risks and identifying potential investments.

To do this, the IDEAS system starts by assessing the operating quality of individual companies (ROCE) and then measures its value and growth attributes. These characteristics are then put into context using our behavioural measure, Estimates Momentum, which helps to time the investment process. Using Estimates Momentum to assess the value and growth characteristics allows us to answer questions such as, "At what point does a value stock stop becoming a value trap?", or "At what point does the implied growth become unsustainable?".

In essence, Estimates Momentum measures the rate that consensus is actively changing its expectations to forward EPS estimates. It is useful because it highlights the companies where analysts are having to revise their forecasts consistently in the same direction, i.e. constantly being wrong in a bullish or bearish direction. The revisions can be small, but persistent, and therefore go unnoticed. These small and gradual but often sustained changes tend to occur when analysts are feeling cautious, taking place progressively as new pieces of information come to light. Estimates Momentum aims to capture and take advantage of the changing news flow driven by, for example, changes to input costs, exchange rates, geopolitical events, management strategy, or macro influences, which are often missed in underlying revisions but can be captured in the momentum of these revisions.

From the underlying factor data every company in the system (c3,500) is assigned a score out of 100 on each of the four attributes mentioned above (Quality, Value, Growth, Estimates Momentum). The Value, Growth, and Estimates Momentum scores, which are negatively correlated, are then combined to produce an overall IDEAS Score. This essentially boils our analysis down to a simple score out of 100 for each stock. The companies with high IDEAS Scores offer the best investment opportunities according to the system.

Alongside the IDEAS Score, we use a visual tool, the IDEAS Wave, to evaluate a company's characteristics. The Wave groups companies depending on their Estimates Momentum and Value/Growth trade-off, with extra partitioning being offered by the IDEAS Score. This allows for a simple visualisation of where companies in a sector, portfolio or interest list sit depending on their factor characteristics. The visual separation helps to focus investor attention on the areas in

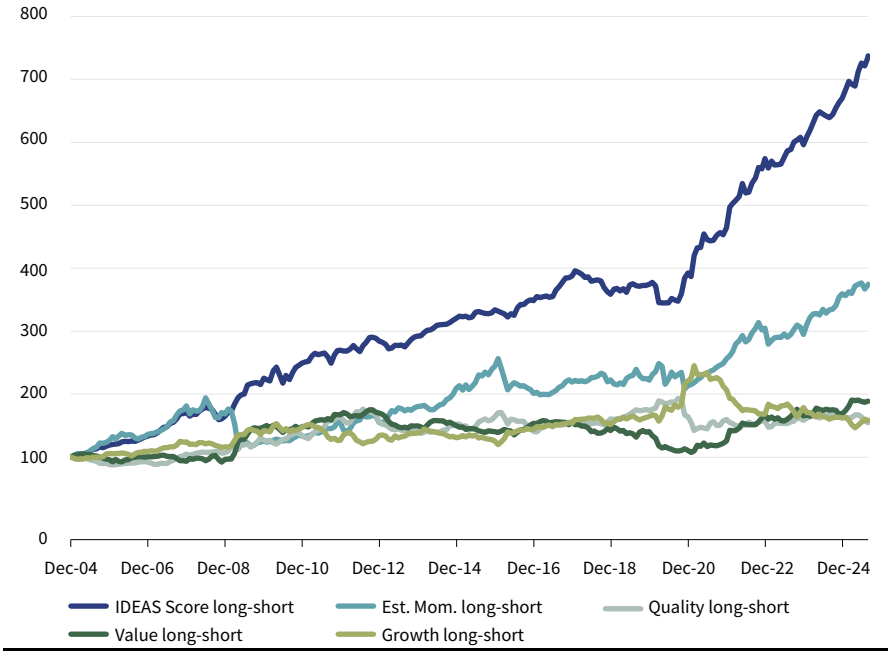
a portfolio which we think require more time and consideration.

This may all sound promising in theory, but the main question, and one we are forever being asked by clients, is how IDEAS performs in reality. With historic, as-seen-at-the-time data collected since Redburn's inception in 2003, we can run back-tests and monitor returns to see how the factors have performed while avoiding any look-ahead bias. Fig 1 shows how the individual factors and the IDEAS Score have performed over the past twenty years. The performance lines show how a long-short strategy for each factor would have performed, with the long basket containing companies with a score over eighty and the short the companies with a score below twenty. We equally weight the companies and reconstitute and rebalance these baskets monthly depending on how the scores change.

As can be seen in Fig.1, all the factors show positive returns, excluding transaction and other frictional costs, over the whole twenty years. Estimates Momentum is the standout single factor, making a positive return over twenty years, but failing at major earnings events, notably during the Global Financial Crisis, the start of 2016 when there were global recession fears, COVID uncertainty in 2020, and the impact of the outbreak of the Ukraine war in 2022.

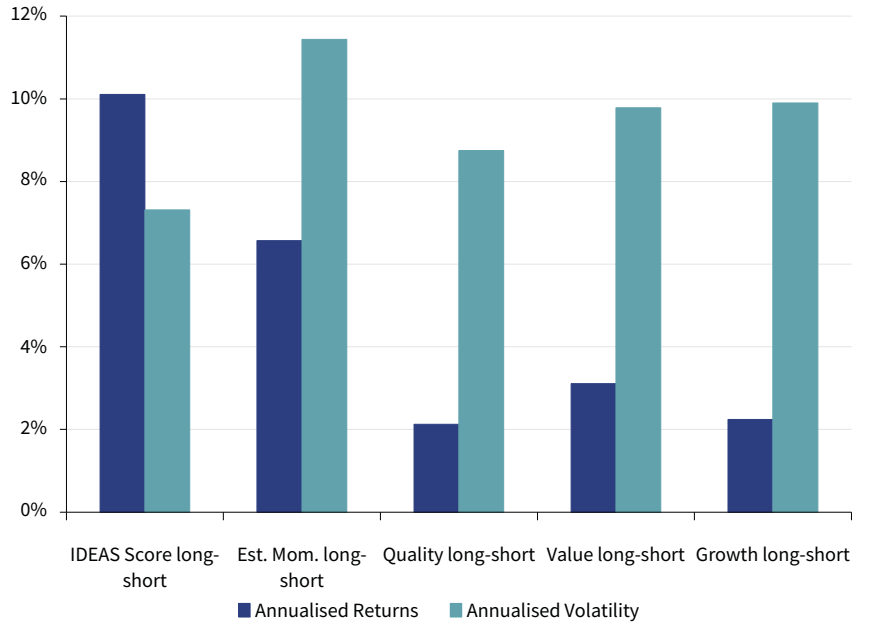
The primary point to note from the chart, however, is the returns of the IDEAS Score, which clearly outperforms the individual factors and with less volatility. This can be seen equally in Fig. 2, which shows the annualised returns of the factors compared to the annual volatility of those returns. It is clear how combining factors helps to improve performance, reduce risk in a portfolio and how IDEAS can provide useful investment suggestions.

As mentioned briefly above, the main output of our analysis is through the IDEAS website. In addition to single company analysis, the website allows screening on



Source: Rothschild & Co Redburn IDEAS

Fig 1: IDEAS Score and individual factors



Source: Rothschild & Co Redburn IDEAS

Fig 2: Annualised return of factors relative to annualised volatility

over two hundred measures in the system, factor performance charts, sector analysis, portfolio monitoring, timing signal alerts, Rothschild & Co Redburn Fusion, far more than I have time or space for here.

In focusing on the factors, IDEAS Score and Wave I have only described one part of the IDEAS model and, although one of the major elements, there is an array of other data provided and the functionality on our website mentioned above. We in the IDEAS team are always happy to show clients all the possibilities IDEAS has to offer, and to help investors customise usage in a way specific to their needs, so please do not hesitate to get in touch if you are interested or would like to know more about the system.

ideas@redburnatlantic.com

KEYBOARD WARRIORS

The Truth About Gaming

Hamilton Faber
Media Research

I have been a gamer for more than four decades, something the ten-year old me would never have envisaged. Whether this is a good or bad thing is open for debate. While some might suggest it's time to move on to more age-appropriate pastimes, it never felt right to stop an activity I thoroughly enjoyed. So, when two years ago I was presented with the opportunity of covering the video game industry alongside my existing media coverage, I jumped at the chance. What better than to analyse companies in which I was already personally invested?

By any measure, four decades is a long time. In the eighties, Pet computers, joysticks and Pacman were the height of sophistication; today, fewer people remember those than don't. Games have evolved dramatically. Their ultra-realistic environments are now considered an art form and are celebrated at annual award ceremonies analogous to the Oscars.

So, has gaming been a boon or bane for humanity? Economically, there's no doubt. The industry provides hundreds of thousands of people with gainful employment and generates annual global revenues of c.$250bn, dwarfing the music and film industries at c$100bn and c$30bn respectively.

For billions of gamers, the industry offers countless hours of entertainment, albeit it is not without its dark side. Gaming has clear social issues. Personally, as a member of Generation X, the first to have experienced a lifetime of video games, my view is we have emerged relatively unscathed, but it is important to look from all angles.

Visting Gamescom in Cologne last month, now the world's largest video gaming conference, I was struck by the balance between male and female gamers, an impression backed up by the data. According to game data platform Newzoo, women represent around 46% of gamers worldwide with the average female gamer skewing older than the average male (44 versus 35).

While I was probably one of the older attendees at the conference, gaming is not just the domain of the young. Industry data shows that gamers are older than ever before. Specifically, the Entertainment Software Association suggests 28% of US gamers are over 45, with 14% aged 55 or older. UK gamers are even grizzlier. Ofcom reports that nearly one in three aged 55 or more play video games regularly. Even seniors, given fewer time commitments, seem keen to remain part of the community, accounting for 7% of the gaming population according to Newzoo.

Although gaming is primarily a source of enjoyment, there are clear health benefits, particularly for older players. Recent analysis found some game-based treatments could substantially improve processing speed, attention and mental function for people over sixty. Another study suggested older adults who played regularly scored cognitively similarly to people ten-to-thirteen years their junior, while VR 'exergames', exercises combining movement with cognitive challenge, can have longer-lasting mental acuity benefits.

It is not just older people who do well from maintaining reaction speeds. A 2007 report indicated that surgeons who play video games can perform better in laparoscopic operations. The report suggests they tend to be faster, make fewer mistakes and handle 3D visualisation more effectively. Given these operations essentially require the use of a controller and a screen, the gaming benefits are perhaps unsurprising.

Gaming also has social benefits. The perception players spend hours alone locked away in a dark room, furiously fighting imaginary enemies, is often misplaced. Relationships and friendships can be born and nurtured through gaming, pulling together people with similar interests from across generations. Gaming is an important social outlet for many. From personal experience, I know people with disabilities who use gaming as one of the most important ways they interact with others. Gaming groups are incredibly supportive with in-game dialogue often moving far beyond the circumstances and position of the game.

Incorrect stereotypes reinforced

Health, enjoyment, social, economic and technological benefits aside, there is a darker side to the industry, the most serious of which is the role of video games in school shootings. There have been several instances where the killer regularly played violent games, and the hyper-realism of these does risk normalising violent behaviour for some. That said, the data tells a different story.

According to a US Department of Justice report, violent youth crime arrest rates fell between 1994 and 2020 – by 78%. Another report showed youth incarceration dropped by a similar rate, 75%, between 2000 and 2022. But while the instances of youth violence may have reduced over time, access to modern weapons means one troubled teenager can have a disproportionate effect on many lives.

Social communication within games certainly has benefits but there are also grooming and cyberbullying risks. Reports from child safety organisations have highlighted instances of predators using in-game chat functions to initiate contact with minors, often moving conversations to less moderated spaces according to a 2022 BBC report. Companies such as Roblox are exposed to this risk, particularly with 40% of its daily active users under thirteen. Roblox has invested heavily in moderation tools, AI chat filters and reporting systems, but the sheer scale of user-generated content makes full prevention challenging as evidenced by the State of Louisiana's recent case against the company. For young players, particularly those without active parental oversight, it is not just their emotional well-being at risk but their safety.

Addiction is another area where the industry faces negative headlines. However, a 2021 report suggests only 3%-4% of gamers have a gaming disorder, a comparatively low figure. China is perhaps the best example of a country that has taken this issue seriously, restricting minors to one hour of gaming per day on weekends and holidays, with a strict 10pm to 8am curfew. Even if it is not officially addictive, gaming can be incredibly absorbing and therefore is an activity with a potentially adverse impact on family dynamics. While children may infuriate their parents by not coming down for dinner ("just one more level"), the cost of spending parents' hard-earned cash on in-game items can be even more destructive. It is a fair criticism. Games are often designed to entice players to spend more in order to advance faster with 'loot boxes' offering the chance to win an important virtual item, a ploy tapping into gamers' gambling sensitivities.

One vivid real-world application which sits astride the debate is the role of gaming skills within the military. Drones are operated using interfaces resembling gaming controllers, while recruits with a gaming background often excel at multitasking, spatial awareness, and decision-making under pressure. Advanced simulations are now integral to training and planning, offering realistic, risk-free environments to test tactics, experiment with coordination and, importantly, learn from mistakes.

So, while there are clear benefits to gaming, the industry also ticks all the wrong boxes: sexual predation, incitement to violence, gambling and addiction. But the truth is that gaming is no longer a fringe activity; it is a mainstream medium and it is not going away. For a minority, the risks are real, but these should and can be controlled with carefully thought-out government regulation and parental intervention.

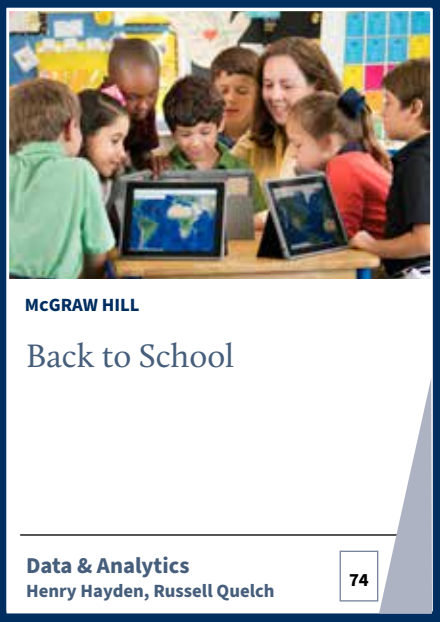
Personally, it is hard to imagine a world without gaming. It is an industry that has become a fixture in our cultural infrastructure, albeit one about which, given the risks, consumers should never become complacent.

Research Matters

A Selection of Recent Analysis

15 September 2025

11 September 2025



18 August 2025

Harry Read

Accenture, Capgemini, TCS, Infosys, Reply

3 September 2025

IT Consultants

The Generative AI Paradigm

While Gen-AI presents the same services fee growth as the cloud, product owners will subdue the portion of the increment distributed to traditional consultants. Unlike the cloud, AI presents a fundamental change in delivery model, from offshore to automated. This threatens volume (headcount) growth, which has typically been the sole contributor of revenue expansion for consultants. Commoditisation of delivery presents revenue growth and gross margin risk, as pricing power erodes.

Cara Thomson, Simon Clinch

Intercontinental Exchange, CME

26 August 2025

Energy Derivatives

Going Dutch

While ICE and CME Group have benefited from heightened volatility in their energy derivatives franchises, we see the risks of volume normalisation as less threatening than perceived and perhaps even behind us. We take a deeper look at the energy franchises of both companies and conclude that, while both have strong positions, Intercontinental Exchange's exposure to structural growth in Dutch Title Transfer Facility (TTF) gas offers investors a more attractive asymmetric skew to the upside.

REGENERON

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crazy Tennis

The Inexorable Growth of Padel

Alex Brignall
Transport & Leisure Research

Have you ever heard of Marc Chapman? No? Thought not. How about Agustin Tapia? Shame on you. You are probably trying to recall former colleagues or lower league footballers, but you'll have no luck there. I will return to Tapia, but Marc Chapman is World Champion in a sport played by eleven million Britons each year. The 'sport' is crazy golf, and I'm embarrassed to say I was entirely unaware of him or his achievements until I started writing this piece. This despite his declaration that, "We are like the Rafael Nadal, Novak Djokovic and Roger Federer of the crazy golf world". That'll be the royal 'we'.

The UK's first crazy golf 'course' opened in Skegness in 1926, but they have expanded rapidly in recent years, growing 25% since the pandemic. This reflects a popular seaside activity being transposed into a city centre, night-time social event.

Urban expansion offers a pivot into the occasion which prompted me into writing this piece. It is July, and forty of my colleagues are heading out to the office crazy golf event. The number of attendees validates the decision to swap the traditional golf day for crazy golf. It had felt uncomfortable for some time that twelve of us would leave for an entire day to play golf while our colleagues toiled in the office. The number of attendees was not a consequence of availability, but rather a measure of how many people played enough golf to be willing to risk the mortal shame of losing three balls on the first tee, a fate endured by one (ex-)colleague.

Golf is hard, and with fewer than six million playing in the UK, it is 50% less popular than crazy golf. However, Marc Chapman would have to win the World Crazy Golf Championship each year until 51,785 AD to match the prize money won by the World number one golfer, Scottie Scheffler, in 2024, with no adjustment for inflation. Scheffler also enjoys a substantial sponsorship deal from Rolex, among other brands, none of whom appear to have shown any interest in the crazy version of golf.

Crazy golf is more widely played than traditional golf, but there is no elite competition and insufficient interest to attract television or commercial attention. The reason is simple: it is not a good medium for determining skill. It would have been as hard to identify the generational talents of Tiger Woods and Jack Nicklaus by asking them to putt through a rickety windmill as it would be to identify a chess grand master at a checkers competition.

In an earlier life, I won the National Schools Championships at a sport called rackets. If you are now on Google, it is not racquetball, but rackets. National Schools Champion is a misleading title for a sport with only 28 courts across the country, and for which I qualified by not being good enough to make the rugby team. As non-inclusive sports go, rackets is right up there. One recent 'World Champion' didn't even make the first pair of his school team, and his real skill appears to be his resistance to gout, which often follows the traditional post-game fare of red wine and barely cooked meat.

Rackets is one of the fastest ball sports in the world, akin to playing squash on a giant court with a wooden tennis racket and a golf ball travelling at almost two hundred miles per hour. Tim Henman warmed up for tennis matches at Queens by playing rackets. Rackets can make a strong claim to be harder than tennis, but that does not mean its world champion is more talented than Roger Federer, or that it would have taken Tim Henman much effort to become world champion. Unlike crazy golf, rackets suffers not from simplicity but exclusivity, and the lack of public and commercial interest reflects this.

I was unable to attend this year's crazy golf evening, which would ordinarily have been a source of discontent, but a ticket to the cricket more than compensated. While there, another sport was discussed, one with which I have been grappling for some time.

Padel has become wildly popular in the past couple of years, especially in finance circles if my Instagram feed is to be believed. The first world championship was played in 1982, and the title has been shared between Argentina and Spain. The winners are not household names outside padel circles and, as you may have guessed, the top ranked player is Agustin Tapia.

The increase in popularity has driven a tenfold increase in the number of padel courts in the UK over the past five years, from fifty to five hundred, albeit this remains dwarfed by the 24,000 tennis courts. However, padel is administered by the Lawn Tennis Association, and with one tennis court capable of being converted into two padel

courts at minimal cost, there is huge potential for further growth.

At the cricket, a friend asked if I was worried about future elite tennis players being lost to padel. Having played a lot of tennis in my youth, his question resonated, especially as the parent of one tennis-mad eight-year-old and one six-year-old for whom padel might be a better fit.

Padel's popularity, particularly among adults, is built on solving a problem tennis has found insoluble. Golf has a high barrier-to-entry, as it takes a long time to learn how to play well enough to be able to enjoy a round. Tennis has solved the barrier-to-entry problem but has a shared enjoyment problem: players need to be of a relatively similar standard to enjoy playing together. This is much more troublesome. Golf has navigated this through its handicap system, which means a hacker like me could enjoy a competitive round with Rory McIlroy by virtue of adjusting my score for the (very large) number of shots by which McIlroy would be expected to beat me. So, golf has solved the 'barrier-to-enjoyment' problem, but struggles with the 'barrier-to-entry' problem, which is where crazy golf comes in.

Padel uses a softer ball than tennis and is played with wooden bats which remove much of the spin, while the walls surrounding the court remove the premium on accuracy and tactics which are important components of high-level tennis. Tennis solved the barrier-to-entry challenge with mini-tennis, where children and beginners use softer balls and smaller rackets with low-tension strings, playing on a smaller court with a lower net than full-court tennis. The parallels of mini-tennis to padel, and, even more-so pickleball, a sport which is also mushrooming but one I really cannot endorse, should be easy to spot.

The barrier-to-enjoyment problem is much harder to solve in tennis than in golf as tennis is played 'against' your opponent whereas golf is played 'relative' to your opponent, i.e. with one player's play not affecting the other. This is padel's USP. The elements that encourage tennis players to look down their nose at it are precisely those that mean the barrier-to-enjoyment is much lower. Thus, in a world where time is for many people the most valuable commodity, padel has solved tennis' barrier-to-enjoyment by allowing friends with a broad range of ability to play a competitive sport against each other.

I started this article as a typical tennis player sceptical about padel, trying to find an angle for a hit piece, but my conclusion is more nuanced. Is padel fun? Yes. Is it a good test of skill? Not so much. Does that underwrite its continued popularity? Almost certainly. Should we be worried about future Wimbledon champions being lost to it? Absolutely not.

Of course, it is incumbent on padel advocates to disagree. Marketing executives would have a far greater challenge if padel were called mini-tennis, or even crazy tennis, particularly when marketing to the competitive young professionals who seem to have taken to it so enthusiastically, so this conclusion may raise a few hackles.

However, as a highly inclusive sport which can expand easily given existing tennis infrastructure, its prospects are good, regardless of my reactionary predisposition.

Making it look easy

Glastonbury

Thoughts of a Festivalgoer

Max Georgiou
Global Financials Specialist

This year I attended my ninth consecutive Glastonbury Festival of Contemporary Performing Arts or, colloquially, 'Glasto'. To me, Glastonbury is an example of economic theory colliding with the mud-splattered or sunburnt reality of more than 200,000 music lovers submitting themselves to tens of thousands of steps a day, questionable hygiene standards and cattle-like crowd control.

After subjecting myself to these conditions for the ninth time and hoping there will be many more, I find myself increasingly drawn not only to the transcendent moments – Snow Patrol's ethereal *Chasing Cars* floating across the Other Stage as dusk settled over Worthy Farm and a plane sky-typed a smiley face, or the ecstatic chaos of Scissor Sisters – but by the event's evolution. From its 1970 incarnation as the Pilton Pop, Folk and Blues Festival, Glastonbury has evolved into a case study of information asymmetry, luxury positioning and market segmentation.

In my first year, arriving at the grounds with little more than a Nokia brick and soaked backpack, Glastonbury operated a fundamentally different model. Information travelled at the speed of conversation. Secret sets were secret, discoverable only through serendipity or industry connections that seemed fictitious to those wearing 'general admission' wristbands. The festival was democratic in its chaos and unified by its shared ignorance of what lay beyond the next stage.

Today, Glastonbury is a complex multi-tiered economy where information has become a currency, and access to knowledge, comfort and experience stratifies attendees. The evolution mirrors broader themes we observe across luxury markets and asset classes but condensed into a five-day microcosm in rural Somerset.

Walking through the circus of Block 9 for a 'secret set' by one of my favourite artists, my group was struck by how the information economy has shifted. If financial markets aspire to information efficiency, Glastonbury operates on the opposite premise: asymmetric information isn't a market failure, but rather the inherent architecture of the experience itself. The festival's secret sets, surprise appearances and unmarked performance spaces create a parallel economy where insider knowledge translates directly into experiential returns, and social media has transformed serendipity into a sophisticated cascade system.

Consider the mechanics behind rumours of a secret set. On the Saturday of this year, Pulp played on the Pyramid stage under the alias 'Patchwork'. Whispers had been circulating it would be Pulp before the festival began. However, there are information hierarchies. Those with backstage access or industry connections possess actionable intelligence worth queuing time or a spot near the front. This knowledge propagates through social networks, degrading in accuracy and timeliness with each degree of separation. By the time rumours reach general circulation, they often morph, sending thousands on wild goose chases across nine hundred acres of Somerset farmland.

Today's environment has parallels to equity markets. Secret sets are announced through orchestrated social media campaigns and coded industry signals. Spotify playlists hint at surprise appearances. Hardcore fans decode cryptic messages in minutes. The result is a secondary market for information itself, where Twitter followers, industry connections and even proximity to certain stages create actionable ideas, much like the drive for high-frequency or proprietary data that many funds are pursuing today.

This year, I witnessed an emblematic moment when news of an unannounced Lorde set spread through the crowd. However, the democratising potential of technology has paradoxically created forms of inequality. Those with social media strategies and professional

Happy daze

connections possessed an advantage unimaginable in the analogue era. Efforts to preserve spontaneity collide with the relentless drive towards efficiency, resulting in a hybrid information economy where serendipity and algorithm coexist.

This transformation reflects a broader paradox. No aspect of Glastonbury's evolution contradicts economic theory more than its pricing. When tickets leapt from £285 in 2022 to £360 in 2024, a 26% increase far outpacing inflation, conventional thinking suggests demand should have contracted. Instead, the opposite occurred. The scramble for tickets became more frenzied than ever as experiences broadcast on social media drove the social currency of attendance.

This phenomenon transforms Glastonbury tickets into a 'Giffen good' – a market anomaly where demand increases in tandem with price. As prices rise, the festival not only maintains its position as the premier cultural experience but also reinforces that positioning through the price signal. Each increase creates a virtuous cycle whereby exclusivity breeds desire, justifying further exclusivity.

There are clear parallels to luxury asset markets. As contemporary art stokes bidding wars, or vintage Bordeaux becomes more coveted as prices rise, so Glastonbury has transcended simple supply-demand mechanics. The high price is integral to the value proposition.

Seeing friends struggle with the ticketing system last November, I was also struck by how pricing psychology has shifted. They weren't purchases, they were investments in social capital, cultural credibility and access to a narrative that money increasingly can't buy – except, of course, it can, and the price was rising.

The pricing evolution coincided with the festival's most visible transformation: the rise of the hospitality market. A decade ago, luxury meant a less muddy camping spot and functioning phone charger. Today, packages command more than £10,000, a 4,000% markup over general admission, making even the boldest luxury brands appear conservative. These packages offer not only accommodation but also parallel experiences, including private viewing areas for main stage performances, champagne receptions with industry luminaries and, most importantly, guaranteed access to clean facilities. The pricing isn't only about premium positioning it's also about market segmentation. Two festivals now occupy the same space.

The economic dichotomy is impressive, if chilling. By creating ultra-premium offerings, the festival argues it subsidises general admission, maintaining accessibility while extracting the maximum consumer surplus from high-net-worth attendees. In reality, it is a textbook case of dynamic pricing.

The 'glamping' contingent populates environments carefully curated to eliminate friction, discomfort and uncertainty. Private bars serve cocktails, while sets are performed for select crowds in private areas unknown to most general ticket holders. Rest areas and functioning toilets offer respite. But the experience, superior by conventional measures, loses something essential in translation.

The comparison with global wealth inequality is unavoidable, the whiff of organiser hypocrisy hard to avoid. For, while the festival's democratic ideals persist in its rhetoric, the economic reality crafts a systematic advantage for the few.

However, for all this analysis, Glastonbury's democratic genius lies in its ability to create 'peak experiences' for all festivalgoers, no matter the size of their wallet. These are moments that justify any cost, or toilets in any state, and transcend the strictures of traditional economics. For me, experiencing Elton John close the Pyramid Stage in 2023 with 120,000 voices singing *Rocket Man* in perfect unison rendered arguments over the ticket price redundant. The broken tent, overpriced food and interminable queues dissolved into the human connection of a shared musical experience.

It is this arbitrage between cost and emotion that explains why Glastonbury's model succeeds. Attendees aren't buying entertainment; they're investing in belonging, and memories that appreciate over time. The festival is both a luxury good and an essential experience, commanding a premium price yet delivering a value that exceeds purely monetary calculations.

My experiences have taught me that Glastonbury's product isn't music; it is social capital. In this realm, economics bends to serve a deeper human need, for community and purpose. In an age marked by isolation and uncertainty, Glastonbury remains priceless: five days where the intangibility of shared experiences trump rational economics.

Beyond Borders, Beyond Positions

The Rise of Nikola Jokic

Luke Han
Software & Cloud Graduate

Since moving to the UK, a persistent frustration has been the inability to watch live NBA. With tip-offs often falling between midnight and 3am local time, following games in real-time has unfortunately become largely impossible.

One would have assumed the awkward timing, alongside football's dominance, would have impeded the sport's growth here. To my surprise, this has not been the case. I have encountered lots of enthusiasm for the NBA, and my weekend rec leagues are frequently oversubscribed. This experience is not purely anecdotal. Basketball England reported that in 2023, 344,000 adults played basketball at least twice a week, growth of nearly 50% since 2021. In addition, 1.2 million children under sixteen played at least weekly, adding more than 20,000 from the previous year.

The growth in global interest reflects a structural shift for a sport undergoing its own revolution. Once dominated by American-born players, it is now becoming fully international. At the 2024 Paris Olympics, after finishing third in the 2023 FIBA World Cup, the US fielded a team including LeBron James, Stephen Curry and Kevin Durant. This team was widely considered to be the most talented basketball roster of all time, sporting eleven All Stars, three former Finals MVPs and seven who had won NBA championships. Yet, it only narrowly beat Serbia (by four points) in the semi-final and France in the final. Its average winning margin was nineteen points, less than half that of the original 1992 'Dream Team' who crushed their opponents by an average of 44 points.

The change has been evident within the NBA. This season, there were 108 international players making up a quarter of the league, compared to 24 foreign-born players (5%) in 1994. Additionally, of the past ten regular season MVP trophies, six have been awarded to international players. The median NBA star is as likely to hail from Athens or Ljubljana as from Los Angeles or New York, signs of waning American dominance over the sport.

The other major shift has been in the style of play. NBA veterans and media pundits have made a living complaining today's players are robotic, soft and lacking the grit of past eras. They characterise modern NBA games as a barrage of ill-advised and inefficient three-pointers jacked up from circus-shot range.

In reality, the transformation demands more from players, not less. For example, the centre position – traditionally occupied by the tallest, strongest and often slowest player on the court – once revolved entirely around grabbing rebounds, protecting the rim and scoring from within ten feet. All-time greats such as Shaquille O'Neal built their careers on dominating within the paint while contributing little outside. In the modern NBA, nominal centres like Bam Adebayo, Giannis Antetokounmpo and Draymond Green possess the skills to switch and defend any of the five opposing players from the rim all the way to the three-point line. Players like Karl-Anthony Towns, Nikola Vučević and Kristaps Porzingis shoot the three-ball with the volume and efficiency of a shooting guard while being 6'10" or taller. Meanwhile, big men like Domantas Sabonis, Alperen Şengün and Victor Vembanyama have become capable ball-handlers, initiating offences often as the primary playmaker. Today's NBA demands multi-dimensional skillsets in every position. Nikola Jokic of the Denver Nuggets serves as a clear example.

Born in Sombor, Serbia, Jokic contradicts expectations. He lacks the chiselled frame, runs at below-average speed and rarely jumps high enough to dunk the ball, despite being listed at 6'11". Visually, he lumbers around the court and looks more like a middle-aged father in an after-work pickup game than one of the best players in the world. He is also perhaps the most nonchalant MVP in recent memory. After winning his first NBA title in 2023, in response to a reporter's question about how he felt, Jokic replied, "It's good. It's good. The job is done. We can go home now." He famously showed more interest in returning to his racehorse in

Serbia than attending the Nuggets' championship parade.

Yet his impact on the court is remarkable. His performance over 2024-25 was one of the greatest individual seasons ever. Jokic averaged 29.6 points, 12.7 rebounds and 10.2 assists per game over seventy games. This is known as a triple-double, where a player achieves ten or more points, rebounds and assists, a stat that used to make headlines when achieved by a player in a single game.

Averaging a triple-double over a full season has only been achieved by three players in NBA history, with a 55-year gap between Oscar Robertson in 1962 and Rusell Westbrook in 2017. Ranked against his fellow players this season, Jokic is third in points per game, third in total rebounds per game and second in assists per game, the first player in NBA history to be so. He also ranks fourth in total steals and third in mid-range field goal efficiency.

Advanced metrics reinforce the argument. Box Plus/Minus (BPM) measures a player's impact by analysing the incremental number of points per hundred possessions a player adds to their team, compared to the average player in the league. Daniel Myers, the creator of the BPM stat, argues a score above eight is an "MVP season", while anything above ten is an "all-time season", equivalent to the "peaks of Jordan or LeBron", who were widely considered the greatest players of all time. Since 1973, a BPM score above ten has only been achieved in 33 regular campaigns. A score of above twelve has only been achieved in eight seasons. Of these, five belong to Nikola Jokic.

Despite lacking elite speed or athleticism, Jokic dominates offensively through an incredibly polished all-round game. Near the rim, his stocky frame and agile footwork make him almost impossible to counter. His arsenal of post-up moves, a style of basketball where the player has his back to the basket, is equal to any of the all-time greats. Jokic was first in the league in post-up points this year.

Making space

The two defensive schemes that opposing coaches have set up to stop Jokic are either to push him out further away from the rim, or for additional defensive players to collapse inwards and double-team him in the post. Pushing him further away has failed. This season, Jokic recorded a career-best 138 three-pointers on 42% efficiency, one of just two centres within the top twenty in the league in three-point field goal percentage. The other strategy, collapsing inwards, has been even more futile, as Jokic is also the greatest passing big man of all time, consistently punishing defences by finding open teammates for shots whenever teams send additional defenders to him.

And yet, even a season of this calibre wasn't enough in today's league. In a decisive Game 7 in the second round of the playoffs, Jokic and the Denver Nuggets fell to the Oklahoma City Thunder (OKC), led by Canadian guard and eventual MVP Shai Gilgeous-Alexander. The Thunder, the second youngest team in the league, showed remarkable cohesion, balance and raw talent across their roster, sporting their own 7'1" centre Chet Holmgren, famous for his guard-like skills and agility. OKC went on to win the NBA Championship in a gruelling series against the Indiana Pacers.

This result, despite Jokic having perhaps the greatest all-around season of all time, is testament to the level required to win today's NBA. It also underscores a broader truth: the league is in an era of unprecedented parity. There is no longer one dominant team steamrolling the competition. Instead, the league has a deep roster of highly skilled contenders, with elite players hailing from Canada, Serbia, France, Slovenia and beyond. The game has not become diluted or robotic, but more demanding, diverse and global than ever before.

If the greatness of Jokic signals the modernisation of the centre position, then the rise of Shai and the Thunder symbolises the changing of the guard – and the arrival of basketball's truly international future.

Gold Star

In Praise of Saffron Walden

Richard Radbourne
Capital Goods Research

My wife, two daughters, dog, cat and I moved to Saffron Walden, Essex, in February 2020. Little did we expect to be imprisoned in our new home for the best part of the next twelve months. However, the subsequent five years have allowed us to appreciate the beauty of this historical town, its range of services and attractions and cultural history. In March this year, Saffron Walden was named the best place to live in the UK by *The Sunday Times*.

Most readers will be familiar with 'saffron' in name, but perhaps not from where it originates or its broader uses. It derives from the flower of *crocus sativus*, specifically the crimson stigma known as threads. The etymology of 'saffron' lies in the Arabic *za'faran*, which means yellow. Today it is most commonly used in the culinary world as a spice and food colouring agent, notably in paella, risotto and rice dishes. It is also used as a dyeing agent for fabrics in certain parts of the world, particularly Asia. Saffron has also been shown to have medicinal properties in helping with depression, anxiety and weight loss, while studies have suggested it could help manage neurodegenerative diseases such as Alzheimer's.

Fewer readers will appreciate its value. As the world's most expensive spice, it is often referred to as 'red gold' given the highest grade has at times been as expensive to purchase as the world's favourite precious metal.

The reason is because harvesting saffron threads is highly labour intensive. Each *crocus sativus* produces only three stigmas (threads), which must be harvested in a narrow window of about three weeks during the autumn each year. Furthermore, picking the flowers and removing the threads must be done by hand. One kilogram of good quality saffron spice can require up to 150,000 threads, or about 50,000 flowers. Once harvested, the threads must be carefully dried and stored in airtight containers to prevent them being exposed to atmospheric pressure. Unlike gold, or many other food products or commodities for which machinery and modern technology can be utilised for harvesting, extraction and processing, saffron's ancient and backbreaking methods of cultivation are irreplaceable, at least as it stands today. Hence the high cost to produce and its value on the shelves.

Iran is by far the largest producer, accounting for an estimated 90% of the world's saffron supply, centred in the country's Khorasan region. The ideal climate and rich history of cultivation expertise allows this area to produce the world's highest quality saffron. Optimal growing conditions require direct sunlight for at least six hours a day during dry summers and well-drained soil, followed by mild winter conditions when the plants flower – all of which Iran has in abundance. Nevertheless, climate change has been impacting yields in recent years. If this continues, as seems likely, it will only drive the price of this precious spice even higher.

Afghanistan is currently the second largest producer of saffron, having transitioned from opium production. It also serves as a logistical route for Iranian saffron that cannot be exported directly to some countries owing to trade sanctions. India is the world's third largest producer, mostly from within the Kashmir Valley, while Greece and Spain complete the world's top five. Morocco, Turkey and Italy all feature on a smaller scale.

Given saffron production requires long dry sunny summers and mild winters, hardly conditions traditionally associated with England, it begs the question: how does Saffron Walden have the right to include 'Saffron' in its name?

Saffron flowers were initially planted in Walden during King Edward III's reign (1327-77) when its use as a yellow dye for the growing wool industry led to rising demand for the flower and therefore expanding production. Walden's rich chalk-based soil and a generally more suitable climate during medieval times allowed for successful cultivation of the plant.

The town was originally called Walden and later Chipping Walden. However, by the 1500s the cultivation of saffron crocus flowers had expanded so dramatically that, in acknowledgement of its importance in saffron production, the name was changed to Saffron Walden in 1514 by

Like your threads

Henry VIII. The five saffron flowers depicted in its charter formalised the change of name.

During the seventeenth century in northwest Essex, where Saffron Walden is situated, it became popular to decorate buildings with pargetting patterns of various designs. The saffron crocus became a common feature and can still be widely seen on buildings throughout the town. One of the many good examples is the grade I listed Old Sun Inn, originally a medieval house pargetted in 1676.

However, the commercial success of saffron production in northwest Essex was not to last, as purchasers saw the rising availability of cheaper imported saffron from Spain and the Middle East. Imported saffron was, at times, of a lower quality, having been diluted with the stigmas of the safflower, which can also be used for dyes. Despite this, it led to the rapid decline in production of the flowers in Saffron Walden and neighbouring villages and the disappearance by 1790.

Nevertheless, the saffron crocus remains entrenched in the town's culture and heritage. Aside from the numerous pargetting examples, there are many references to the flower – the Crocus Medical Practice is one the town's most critical services, albeit one I try to avoid.

While the saffron crocus is central to the town's heritage, its cultural history is much broader. Audley End House is one of the most important Jacobean properties in the country. Initially Walden Abbey, a Benedictine monastery, it was given to Sir Thomas Audley by Henry VIII in 1538 and converted for domestic use. It was demolished and rebuilt by Lord Howard de Walden (1st Earl of Suffolk, Lord Treasurer) and after several more changes in ownership is currently owned by English Heritage. The house is open to the public and hosts concerts during the summer.

Indeed, for pop pickers of a certain age, there is no more beautiful place to indulge a little nostalgia and enjoy your favourite 1980s bands on a summer evening. Adjacent to the house is a miniature railway that winds its way around the countryside and is very popular with children of all ages.

Saffron Walden is also widely regarded for its thriving market, which was awarded 'Best Small Outdoor Market' in 2018 at the Great British Markets Awards. In operation since 1141, it operates on Tuesday and Saturday, offering fruit and vegetables, plants, clothes, fresh fish and cheese, among other delights.

After a year of imprisonment in Saffron Walden and ignorance about the town and its surroundings, we have made up lost ground, enjoying its pleasures and learning about its rich history. If anyone is ever visiting or passing through, we would be delighted to show you around.

Letter from America

Garden Leave to Garden Life

Kevin Galvin
US Sales & Trading

Discovering a hobby in a chore might sound complicated, but meaningful transformations can begin in unexpected places.

I joined Rothschild & Co Redburn just over a year ago. One unexpected benefit of moving firms was a few months' free time, a rare gift in today's fast-paced world. My wife and I are blessed with two energetic children, Harper (7) and Ryan (4), who keep us busy. We live in a small coastal town fifteen miles south of Boston, in a home we fell in love with seven years ago for its historic charm and peaceful backyard. The backyard, once a selling point, had become a neglected space – overrun, uneven and forgotten.

That backyard became my project.

I envisioned restoring the space, both for aesthetics and as a place our family could gather, play and reconnect. I wanted plants that wouldn't require constant watering, knowing our coastal microclimate could swing from torrential downpours to dry heat almost overnight. The lawn was uneven, bordered by blue cobblestone footers that had sunk over time, and the rose bushes were skeletal from years of neglect. The garden, once a sanctuary, had become a symbol of deferred dreams.

I had help. My brother, a golf course superintendent who recently led the restoration of the International Golf Club in Bolton, MA, alongside Ben Crenshaw and Bill Coore, came down, surveyed the yard and said, "This is going to be a lot of work." I replied, "Good thing I have some time."

Over the next four weeks, with trips to the nursery and help from my wife and kids, I stripped back dead plantings, pruned rose bushes and hydrangeas, and spread fresh loam to restore the soil's pH balance. I learned how to test soil acidity, how to prune without damaging regrowth and how to edge beds to create clean lines. I immersed myself, researching soil composition, understanding microclimates and learning the language of plants.

Then came the planting.

We chose hardy perennials that could thrive in our unpredictable climate and shallow, ledge-filled soil: lavender for its fragrance and resilience, English ivy for ground cover, liriope for its grassy texture, peonies for their lush blooms, feather reed grass for vertical interest and daylilies for their cheerful color. My son helped to dig holes with a plastic shovel, while my daughter built a fairy village nestled among the flowers complete with painted stones and tiny wooden doors. It wasn't just gardening, it was storytelling, imagination and collaboration.

As green shoots, buds and full blooms appeared I found solace in repetition. I began to work with pride rather than urgency. Chores were no longer burdens, but opportunities for growth and connection. I started to understand the rhythm of the garden, the patience demanded, the subtle rewards offered.

This summer was our first with the garden fully grown in. It's become a gathering place for family, with our kids sharing the tasks. We've hosted dinners, played games on the lawn, watched butterflies. The garden is a reflection of our effort, patience and togetherness. Working with your hands is grounding.

Time well spent

Gardening forced me to slow down, to observe, to listen. It reminded me that growth isn't always linear, and beauty often emerges from persistence and care.

The challenges became part of the experience. Our hydrangeas, for example, are forever thirsty. I water them daily after the children are in bed. It's a quiet, peaceful, meditative moment, the reward for edging beds, pruning bushes, or pulling weeds under the midday sun.

The garden taught me about leadership and change. Just as plants need the right conditions to thrive, people do too. Whether a backyard or boardroom, transformation requires vision, patience and a willingness to get your hands dirty. It's not about perfection; it's about progress.

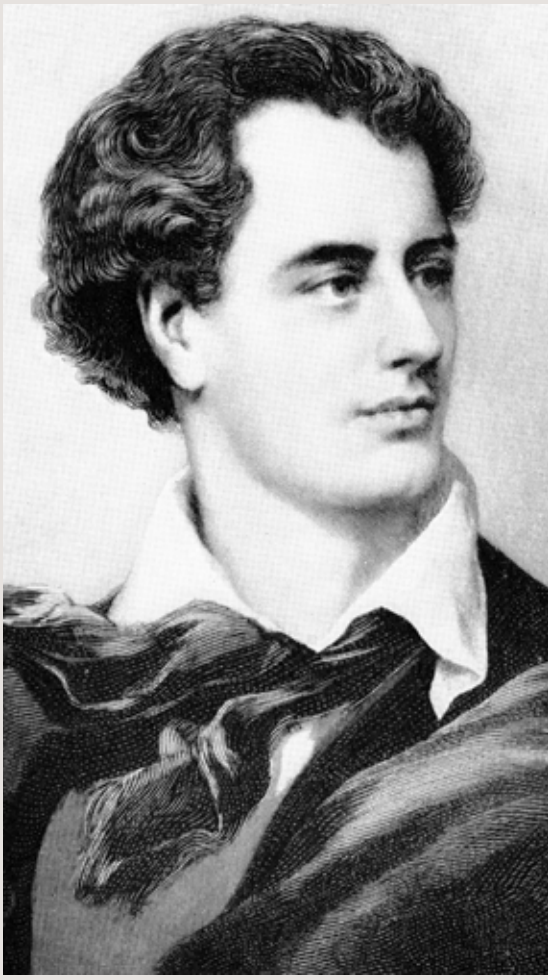
Gratitude comes in many forms. As the author Melody Beattie wrote, "Gratitude makes sense of our past, brings peace for today, and creates a vision for tomorrow." My garden leave was spent in the garden, doing hard productive work that never felt like work. It required patience and commitment, and it paid off in spades.

Time well spent indeed.

A Rockstar Poet

Why I Fell in Love With Lord Byron

Marina Hardwick
Supervisory Analyst



Like thousands of women in Europe in the 1800s, I developed a crush on Lord Byron. Mine has lasted nearly forty years.

Byron leapt to fame in 1812 when the first instalments of his romantic epic poem *Childe Harold* were published. Conventional for its time and full of overblown language ('chambers desolate and portals foul'), *Childe Harold* was part of an enticing package: Byron had a beautiful face, aristocratic lineage, and a club foot, setting society hearts a-flutter with a desire to adore and protect. But not long after, at the height of his fame, he fled England in the face of widespread horror at his rumoured affair with his half-sister, ending up in Venice where he rented a canal-side palazzo and energetically entertained entranced Italian ladies. He had to lock himself in and seek help when a besotted baker's wife became particularly demanding.

Eventually a young Countess, eighteen-year-old Teresa Guiccioli, left her husband and followed Byron on his European travels, as Greece's struggle against four hundred years of Ottoman occupation became his driving mission. In the meantime, he wrote the piece of work I consider to be his masterpiece.

Breaking away from the self-important romantic gesturing of *Childe Harold* and its ilk, the satirical mock-epic *Don Juan* attacked politicians, writers and anyone who did not match his fierce intelligence and hatred of hypocrisy. He dismissed authority figures with the lightest of touches and incongruous rhymes – '*having voted, dined, drank, gamed and whored/The family vault receives another lord*' – and his barbs were spot on. In his choice of the ottava rima format, in which the fifth and sixth lines frequently seem to be drifting off in flaunted incorrectness before the couplet manages to re-establish order and an ending, he flirts with self-mockery, but his motives and message are serious. It is in this long poem that he shines as a brave freedom-lover and virtuoso stylist.

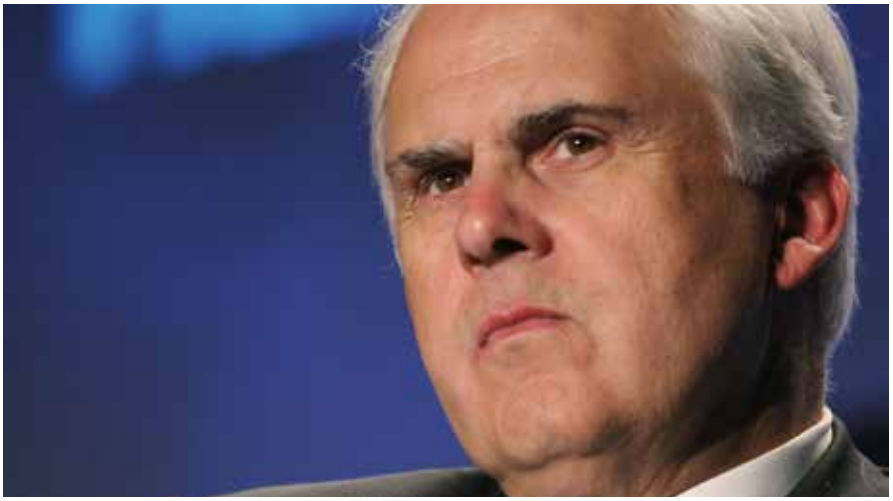
Like Teresa, I fell in love with this clever, critical, passionate man. I'm sure I, too, would have saved his sunburnt skin after it flaked off, as she did. However, I would have nursed him properly when he caught a chill in Messolonghi in 1824, so he would not have died tragically young. I read all eleven volumes of his letters, where he is outspoken and funny, and wrote a seven-thousand-word undergraduate dissertation on *Don Juan*. I have read every biography I could lay my hands on, watched the Tom Stoppard play *Arcadia* about Byron's mathematician daughter Augusta Ada, visited Newsted Abbey near Nottingham, ancestral seat of the Byrons, which he had to sell to a friend to raise cash for his Greek exploits, and seen the parish church at Hucknall where most of his body is buried (Westminster Abbey would not accept a notorious sinner into Poets' Corner). But I have not yet made it to Messolonghi in Greece where his heart was placed. I have, however, admired his travel desk in Athens's Benaki museum, (my fellow Greeks still admire his philhellenic record; Byron was not an unusual first name for Greeks in previous generations).

I hope some readers will be encouraged to read *Don Juan*. For a shorter but moving last word, I draw your attention to a better-known poem he wrote when he tired of the emotional and physical demands of celebrity. Even rockstar poets sometimes need to step back.

'So, we'll go no more a roving
So late into the night,
Though the heart be still as loving
And the moon be still as bright.
For the sword outwears its sheath
And the soul wears out the breast,
And the heart must pause to breathe,
And love itself have rest…'

Fred Smith

11/08/1944 – 21/6/2025



Transport was in Fred Smith's blood. His father built a Mississippi bus company and sold it to the Greyhound Line. He learnt to fly as a teenager. At university, where he was friends with George W. Bush and John Kerry, he reestablished the Yale Flying Club, originally convened by the appropriately named Juan Trippe who also founded Pan Am. He was twice involved in fatal car crashes. In Vietnam, he was a Forward Air Controller flying OV-10 Broncos, directing strikes against the Viet Cong. And his second wife's maiden name was Avis.

Southeast Asia provided the inspiration for his success. He claimed to have earned his business degree in the US Marine Corps rather than Yale, and he won the Silver Star for 'unhesitatingly rushing through enemy fire to rescue casualties on Goi Noi Island in 1968', a Bronze Star and two Purple Hearts. Between bouts of heroism he noticed, "In the military there was so much waste… invariably all the supplies were in the wrong place."

On his return, he joined his stepfather brokering private jets in Little Rock, Arkansas. But he became disenchanted, both with his stepfather and the business. Using a paternal legacy, he bought the company and established Federal Express.

Transferring cheques between branches of the Federal Reserve and the destination regional bank was famously slow and inefficient. Using a template he had created in a finance paper at Yale, for which he was apocryphally awarded a 'C' grade, Smith created the 'hub-and-spoke' system. In this, cheques would be flown from the Federal Reserve's branches to a central hub, processed overnight and delivered to the appropriate bank the following day. He named his embryonic Memphis-based company Federal Express, in honour of his only customer and because it "sounded substantial".

Unfortunately, his only customer pulled out, leaving Smith with an idea (and a substantial name) but no business. Undeterred, he switched to parcels, having realised there was a market for a premium service guaranteeing express delivery: "If a hospital in Texas needs a heart valve tomorrow, it needs it tomorrow", he said. On 17 April 1973, Federal Express flew 86 packages to 25 cities in fourteen Dassault Falcons.

It was not an overnight success. Cash burnt as fast as fuel. In the early days, aircrew were asked not to cash their pay cheques. A Cleveland courier pawned his watch to cover a landing charge. One Indianapolis pilot paid his own hotel bill. And, the stuff of legend, Smith played blackjack in Las Vegas with his last $5,000, winning the $27,000 he needed to stay aloft.

The debtors were held at bay and, benefiting from the deregulation of US air cargo, Federal Express flourished, using the strap 'Absolutely. Positively. Overnight.' In 1983, it became the fastest American company to reach $1bn revenues without M&A. Three years later, it expanded to the UK. In 1994, the group was rebranded FedEx, the noun colloquially becoming a verb, and by 2024 it was delivering seventeen million parcels per day across 220 countries, employing 500,000 staff and 698 aircraft.

That Fred Smith was a visionary is beyond doubt. An enabler of globalisation, not only did he singlehandedly create a market that had not previously existed, but he positioned his business at the turn of the millennium to thrive in the unanticipated and completely different world of e-commerce. An evangelist for the logistical possibilities of IT, Smith introduced – *inter alia* – data-driven route optimisation and real-time tracking. As he observed, "The information about the package is as valuable as the package itself."

A staunch Republican, he twice refused George W. Bush's offer to become Secretary of State for Defence, citing firstly ill health and latterly a terminally ill daughter, but co-chaired fellow Vietnam veteran's John McCain's presidential campaign in 2008 and was a pall bearer at his funeral. He rejected unionisation, maintaining "the only union at FedEx is the customer". It was a lifelong belief, one on which he created the conditions for just-in-time delivery and minimal inventory, two now-central tenets of the modern business world.

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Alex Brignall
Geoff Lowery

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Neil Tyler
Oliver Davies
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BLT: Transport & Leisure
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Andrew Tam
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Oliver Prayon
Philip Burton
Pierra Morgan
Pooja Patel
Rayan Blanchard
Rowan Adley (TMT)
Stuart Joyner (Energy)

Rothschild & Co Redburn Sales Trading +44 20 7000 2000
Andy Wilson
Alexander Laux
Andrew Quick
Blanca Segimont de la Concha
Emma Horner
James Kebell
KC O'Rouke
Lisa Christou
Luc Demoulin
Oisin Doyle
Tony Atkins

Rothschild & Co Redburn Execution +44 20 7000 2010
Benjamin Rose
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Redburn Atlantic LLC / Member FINRA/SIPC
461 Fifth Avenue, 15th Floor, New York NY 10017
131 Dartmouth Street, 3rd Floor, Boston MA 02116

London
Capital House
85 King William Street
London, EC4N 7BL
Tel: +44 20 7000 2020
contactlondon@redburnatlantic.com

Frankfurt
Börsenstraße 2-4
60313 Frankfurt am Main
+49 69 667 799 82
contactfrankfurt@redburnatlantic.com

Madrid
Paseo de la Castellana, 35
28046 Madrid
Tel: +34 919 26 85 66
contactmadrid@redburnatlantic.com

Paris
11 Rue de Téhéran
75008 Paris
Tel: +33 1 73 05 40 30
contactparis@redburnatlantic.com

New York
461 Fifth Avenue, 15th Floor
New York NY 10017
Tel: +1 212 803 7300
contactnewyork@redburnatlantic.com

Dallas
6060 N Central Expressway, Suite 561
Dallas TX 75206
Tel: +1 212 803 7321
contactdallas@redburnatlantic.com

Boston
1 International Place, 14th Floor
Boston MA 02110
Tel: +1 617 273 8263
contactboston@redburnatlantic.com