Investment nirvana?
What is India's true potential?

The fight against Alzheimer's
Battling Britain's biggest killer

Three billion years in the making
Scotland's geology and economy

Highly strung
The investment allure of violins
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Eastern promise?
India has been tipped to become the world’s second-largest economy by the middle of this century. According to a study by PwC, it will account for 15% of the global economy as a whole, leaving the US, with 12%, in its wake; only China, with 20%, is expected to outshine it.

We can put these predictions into perspective by reflecting on each country’s share of the global economy in 2016, when PwC was compiling its report. The US’s was 24.32%, China’s was 14.84%, and India’s was just 2.83%. It does not take a mathematical genius to conclude that India’s rise is forecast to be notably meteoric.

In this edition of Rathbones Review we take a closer look at India’s ongoing transformation and the radical reforms that are fuelling change. We examine the role of technology and how an extraordinary appetite for data is reshaping attitudes towards spending, saving and investing. Drawing on a range of expert insights, including those of former BBC New Delhi Bureau Chief Sir Mark Tully, we analyse whether India’s potential trajectory really is as promising as has been suggested.

As we welcome our new colleagues and clients from leading Scottish wealth manager Speirs & Jeffrey, we also take a look at the economy of Scotland, exploring how the country’s landscape has moulded industries such as gas, oil, whisky and tourism.

Elsewhere, as ever, we cover a broad range of topics. These include the battle against Alzheimer’s, the spread of artificial intelligence and the fightback against fake news. We also offer two articles about nature — one dealing with nascent efforts to control the weather, the other with the aftermath of the elements at their most violent.

I hope you enjoy this latest edition of Rathbones Review. Your feedback is always welcome.
Investment nirvana?
Investment nirvana?

Economists forecast that India will become the world’s second-largest economy by 2050. Here we examine some of the seismic reforms that are helping to transform this country of 1.3 billion people beyond recognition. On pages 8 and 9, the BBC’s former New Delhi Bureau Chief, Sir Mark Tully, reflects on the changes taking place and his hopes and fears for the future.

Nehal Desai, Investment Manager, Rathbones
It is hard to grasp the epic scale of the reforms that have transformed the Indian economy in the past four years since Prime Minister Narendra Modi came to power.

Some see Modi as a visionary; others think he has been reckless. In November 2016, two years into his term of office, he appeared on national television to unveil a plan to crack down on the shadow economy and the use of counterfeit cash to fund illegal activity. His approach stunned everyone. He told viewers that from midnight, just four hours later, virtually all 500-rupee and 1,000-rupee notes — effectively 86% of the currency outside a bank branch — would be invalid and that the cash would have to be exchanged at banks for a new series of notes.

Chaos ensued. Long queues formed at ATMs. Indian stock markets fell 6% in one day as a nation that relied heavily on cash grappled with the challenge of exchanging old notes for new.

There is little evidence to suggest the measure helped reduce fraud, but it may have changed attitudes to cash. Avinash Vazirani, manager of the Jupiter India Fund, says: “99.9% of Indian households now have access to a bank account. It was less than 59% before Modi came to power – 324 million new accounts have been opened. Money is coming out from under the mattress and going into the banks, and people are not putting as much money into physical assets like gold and property.” Proportionally, more households have bank accounts in India now than in the US, where the figure is nearer 93%. Critics, however, would argue that many of the Indian accounts are actually empty.

It is still quite a transformation, though, helped by the astonishing speed at which internet and mobile phone coverage has penetrated nearly every corner of the country. One mobile phone network in India, Reliance Jio, which only started operations in September 2016, was consuming more data than all of the US mobile networks put together by spring this year. India has gone from being 158th in the world in terms of mobile consumption of data to number one in a matter of four or five years.

Another influential development has been India Stack – a set of open application programming interfaces designed to create a unified software initiative that is enabling India to embrace the digital age as wholeheartedly as any developed nation. Its most controversial aspect is the storing of biometric data, such as fingerprints, for every citizen – the biggest biometric identity project in the world. It has led to privacy protests and complaints that older people with worn-out fingerprints are being denied government services, like rations, because their fingerprint ID does not work.

For many, though, it has opened up the opportunity to have digital lockers for personal records, e-signatures and online wallets. It has enabled them to open bank accounts in seconds and use banking phone apps.

One of the biggest benefits of India Stack has been the development of a “unified payment interface” that allows Indians to make instantaneous payments for free. Visit an Indian vegetable vendor in the street today and it is not uncommon to see a QR code on a post near the front of the stall. To pay you simply take a picture of the QR code on your phone and press a button: the money goes straight to the recipient, who receives a message seconds later to confirm the payment has been received.

Vazirani says: “As small traders begin to conduct transactions digitally they develop a digital footprint. This is really good for getting credit, so the cost of accessing credit and demonstrating creditworthiness has come down. Many relatively poor people are now able to access credit, and that can free them to invest and grow their businesses. We’re at the start of a journey that could be very exciting.”

Visit an Indian vegetable vendor in the street today and it is not uncommon to see a QR code on a post near the front of the stall.”

Many Indian street vendors accept contactless QR code payments from mobile phones.
Modi’s other major reform has been the introduction of a nationwide Goods and Services Tax – India’s first common market sales tax. It replaced a messy tangle of national and local levies and duties.

The tax is not as simple as it might be – there are six different rates – but it has enabled India to close down the checkposts at internal state borders, where lorries carrying goods were often left languishing for hours. This is significantly reducing logistics costs and supporting economic growth.

The combination of the new tax and the increased use of banking is also leading to growth in the number of people actually paying taxes, though it is still only 5% of the Indian population that file an annual income tax return.

The problem of poverty remains – over 64 million urban Indians live in extreme destitution. But the number is falling rapidly. Modi is developing a health insurance system that aims to cover 500 million people eventually. Again, the system has critics, who express concerns about the lack of health service providers and the corruption of those that do exist.

Other Modi schemes, launched with great fanfares, have failed. These include Smart Cities, Cleaning the Ganges and Clean India. Government officials privately admit that half the lavatories built to replace open defecation do not work.

Vazirani understands the criticisms but focuses on the positives. As more people escape poverty and begin earning, the opportunities for investors grow, he says. He cites the example of Gillette, which has spent millions on advertising to establish itself as the only pan-India shaving brand.

He says: “Here’s a country with 670 million men, 45% under the age of 25. They are hugely aspirational, all moving up from earning a few dollars to a few more dollars a day. What will they buy? Gillette – and for years to come, in my view. A similar story applies to Procter & Gamble Hygiene and Healthcare, which has an 80% share of sanitary towels – only 15% of women use them, but usage is going up. These companies are at an inflexion point of growth that looks like an S-curve. A lot of the Indian economy is at the start of the S-curve and has huge growth ahead of it.”

More recently, rising oil prices have set back India’s growth. Around 80% of India’s oil consumption comes from imports, which makes the country vulnerable when the oil price is high. The strong dollar – used to price oil – is not helping.

**Youngest world economy**

580m
under 25, that is 45% of the total population

Source: Jupiter Asset Management

“As more people escape poverty and begin earning, the opportunities for investors grow.”

Mumbai: poverty and wealth in close proximity.
Mainstream Indian markets have taken a sharp correction since the summer — down close to 20%. And the Indian currency has depreciated as much as 14% against the US dollar so far this year.

Yet Vazirani sees these as short-term threats. Other indicators suggest the Indian economy is more robust than the markets are pricing in at the time of writing. India is close to balancing its books for the first time since the financial crisis of 2008/2009. And personal indebtedness levels look much healthier than those in most developed markets: India has a 30% gross domestic savings ratio — as a proportion of GDP — compared with around 16% in the UK.

Vazirani concludes: “If you look beyond the next one or two years there is a clear growth runway ahead of India — and it is huge. How could I not feel excited?”

Financial inclusion

1.1bn bank accounts

99.9% of Indian households have a bank account

Source: Jupiter Asset Management

Every year a billion people ride the Delhi Metro.

When I first went to live in Delhi in December 1965, India was written off by international investors. Restrictions on imports were so strict and there was so little manufacturing that diplomats returning home at the end of their postings could sell second-hand underwear and half-used lipstick.

The country was described as living from ship to mouth, so dependent was it on American food aid. Its fragile economy had just been dealt a further blow by a second war with Pakistan. There were more cows on the roads than cars.

Fifty-three years later I live in a country with the fastest growth rate of any major economy. Delhi is now a modern city with huge skyscrapers and flyovers. The shoddy Ambassador car, which for many years ruled unchallenged, has disappeared, replaced by a dazzling array of modern vehicles and international brands manufactured in India.

Human-powered rickshaws are being superseded by electric cycle rickshaws, and we now have an extensive and crowded Metro.

From Independence until 1991, India was essentially a bureaucracy-bound, planned economy. The crisis in 1991, when it was on the verge of defaulting on its international loans, led to a process of liberalisation that continued over many years. Narendra Modi has radically escalated the pace of change, but his regime has not been an unqualified success. His Goods and Services Tax is showing signs of reducing the number of transactions escaping the notice of tax inspectors, but the haste with which it was introduced and the complications created by its different layers have not
helped to make its implementation smooth or popular.

Modi’s other attempt to tackle corruption – the demonetisation of higher-value currency notes – damaged small businesses and failed to achieve its objective of withdrawing large sums of untaxed money from circulation.

Under Modi, India has improved its position in the World Bank Ease of Doing Business Index, but it is still well down the list – at 77 out of the 190 countries covered. His reforms have fallen far short of the business community’s expectations.

The most obvious challenge India faces is poverty, in particular malnutrition. India is 103rd out of the 119 countries on the World Hunger Index. With the continuing hunger and poverty goes an imbalance in the economy.

Advertising and the increase in availability of all forms of communication are fanning the flames of consumerism.

There is a story that when, in 2008, Tata introduced its smallest vehicle – the Nano – marketed as the cheapest car available, the middle classes refused to buy it. Predicted to sell 250,000 a year at launch, the hatchback sold fewer than 8,000 last year, and in May production ended. That shows how advertising has shaped the consumerism of the middle classes – they don’t want to be associated with something that is cheap and more generally affordable.

Electric billboards, TV and newsprint push adverts for white goods, expensive cars, clothes and cosmetics – for men and women.

By any reckoning the vast majority of Indians do not have the means to live the middle-class life they see advertised.

India has a young population, often described as a demographic dividend. It could well prove to be a demographic disaster if governments are not more successful in creating jobs than Modi or any of his predecessors have been. Unemployed youths are a likely source of social instability.

Modi and his party’s aggressive Hinduism and hostility to Muslims – who constitute 15% of the population – is another threat to India’s stability.

So far Indian democracy, with its regular elections, has provided a sufficiently robust safety valve to contain the outbursts of communal violence that have broken out from time to time. But I see India’s tradition of religious pluralism being more seriously challenged than ever before by the BJP’s ambition to create a Hindu nation.

Then there is the continuing inability of India’s institutions to provide good governance and to enforce the law. N N Vohra is a civil servant who until recently was Governor of the troubled state of Kashmir. In a book called Safeguarding India he has warned that the country could face “chaos, turbulence and serious unrest unless public administrative systems become more efficient, responsive, productive honest and accountable”.

Having reported on the assassination of two prime ministers, the Bangladesh War, the Indian Army action in Amritsar’s Golden Temple, the Bhopal gas disaster, numerous natural disasters, financial collapses and chronic failures of governance, I have come to have a profound respect for India’s fundamental stability.

The problems, however, are getting bigger, and the population’s inherent faith that India always pulls through, somehow surviving calamity and chaos, risks lulling the nation into a false sense of security.
The fight against Alzheimer’s

The devastating consequences of dementia are now impacting more lives than ever. Every three minutes someone in the UK develops the degenerative disease, making it the leading cause of death in this country. Insufficient levels of funding and the high failure rate of prospective treatments have contributed to the situation, but could science offer us new hope?

Peter Thomson, Investment Director, Rathbones

Major breakthroughs in medicine mean that we are overcoming many of the diseases that once claimed so many lives.

Take cancer, for instance. A Macmillan report has suggested that cancer patients are now twice as likely to survive for a decade or more after diagnosis than they were 40 years ago. Some cancers, like testicular cancer, malignant melanoma, prostate cancer and Hodgkin’s lymphoma, now have 10-year survival rates in excess of 80%.

There have been similarly dramatic improvements in the treatment of heart disease. In 1961 heart disease claimed 320,000 lives a year; today the figure is 150,000.

Add to these radically improved treatments better understanding about the beneficial effects of a healthy diet and exercise and it is little surprise we are living longer.

As recently as 1980 a man retiring at 65 might expect to live another 13 years; today it is over 18. For women it was 17 years; now it is 21.

While welcome, this blessing of longevity may be a double-edged sword. It has left us more vulnerable to another disease – Alzheimer’s.

Some 850,000 Britons have dementia. The figure is expected to hit a million by 2025 and two million by 2051. Now the UK’s biggest killer, dementia is caused when the brain is damaged by diseases such as Alzheimer’s – which is the most common cause but not the only one.

With the annual cost of care for dementia patients in the UK currently £26 billion – a figure set to rocket to £55 billion by 2040 – the impetus to tackle the disease is growing.

Pay back

The medical community argues that the fight against any disease needs sustained, heavy investment over time, which Alzheimer’s has not had.
The fight against Alzheimer's
Scientists researching Alzheimer’s have not been entirely bereft of funding, but they have never garnered the same backing as those looking into cancer and heart disease. Even today there are four times more researchers in cancer than in dementia, according to Alzheimer’s Society.

Dr David Reynolds, the chief scientific officer for Alzheimer’s Research UK, says the divergence began several decades ago. “Back in the 1970s, when the public health authorities realised it was the biggest killer, a lot of investment went into understanding cancer, which led to several medicines emerging in the 1990s,” he says. “Dementia is 20 to 30 years behind where cancer is.”

Dr Reynolds acknowledges there has been a “big uptick” more recently in academic research and investment from companies towards developing dementia medicine.

Among the most notable commitments is the £250 million Dementia Discovery Fund. A collaboration between charities, pharmaceutical companies and the government, it backs early-stage ventures working to develop groundbreaking drugs and treatments for all forms of dementia.

Beyond this, the recently launched UK Dementia Research Institute – a £290 million collaboration between Alzheimer’s Research UK, Alzheimer’s Society and the UK’s Medical Research Council – acts as a conduit for leading medical minds to come together to help tackle dementia.

**Unlocking the puzzle**

The symptoms of Alzheimer’s were first described by Dr Alois Alzheimer in 1906. His patient, Auguste Deter, exhibited profound memory loss and other psychological changes in the latter stages of his life. An autopsy showed dramatic shrinkage of the brain and abnormal deposits in and around its nerve cells.

It took until the 1950s for researchers to discover that dementia – contrary to what some may still think today – is not caused by old age. Instead it is caused by illnesses that happen to predominantly affect people over the age of 65.

A key marker of the disease was identified in the 1980s. Researchers found rogue proteins — called amyloid and tau — in patients’ brains. If allowed to build up, these proteins block pathways — known as synapses — in the brain and contribute to the death of nerve cells and to subsequent neurological decline.

While medication was developed to slow the growth of these proteins, debate continued to rage inside the research community about the actual cause of the disease.

The effort to learn more was galvanised by former UK Prime Minister David Cameron, who in 2012 launched a national challenge to fight dementia by boosting research capabilities and improving care for people affected.

His spearheading of the first-ever G8 Dementia Summit in 2013 also shone...
“Some 850,000 Britons have dementia. It is now the UK’s biggest killer.”

Dr Reynolds says the four medicines currently available to patients only treat the symptoms and, while this no doubt comes as a relief to those affected and their families, more can be done.

“It’s effectively like having a coffee if you’re feeling tired,” he says. “It will perk you up, but it will wear off. The only thing you can do to address the tiredness is to go to sleep.”

**Alternative pathways**

With researchers battling away in the lab for breakthrough medicines, others in the medical community are looking at how to fill the void before a major discovery.

Hannah Churchill, research communications officer at Alzheimer’s Society, says developing a drug from scratch and then making it publicly available could easily take 20 years.

Given this, the charity is supporting a drug discovery programme that tests

**Protect yourself**

Many may believe that Alzheimer’s is simply an inevitable consequence of growing old – a case of “when” rather than “if”. Researchers suggest age is the biggest risk factor, which means that an ageing population may be more susceptible to it. But there are contributing factors that can be controlled. Alzheimer’s Research UK’s Dr David Reynolds says that at the population level one in three cases could be avoided by healthy living.

**Here are some things that could reduce your chances of getting Alzheimer’s.**

- Maintaining a healthy diet
- Regular exercise
- Keeping your blood pressure and cholesterol low
- Learning a language
- Staying mentally active and maintaining regular social activities
- Not smoking

Dr Reynolds acknowledges the pipeline of potential drugs is “thin compared to cancer” but says that several of these have a “good chance of helping us hit the 2025 goal”.

“There was new data over the summer that showed they still have promise,” he says. “There is a caveat, though, in that we have been here before with things we thought would be great but fell at the last hurdle.”

If proof were needed of just how difficult it is to create a drug to treat the disease, one needs to look no further than the date of the last UK approval: 2002.
whether approved treatments for other conditions could help Alzheimer’s patients.

“This so-called repurposing could halve the amount of time it takes to bring a new drug to market,” she says.

“We’re currently looking at the effects of Liraglutide — initially approved for the treatment of type 2 diabetes — on Alzheimer’s patients. This is showing some promise, with early studies having had some amazing results and participants reporting changes in symptoms.

“Reducing the symptoms is a huge achievement, especially as there hasn’t been a new treatment for dementia in more than 15 years.”

The drug will be trialled for at least another 12 months to get a better idea of the long-term effects of taking it to combat Alzheimer’s and to ascertain whether it helps reduce the cognitive decline associated with dementia.

Elsewhere, the Prevent Study, part-funded by Alzheimer’s Society, has taken the unusual step of studying people in their forties and fifties because of the growing belief the disease could be spotted very early on.

A total of 150 volunteers are being studied over two years by researchers who are hoping to be able to identify biological changes that may be beacons for the potential onset of the disease.

If this were to be successful then some researchers, notably those at the University of Nottingham, have even suggested Alzheimer’s could one day be like cervical cancer – something that is screened for in a bid to lower serious harm in later life.

End in sight?

With the fight against Alzheimer’s now being waged on various fronts — from new medicines through to repurposing existing drugs and investigating the possibility of early diagnosis — Alzheimer’s is under more pressure than ever. Experts are becoming increasingly confident that the goal of finding a life-changing treatment by 2025 can be reached.

Further resources:
alzheimers.org.uk
theddfund.com
alzheimersresearchuk.org
ageuk.org.uk

Being prepared

The rise in the number of people who have Alzheimer’s highlights the importance of having in place power of attorney agreements.

These can enable loved ones to make important health or financial decisions on a person’s behalf when they are mentally or physically incapacitated. Without them it can become a lot harder for those you rely on to help you to do even simple things, like paying bills.

Power of attorney agreements can only be signed while a person is of sound mind. Attempting to make one after an Alzheimer’s diagnosis may already be too late, so we advise our clients to make them well in advance of old age.

The rules for setting up these agreements differ across the UK. In England and Wales they are called Lasting Power of Attorney (LPA) agreements and come in two forms: property and financial affairs LPAs and health and welfare LPAs.

In Scotland there are Continuing Power of Attorney agreements for financial decisions and Welfare Power of Attorney agreements for health and welfare. Both can be written together under a single Combined Power of Attorney agreement.

In Northern Ireland, on the other hand, there is the Enduring Power of Attorney, which applies to property and finance but not healthcare, as in Northern Ireland no-one has legal authority to consent to medical treatment on anyone else’s behalf.

There is good online guidance on these agreements, wherever you live, and the forms can be completed online. But take advice if you are struggling or concerned about the complexities.
Polls suggest that a majority of the British public would like to see rail, energy and water services renationalised. We look at the history of nationalisation in the UK and consider what a return to state control would entail and whether it is genuinely viable.

Tim West, Investment Director, Rathbones

Amid debate over whether the Labour Party’s renationalisation proposals are a recipe for disaster or success, there may be something strangely fitting in the suspicion that many people’s defining memory of the last period of state industry control in the UK is the British Rail sandwich. For almost half a century, under the solemn aegis of the public sector, examples of these culinary and cultural icons lurked beneath glass domes on the counters of station buffets, thus surrendering to the classic “curled up” effect, or were suffocated in clingfilm in readiness for what we now call “at-seat service”, thus cultivating their trademark sweaty sogginess.

Today, given its enduring status as a synonym for wretchedness, it is all too easy to infer that BR’s gastronomic weapon of choice was emblematic of nationalisation as a whole. Yet recent polls have suggested that if a referendum were held on the renationalisation of rail, energy and water utilities — all of which are included in Labour’s manifesto pledge — the “yes” camp would secure a significantly larger majority than in the vote for Brexit.

So why is the idea of renationalisation so popular? It cannot be that all of its supporters are too young to have experienced the agonies of a slice of Mother’s Pride on the 18.10 to Princes Risborough, so why does the prospect of reversing privatisation have such appeal? More importantly, how realistic are Labour’s plans — regardless of how well received they might be — and could they prove to be the straw that breaks Britain’s fiscal back?

From common ownership to cutbacks

Labour’s fundamental commitment to nationalisation can be traced back to 1918 and a constitution containing a passage that came to be known as Clause IV. Drafted by Sidney Webb, co-founder of the London School of Economics, this endorsed “common ownership of the means of production, distribution and exchange”. Many
In a rare display of innovation, British Rail introduced the InterCity 125 in 1976. It is still widely in service today.

years would pass before the text’s practical implications became clear.

In 1944, at a union meeting in Reading, a retired railway worker named Will Cannon proposed a motion calling for “nationalisation”. It was passed. By December of that year it had been adopted by the Labour Party at a nationwide level; and in July 1945, with Clement Attlee’s government in power and Clause IV very much in mind, it could finally be put into practice.

Crucially, post-war exigencies made the process much more than an exercise in socialist idealism. Facing years of rebuilding, Attlee set about restructuring major strategic industries and public services. The Bank of England was first on the list, followed by coal, railways and steel. Water services had already been nationalised for several decades.

A key argument for nationalisation — then and now — was that private enterprise is naturally focused on making the biggest possible profit, which is against the common interest. Yet the reverse would also apply. With government stepping in to subsidise any operating losses, why would a nationalised industry strive for optimum efficiency or fight for a place at the cutting edge of innovation?

An increasingly common criticism by the 1970s was that state-owned utilities, because they had no duties to shareholders and no competition, were inherently ineffective and inert.

Consider, for instance, the “modernisation” of the rail network in the late 1950s. In 1955 the government announced a package worth £1.2 billion – equivalent to around £80 billion today – to repair outdated track, electrify main lines and introduce diesel engines. It appeared to be a grand plan, but it turned out to be woefully shortsighted. “It essentially replaced what already existed rather than looking at current and future needs,” says Dr Jonathan Cowie, a lecturer in transport economics at Edinburgh Napier University. “It missed a once-in-a-lifetime opportunity to revitalise the system.” The Beeching cuts followed just a few years later.

Concertos, competitiveness and Corbyn

By 1979, with Margaret Thatcher at the helm of the new Conservative government, Britain’s nationalised industries had become the stuff of tragicomedy. Enraged by union-led strikes and poor productivity, Basil Fawlty mooted the British Leyland Concerto — “in four movements, all of them slow, with a four-hour tea-break in between”. The British Rail sandwich had by now been publicly lampooned for more than 25 years, including serving as the subject of an entire episode of The Goon Show, and even the abandonment of clingfilm failed to save its reputation.

In reality, though, this was no laughing matter. Britain was in dire economic straits. Privatisation was in part viewed as a means of tempering inflation and suppressing wages, not least when recession began to bite in earnest in the early 1980s. Extolling the “discipline” of the marketplace, the Conservatives argued that their agenda would boost the nation’s competitiveness.

British Aerospace and Cable & Wireless were the first companies to be sold off. British Telecom and Britoil soon followed as the focus quickly shifted from privatising firms to privatising utilities.

In 1986, as the Thatcherite programme gained momentum, the fast-emerging bent for “popular capitalism” was perfectly encapsulated in the famous “Tell Sid” advertising campaign, which accompanied the flotation of British Gas. Wooed by the chance to buy shares at “affordable” prices, hundreds of thousands of Britons became stockholders for the first time in their lives.

“A common criticism by the 1970s was that state-owned utilities, because they had no competition, were ineffective and inert.”
Nine years later, following a vote at Westminster’s Methodist Central Hall, the same venue where it had been adopted in 1918, Clause IV was officially amended. The revised version no longer signalled Labour’s commitment to nationalisation; instead it signalled a commitment to “a dynamic economy... in which the enterprise of the market and the rigour of competition are joined with the forces of partnership and cooperation to produce the wealth the nation needs”.

The outcome marked a momentous victory for Tony Blair, who would sweep to a landslide election win two years later. Meanwhile, a backbench MP named Jeremy Corbyn expressed his concerns over “the question of the party’s constitution”.

**Populism and practicalities**

So why is there a such a groundswell of support for nationalisation again today? As with so many political issues at present, the simplest explanation lies in a burgeoning appetite for radical change. Amid a continued squeeze on real incomes and a widespread belief that wealth distribution is intolerably unfair, any measure perceived as a curb on capitalism’s excesses is likely to find a sympathetic audience.

But what might the fiscal consequences of renationalisation be? Numerous economists have noted that Corbyn’s would-be targets – unlike Attlee’s – are thriving and that the cost of acquisition would be balanced by the value of the assets acquired. It has been estimated that around five percentage points would be added to the national debt, which at the start of this year stood at 86% of GDP – compared to 245% in the early post-war period.

Policy Studies have calculated that the sector is worth up to £90 billion, while research by the University of Greenwich has found that consumers in England pay £2.3 billion more a year for their water and sewage bills than they would if privatisation had not taken place.

On balance, then, it is easy enough to understand the basic appeal of selective renationalisation. However, even if it could be achieved without inviting immediate calamity, history suggests that a vital question remains to be answered: would it be sustainable?

**Food for thought**

From the 1940s to the 1970s, when nationalisation was at its peak, Britain’s economic growth was poor. Many factors were at play, of course, but nationalisation was undoubtedly one of them.

A sizeable body of research has since shown that privately owned companies are more innovative; and they are more innovative because they have an obligation to deliver profits to their shareholders. Many of the nationalised organisations of the past felt nothing even distantly akin to such an obligation, which is why – all politics aside – they eventually became unsustainable.

So public ownership may well be back in fashion, but its next incarnation cannot be a carbon copy of the original. Should it ultimately materialise, renationalisation will need to offer something substantively different and altogether less flawed – otherwise, like the British Rail sandwich before it, it will present a singularly stale and unappetising prospect.

“Should it materialise, renationalisation will need to offer something substantively different and altogether less flawed.”
In 1991 Sebastian Faulks told his publisher that he was working on a novel set during the First World War. She lowered her head into her hands in despair. Public interest in the subject was notably muted at the time, and she could only remark that she would do her best. The book was *Birdsong*, which would eventually sell more than three million copies in the UK alone.

Why was the First World War considered an undesirable topic for publishing when Faulks made his pitch? Maybe one reason is that it had been overshadowed by its successor. The Second World War was commemorated immediately and in a much more popular way, mainly through film. It was as if the Great War had been confined to history, forgotten, dismissed as a monumental act of futility – not least given that global conflict had re-erupted a little more than two decades after the armistice.

But attitudes have since changed. Ten years ago the death of Harry Patch, the last surviving First World War combat soldier from any country, was marked by hundreds of services up and down the country and even prompted Radiohead to write a song in his honour. Something in the way that he passed suggested to Faulks a very bad conscience on the part of this country.

Faulks is modest when Catherwood asks about *Birdsong*'s role in transforming how we think about the war, but he admits: “Maybe a 19-year-old boy, as he was waiting to go over the top and walk into the biggest military disaster of all time, would like to think that a hundred years later..."
other people have tried to understand, to care and to pay tribute.”

Faulks’ impact on the remembrance of the First World War is not confined to his writing: he was also part of the government’s WW1 Centenary advisory committee. He feels that we waited too long to talk about what our soldiers went through and to show them the gratitude they deserved; but hopes eventually that we will forget. ‘At some point you must let go’ he shared. ‘And what has been so great about the last four years is that we have done enough that we could now let go with a clear conscience, which we couldn’t before.”

Asked about his fascination with war in general, he recalls growing up under the threat of nuclear armageddon and wondering: ‘How did we get here?’ As children of the 1960s, he and his friends had parents, many times father and mother, involved in the Second World War and grandfathers who had fought in the First World War. War was therefore something that had shaped much of his childhood.

It was also a sort of scientific curiosity about human beings and what makes them what they are, which drew Faulks to the theme of war. Like a chemist analysing what a material is made of by subjecting it to absolute extremes, to understand humans there are few more extreme experiences than war.

Today, he feels, our understanding of war has improved significantly. A hundred years ago those left at home could not have imagined the horrors that the soldiers endured, and patriotism gave some meaning to death and struggle. Now media and photojournalism bring events to us in real time and it has become impossible to ignore the reality of war.

Faulks admits to shedding tears of frustration and anger while writing *Birdsong*; oppressed at times by the weight of his stories. But he is optimistic for the future. The whole country, and in particular the young people in it, understands more now about the Great War than ever before. He hopes that maybe our children in the future, when making big decisions that could lead to armed conflict will remember their school projects on World War One and say to themselves “It didn’t go down well. Let’s think.” They will see things in a longer perspective and that can only be a good thing.

Click the video opposite to watch a short highlights video of the evening.

To watch the full conversation, please click here

Sebastian Faulks is a member of the Folio Academy, an international group of writers and critics integral to the Rathbones Folio Prize.

To find out more visit rathbones.com/rathbones-folio
Technology giant Apple became the world’s first trillion-dollar company earlier this year, establishing a new milestone for market capitalisation.

Trillion-dollar companies

Empires rise and fall, and so do companies. As America’s biggest technology businesses continue to reach astonishing new heights, what threats must they guard against?

Sanjiv Tumkur,
Head of Equity Research, Rathbones
On 2 August 2018, just 42 years after it was established, technology business Apple became the world’s first trillion-dollar company. Its share price, multiplied by the number of shares (its market capitalisation), hit the $1 trillion mark.

Hot on its heels came technology peer Amazon, which ran through the trillion-dollar ribbon on 4 September, less than a quarter of a century after it was founded in Seattle in 1994.

A trillion is an almost inconceivably large number – a thousand billion or a million million. Travelling back in time a trillion seconds would take you to the year 29692 BC – the Stone Age. There were 1.6 trillion dollars in circulation in the US. A trillion dollars represents about 5% of US gross domestic product (GDP) in 2017 or 38% of UK GDP; it is roughly the same as the GDP of Indonesia, the world’s 16th-largest economy.

History shows little if any benefit accrues to companies that are first to reach a particular size. US Steel Corporation gained nothing from becoming the world’s first billion-dollar company in 1901. Nor did General Motors when it hit $10 billion in 1955, General Electric when it reached $100 billion in 1995 or Microsoft when it topped $500 billion in 1999. In many cases reaching a particularly large scale is perceived instead as a symbol of over-reaching hubris.

Market dominance

The fact that two technology companies have each been ascribed a trillion dollars of value this year is an indication of the growing importance of technology within the US stock market. Arguably, it has never been higher.

There are 52 companies in the S&P 500 with a market cap of more than $100 billion. Of these, 14 are unquestionably technology companies, such as Apple, Intel and Adobe. Another three are heavily technology-enabled – Visa, Mastercard and Accenture. By comparison, the UK has only six companies with a market capitalisation of more than $100 billion, none of which are technology stocks.

The US has shown an increasing tendency towards market concentration as its technology stocks have grown in size. Much has been spoken about the fast-growing FANG stocks – the acronym for Facebook, Amazon, Netflix and Google (now renamed Alphabet) – but the biggest technology companies by market capitalisation are in fact the FAAMGs (Facebook, Apple, Amazon, Microsoft and Google/Alphabet). For much of 2018 the FAAMGs were the five biggest stocks in the US market, at times representing 15% of the entire index.

“These companies benefit from significant positive network effects.”

Technology is also important to the world’s second-largest economy, China. Here three internet companies, dubbed the BATs (Baidu, Alibaba and Tencent), represent 28% of the MSCI China index and 12% of the MSCI Emerging Markets Asia index.

Customer base power

The rise of increasingly dominant technology companies appears inevitable in retrospect. They benefit from self-reinforcing network effects, with more people more likely to join platforms with large user numbers because they offer more potential connections. Facebook has 2.23 billion monthly average users across its Facebook, Instagram and WhatsApp social media and messaging platforms – nearly one third of the entire population of the world. Tencent has 1.06 billion users of its WeChat/Weixin social media platform – the majority of China’s population.

Alphabet has seven services that each have more than one billion users globally – Google Search, YouTube, Android, Google Maps, Google Chrome, Gmail and Google Play Store – with YouTube boasting 1.8 billion monthly logged-in users. Amazon reported 310 million users two years ago and has grown significantly since, while its Amazon Prime subscribers now exceed 100 million.

These large entrenched customer bases, if they can be sustained and grown, provide companies with an important source of competitive advantage, enabling them to offer huge audiences for advertising and to spread the cost of innovation.

By building these customer bases, the large internet companies have become extremely profitable and cash-generative. Most now sit on sizeable net cash balances, which they are using to buy up promising new platforms and businesses.

Buying up the competition

Google/Alphabet acquired YouTube in 2006, a year after it was founded, and has made nearly 200 acquisitions in its 20-year history. These include Android, developer of the eponymous mobile operating system; Where 2 Technologies, the business that created Google Maps; Nest, which specialises in home automation; and Waze, which makes driving navigation software.

Facebook used its cash flow to acquire potential rivals Instagram and WhatsApp, which are seen as key drivers of its future growth. So in some ways the technology giants are able to stifle or hijack future competitors and protect their own franchises, as well as extend them into new areas.

Threats ahead

What can challenge the dominance of the technology giants and trillion-dollar companies? Hubris has always been a risk for companies that grow too big. General Electric has spent most of the 17 years since the retirement of CEO Jack...
Welch (dubbed Manager of the Century by Fortune magazine) underperforming the market due to its conglomerate nature, unfocused acquisition activity and the build-up of the esoteric GE Capital, which required a government bailout during the global financial crisis.

Scale tempts CEOs and companies to believe their own hype and become convinced of their superiority and inevitable future success. They start becoming less aware of risks and criticism. We see evidence of this at Facebook and Tesla, where founder-CEOs Mark Zuckerberg and Elon Musk have made recent mis-steps.

Another key risk is government antitrust regulation, which has often come into play when monopolies, natural or otherwise, have built up. This occurred with Standard Oil, which dominated US oil supply at the beginning of the 20th century and consequently was required by the Supreme Court to break up into 34 independent companies, including the forerunners of Exxon, Mobil, Amoco and Chevron. It occurred again when AT&T — known colloquially as Ma Bell — was compelled to break up into seven regional telecom companies, the Baby Bells, in 1984.

“Dominance is these companies’ to lose. They need to continue reinvesting.”

The European Union is relatively active in trying to curb abuse of monopoly positions. Over the past decade it has fined Microsoft, Intel, Facebook and Alphabet billions of euros, but this has done little to dent the companies’ advance.

In the key US market antitrust legislation is primarily aimed at ensuring fair competition for the benefit of consumers. The technology companies can argue that they have benefited the consumer significantly by offering price discovery and unparalleled connectivity with others, leading to lower prices and better consumer satisfaction. There is a risk that technology companies may begin to abuse their monopoly positions — the fear with Amazon, for example, is that it could put much of the High Street out of business and then start to raise prices. Governments and pressure groups need to be vigilant about this.

How to survive

Technology giants must continue to invest in order to sustain their market positions and to try to foster future growth. They must stay relevant to their customer bases. So, for example:

- Apple must continue evolving the design and functionality of its smartphones to keep them aspirational, as well as innovating new products (like wearable devices) and services to keep customers within its ecosystem.

- Amazon needs to keep offering customers more choice and convenience (for example, it has trialled delivery by drone).

- Microsoft must invest in keeping its Office software suite relevant to businesses and consumers as all migrate to the cloud (renting software rather than buying licences).

- Alphabet should keep honing its algorithms and artificial intelligence, using its massive amounts of data to improve customer search results and provide advertisers with more targeted access to potential consumers (though the really exciting angle is its “moonshot” investments in areas such as self-driving car technology).

- Lastly, Facebook must offer its customers more reasons to stay on its social media platforms. To do so it is currently prioritising user-generated content over corporate advertising.

Domination to continue

The era of the trillion-dollar company has arrived, and we suspect technology companies will continue to dominate stock market indices over the coming decades. We have seen this year how market expectations of the future growth and profitability of a company can change quickly — Facebook’s share price fell 28% from peak to trough in the wake of its data privacy scandal. The large technology companies are relatively highly rated by the market, due to their strong growth forecasts, but earnings multiples are anchored by solid cash flows and not as fanciful as many were in the dotcom boom.

Dominance is these companies’ to lose if they ignore lessons learned from previous market leaders — if they grow overly complacent and stop striving for excellence or if they exploit their leadership positions and trigger material antitrust regulation. Most importantly, perhaps, they need to continue reinvesting to sustain and extend their technology leadership and relevance. Innovation is the lifeblood and agent for economic disruption, especially for the technology sector. These companies must stay alert to the risks of obsolescence.
Cloud control

Around the world governments are using cloud seeding to try to influence where and when it rains. If they succeed they may help alleviate droughts. But they also risk sparking political tension. Could nations find themselves fighting over who owns the clouds above us?

Nik Mir, Investment Director, Rathbones
Water covers 70% of the planet’s surface, but a forecast leap in demand, combined with increasingly aggressive weather patterns, means a growing number of countries are looking to create rain on demand.

The process of cloud seeding has been around since the 1940s, but its popularity has rapidly increased in the past few years. According to the most recent report by the World Meteorological Organisation, the number of countries with official cloud-seeding operations jumped from 42 in 2011 to 60 last year.

The idea might seem uncontroversial — surely if a drought-hit region needs rain then triggering it makes sense?

But many view controlling the weather as extremely contentious, partly because of questions about its reliability and the fear that conflicts could erupt if a country feels its neighbour is “stealing” its rainfall.

Rain falls when supercooled droplets of water in clouds form around particles, like dust or salt, to create ice crystals. Too heavy to remain suspended, they fall, melting on their way to earth. By using aircraft to disperse materials such as silver iodide, magnesium, sodium chloride and potassium chloride it is possible to trigger this process.

The method was discovered in 1946 by Dr Vincent Schaefer, who in his obituary was hailed as “the first person to actually do something about the weather and not just talk about it”.

Dr Schaefer’s motives all those decades ago in his New Hampshire observatory may have been purely scientific, but subsequent applications have been at times nefarious.

**Damaging downpour**

It is alleged the US used cloud seeding during the Vietnam War to prolong the monsoon over the Ho Chi Minh Trail. Operation Popeye, as it was known, was an attempt to hinder the movement of North Vietnamese troops and equipment as well as suppress anti-aircraft fire.

Russian pilots have alleged Moscow engaged in cloud seeding above Ukraine and Belarus after the Chernobyl nuclear disaster in 1986 to try to ensure that radioactive particles in the clouds did not make it towards densely populated cities, such as the Russian capital.

Meddling with the weather may also have unexpected consequences. America attempted in 1947 to weaken a hurricane with 102kg of dry ice, only for it to change direction and hit land with devastating consequences. The General Electric corporation was sued for damages as a result.

In spite of this cautionary tale, the global community is unlikely to abandon cloud seeding and the potential benefits it could bestow.

**Forecast for rain**

One country at the vanguard of attempts to influence the weather is the United Arab Emirates, whose government recently launched the £3.8 million Research Programme for Rain Enhancement Science.
The nation, one of the driest on earth, receives roughly 120mm of rain per year compared to the UK’s average of 885mm. The UAE embarked on 242 cloud-seeding operations in 2017.

China also has ambitious plans. It famously used cloud seeding to ensure the opening ceremony of its 2008 Olympics remained a dry affair and is experimenting with a system of burners on ridges in the Tibetan Himalayas that fire silver iodide particles into the air to try to increase rain and snowfall. China is thought to be aiming to generate 10 billion cubic metres of rainfall in an area the size of Iran to feed the Yangtze and Yellow rivers.

Rain check

While the theory behind the process is widely regarded as sound, remarkably – in the light of how many countries are attempting it – cloud seeding had until recently only been “proven” in laboratory conditions.

This year an American study in Idaho broke new ground when it published for the first time data gathered outside a lab that showed cloud seeding working.

Researchers used the latest radar equipment to identify the formation of water particles where cloud-seeding aircraft had flown and monitored them as they grew into snowflakes.

The Wyoming Weather Modification Pilot Programme, the largest study monitoring silver iodide cloud seeding, found in 2016 that the technique can increase precipitation if conditions are just right but cannot be relied upon over a long period or on a large scale.

Cloud seeding’s disciples are unlikely to be perturbed by questions about its efficacy, though, raising the question of whether some form of monitoring system is needed given the regional frictions it can create.

“The number of countries with official cloud-seeding operations jumped from 42 in 2011 to 60 last year.”

The UN’s Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques, which forbids weather tampering from being used as a tool of war, was established in 1977. In 2010 the UK’s Science and Technology Committee stated that the line between peaceful and hostile usage of cloud seeding was “very thin”.

Indeed, political discontent has already been created by cloud seeding. Iran’s former president, Mahmoud Ahmadinejad, claimed in 2011 that Europe was “stealing its rain” through seeding programmes and cited this as a key cause of droughts in his country. The Chinese cities of Zhoukou and Pingdingshan also had a public spat over the latter’s programme.

Forecasts for more extreme droughts will only fuel the desire of nations to control the weather for their own gain – and to develop the science behind it. But playing with clouds might bring more than just rainstorms.
Scotland: three billion years in the making
Scotland: three billion years in the making

Landscapes shape the character and economy of many nations, but in few countries is this quite so evident as in Scotland. As Rathbones acquires historic Glasgow wealth manager Speirs & Jeffrey, Glasgow Investment Director Susan Stevenson examines the surprising extent to which an ever-evolving Scottish economy is still moulded by its geological past.

Susan Stevenson, Investment Director, Rathbones

Most people date the union of Scotland and England to the treaty of 1707. It was arguably 440 million years earlier when the two separate landmasses of Scotland — along with parts of northern England — and Southern England collided as they migrated from south of the equator to nestle, firmly conjoined, in the northern hemisphere.

Scotland is a particularly exciting country for any lover of geology. For a country of its size it has a remarkable variety of geological features, including rocks that date back to the formation of continents and the start of life on Earth.

It is also birthplace to the father of geology. In 1788 scientist James Hutton headed in a boat along the southeast coast of Scotland to the cliffs of Siccar Point, where he made what has been described as one of the most celebrated geological discoveries of modern times.

At the base of the cliffs sat parallel vertical rows of grey sandstone — now believed to be 430 million years old. It was obvious that these had once been sediment, petrified and turned into rock and tilted upwards. On top rested horizontal layers of red sandstone that had been deposited years later — 50 million years later, geologists now believe. Hutton’s companion, James Hall, wrote afterwards: “The mind seemed to grow giddy by looking so far into the abyss of time.”

What the men saw led Hutton to challenge the biblical view of everything being created at the same time. It also influenced Darwin.

Innovation

It is hard to describe Scotland’s geology without referring to its ancient volcanoes — from Arthur’s Seat to the Black Cuillin of Skye — and without acknowledging the incredible challenges that the
landscape has posed for those seeking to eke a living from it over the centuries. This helps explain why Scotland is the only country in Western Europe where the population is barely higher than it was 40 years ago. But necessity is the mother of invention, and the drive to survive has also shaped the Scottish character in a positive way, earning Scots renown for their adaptability.

Coupled with advances in technology, improved transport, globalisation and the digital revolution, it is ingenuity that is now allowing us to turn our landscape to our advantage economically — perhaps more effectively than at any other time in history.

Five centuries ago a Scottish friar at Lindores Abbey in Fife was recorded as making whisky for King James IV. He understood how drying damp malt over a peat-heated fire brings smoke into the barley grain, which creates unique flavours when it is later distilled. The knowledge soon spread, aided by the prevalence of peat.

“Necessity is the mother of invention, and the drive to survive has shaped the Scottish character in a positive way.”

Scotland’s healthy peatlands cover 20% of the country, helping to maintain the quality and supply of fresh water and the diversity of the country’s whiskies. There may be fewer distilleries in Scotland than historically, but the current 128 send bottles to markets as diverse as Japan and America — representing 20% of all the UK’s food and drink exports and generating more than £4 billion each year.

Whisky is not the only industry that is thriving and which relies on the landscape. Think of fish farms in Scottish lochs, golf courses (the game was invented here, of course), wind farms and tourism.

There are some less obvious industries, too. Scotland is perhaps not the best-known mining country in the world, but it has a rich mineral heritage. Lead and silver have been mined here since the 13th century, and the 21st century saw the successful auction of the first gold ever mined commercially in Scotland.

As demand for new technologies grows, so does the requirement for strategic metals. These include the rare earth elements, platinum, lithium and tantalum, and potential deposits in Scotland are the subject of ongoing research.

Digital economy

The beauty of the country, which draws in the tourists, is also influencing...
Rathbones is delighted to welcome clients of Scottish wealth manager Speirs & Jeffrey. Speirs & Jeffrey is market-leading in Scotland, where Rathbones already has a strong presence, with our offices in Aberdeen, Edinburgh and Glasgow.

Both firms have a long history — though by the standards of the timescales discussed in this article we are newcomers! Rathbones was founded in 1742 and Speirs & Jeffrey in 1906. From the onset of our engagement, both firms have recognised how compatible they are in culture, investment philosophy and dedication to client service.

Speirs & Jeffrey represents an ideal strategic, professional and geographic fit with Rathbones, and we look forward to working together to develop our business in Scotland, creating a new and shared history in an evolving 21st-century landscape.

Philip Howell, Chief Executive
The truth is out there

Encyclopaedia Britannica is celebrating its 250th anniversary this year. Though no longer sold in hefty multi-volume sets, it is thriving in the age of digital media as fake news sparks a revival of interest in sources of curated information and knowledge.

Mark Winchester, Investment Director, Rathbones

The first edition of Encyclopaedia Britannica appeared in 1768, the year Captain Cook sailed for Australia. Written by “a society of gentlemen in Scotland” and published in Edinburgh, it was issued in three volumes of 2,500 pages with 160 copperplate engravings.

Its genius over rival encyclopaedias was that it presented general knowledge alphabetically and cross-referenced. In other words, it was a practical reference tool. Retaining this format, the series has since witnessed and recorded historic events including the Industrial
Revolution, the American War of Independence, the French Revolution and both World Wars.

The breadth of topics covered has always been astounding and often esoteric. In 1788 an article asked where the kitchen was on Noah’s Ark. One piece suggested banning golf – “for there are statutes prohibiting it as early as the year 1457, lest it should interfere with the sport of archery”.

In 1801, by which time there were 20 volumes, readers were offered an article on where to find unicorns. In 1875 the subject of how to become a vampire was explored.

This mix of the essential and the obscure proved enduringly successful. For generations, with more than a hundred Nobel Prize winners and five US presidents among its scholarly contributors, Encyclopaedia Britannica was the undisputed go-to reference source. And then the internet arrived.

**The challenges of the digital age**

In 2012, after dozens of editions and with seven million volumes sold around the English-speaking world, it was revealed that Encyclopaedia Britannica would abandon print to focus on a purely digital format. The announcement came with confident claims about embracing – and thriving in – the digital age.

By then Wikipedia – which today has more than 29 million pages – had already established itself as a remarkably powerful online resource. A key challenge for Encyclopaedia Britannica was the growing expectation among readers that content should be free, paid for by adverts alone.

Newspapers were already painfully familiar with this issue. In the same year Encyclopaedia Britannica made the momentous decision to scrap print publication, Britain’s most popular newspaper, The Sun, sold 2.4 million copies – down from 3.5 million a decade earlier; today the figure is below 1.5 million.

The problem is by no means confined to the tabloids. The Telegraph, for instance, has seen its circulation fall from 651,000 in 2012 to 385,000 today. In addition, many papers have faced a backlash when trying to charge for online access.

The Times’ decision to introduce a paywall in 2010 offers a stark illustration. The move saw only one in every 200 readers upgrade to the Premium Content option. Traffic to the website nearly halved, and the number of pages viewed in a month reportedly shrank from 41 million to just four million.

“People are increasingly prepared to pay for curated content that is well written and that they can trust.”

Yet a recent study by media research specialist Enders Analysis suggests things are changing – thanks in no small part, perhaps, to President Trump and one of his favourite bugbears.

“Since Trump was elected and the issue of fake news has arisen, people have come to distrust commoditised news,” says Enders CEO Douglas McCabe. “We have seen a surge of confidence in professional journalism. As more publications have begun putting all or some content behind paywalls, we have seen less reluctance about paying – particularly from younger readers.”

**A renewed appetite for accuracy**

Enders’ research confirms that newspapers are taking a shrinking share of global advertising budgets. “All print media was nearly 50% 20 years ago,” says McCabe. “Newspapers are less than 10% today. Adverts alone cannot meet the costs of maintaining a full-scale newsroom – reader revenue is crucial.”

In 2016, the year Trump was elected, the proportion of US adults aged 18 to 24 who were willing to pay for online news was just 4%. A year later, with the notion of fake news gathering momentum, this figure had risen to 18%. Some 20% of US adults aged 25 to 34 are now paying for online news.

These developments very much play to Encyclopaedia Britannica’s strengths. “In the era of fake news,” says senior marketing executive Perry Pearcy, “we want to lead the fightback and provide an authoritative source of information.”

Today Encyclopaedia Britannica employs around 100 full-time editors and more than 3,000 contributors, including respected academics. It has deals with education authorities around the world, from California to Egypt, to enable 140 million students in 83 countries to have free access to articles. Some content is still free to the wider public, supported by advertising, but a growing proportion of revenue now comes from individual subscriptions.

“People are increasingly prepared to pay for curated content that is well written and that they can trust,” says Pearcy. “A generation has grown up without ever having seen a print version of Encyclopaedia Britannica, but we still want to inspire that joy of learning. The digital format works well – it allows us to update articles quickly and easily and create attractive content that is readily accessible. ‘Things have probably never looked more positive.’

It may be worth noting that Encyclopaedia Britannica first featured an article about fake news in 1830. Now, almost 200 years later, it seems the phenomenon has become central to its continued success.
The AI revolution
The AI revolution

We may not realise it, but artificial intelligence (AI) has been a part of our daily lives – working quietly in the background – for decades. Now more advanced AI is beginning to take a front-seat role. Just how much will we come to rely on this technology and what risks does it pose to us?

Rebecca Tunstall, Investment Manager, Rathbones

For the past decade Google has invited the world’s technology geeks to California to showcase its latest technology. This year, at the open-air Shoreline Amphitheatre in Mountain View, it unveiled its most advanced AI assistant, called Duplex.

It was an event with the potential to be just as consequential for society as the creation of the company’s eponymous search engine three decades ago. And yet it was so mundane, too.

Duplex booked Google CEO Sundar Pichai an appointment at a Californian hair salon – umming and ahhing and incorporating the speech imperfections that make a real human voice so distinctive.

Duplex is a significant leap from Google Assistant, which is the company’s alternative to Apple’s Siri and has been on Android phones for some time. Google Assistant is easily distinguishable as an AI – you even have to activate it by saying: “Okay, Google.” There is no possibility of confusion. But Duplex was deliberately hiding its true nature with its life-like speech imperfections and conversational manner.

The hairdresser at the other end of the line had no idea she was talking to a machine. The 5,000-strong crowd watching on whooped, cheered and applauded. But around the rest of the world the reaction was decidedly more mixed.

“Duplex” is a significant leap from Google Assistant, which is the company’s alternative to Apple’s Siri and has been on Android phones for some time. Google Assistant is easily distinguishable as an AI – you even have to activate it by saying: “Okay, Google.” There is no possibility of confusion. But Duplex was deliberately hiding its true nature with its life-like speech imperfections and conversational manner.

How will you now know if you are talking on the phone to a computer or a human? Are computers becoming so clever that they can replace humans and leave us redundant?

The thinking machine

Artificial intelligence is as old as Velcro. The term was coined by American computer scientist John McCarthy in 1955 when he organised the “Dartmouth Summer Research Project on Artificial Intelligence” to bring together mathematicians and scientists to brainstorm over the development of “thinking machines”.

The funding proposal for the six-week project offered a definition of AI that is still helpful today: “The study is to proceed on the basis of the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it.”

The subject as a field of study was born. Early research began by exploring logic and problem-solving techniques to work out how humans learn and adapt and how those processes could be written into computer programming.

Progress was initially slow. When a young Nigel Shadbolt started studying a PhD in artificial intelligence at the University of Edinburgh in 1978 the department was under threat of closure on the grounds that AI “had no future”.

Now, 40 years later, Sir Nigel Shadbolt is a professor of computer science at the University of Oxford and recognised as one of the world’s leading experts on the subject. The future of AI has never looked brighter – or bleaker, depending on your disposition to dystopian predictions.

“The capabilities of AI are extending further into the realms of human work.”

Two things have driven this change – the development of computer processing power and cloud computing.

Reflecting on the past four decades in a recent episode of the Rathbones Look forward series, Sir Nigel said: “If improvements in the speed of air travel had kept pace with the improvement of computer processors, we would be able to fly from London to Sydney in a quarter of a second.”

Most recently, the development of cloud computing means that AI can
now soak up unparalleled amounts of data and utilise additional processing power beyond its “physical” constraints.

With more global internet users every day, tech companies also have access to the biggest data pool in history, which they can use to inform and shape their activities. It is no surprise that it is the large tech companies that are leading the way in AI investment. According to research by McKinsey, companies such as Google and Baidu invested $20 billion to $30 billion in AI in 2016.

Data-powered algorithms now influence our whole lives. Netflix, for example, has estimated that improving its personalisation algorithms to recommend programmes that customers are likely to enjoy has avoided subscription cancellations that would have otherwise reduced the company’s revenue by $1 billion annually.

Algorithms—commonly described as “the maths that computers use to decide stuff”—shape what public services we receive and how much we pay for insurance, flights, rail tickets and hotel rooms. They even help determine how stock markets behave.

AI is now driving machines, too. Amazon acquired robotics company Kiva for $775 million in 2012. Kiva, now renamed Amazon Robotics, automated picking and packing in the company’s warehouses, substantially reducing average “click-to-ship” times—from around an hour for a human to 15 minutes for the AI system—and cutting operating costs by around 20%.

However, the concern for many people is that the capabilities of AI are extending further into the realms of human work.

The kinds of AI that we live with in future may be moulded by whoever wins the battle for control of our data.

But despite these concerns, we need not be overly pessimistic, argues Sir Nigel. Disruptive technology almost always creates more jobs than we predict. He jokes that his “mum wasn’t a search optimisation engineer… There are whole jobs now we’d never thought of.” And in the case of AI there will almost certainly be a transition period where full automation is tentatively guided by human hand. Logistics companies may retrain staff to be at either end of transporting goods, like a pilot handles the take-off and landing of a plane. Similarly, a single worker might watch over 10 or 20 AIs in a call centre.

Human augmentation

Not all AI is being designed in a way that will replace humans like-for-like. There are many “augmentative” AI projects in development that are designed to boost human capabilities without replacing them.

One of the most promising areas in which AI could augment human capabilities is healthcare. Infervision...
is a Chinese company that builds AI capable of using machine learning and visual recognition software to diagnose lung cancer from CT scans and X-rays. Infervision hopes that its AI can provide a safety net for overworked doctors.

Google is working on technology that will help diagnose diabetic retinopathy, the fastest-growing cause of blindness, which is a threat to 415 million diabetic patients around the world. If found early the disease can be treated, but there are insufficient trained medical experts available to detect it. In tests Google’s deep learning algorithms have performed at least as well as ophthalmologists and could in future help healthcare workers screen many more patients in areas of the world with limited resources.

Google researchers found their AI was not only able to diagnose eye disease but could also pick up patterns in the eye that could be used to predict the risk of a heart-attack or stroke with up to 70% accuracy – just below the 72% accuracy of orthodox blood-testing techniques currently in use.

**Ethical issues**

Maybe AI is not as big a threat to livelihoods as we fear, but it still poses enormous ethical challenges.

The *Duplex* voice challenge is one. Google subsequently clarified that upon its public release *Duplex* will give prior warning to the people it calls, but history tells us that technology is impossible to keep isolated. Many are anxious about the potential damage an AI like *Duplex* could do in the hands of hackers, scammers or someone trying to spread political misinformation.

Another issue is how organisations acquire the data that fuels their AI programmes. Many of those organisations investing most in the development of AI are under fire from large parts of the public, politicians and privacy activists. Companies like Facebook and Amazon need data to feed their AIs. Changes to European data privacy law under GDPR, for instance, mean that organisations must now inform users of how they intend to use their data and receive permission before doing so.

Constraining access to data may also constrain technological development. In 2017 Nvidia, a computer hardware company, trialled an experimental vehicle AI that taught itself to drive by watching humans. AI that can teach itself without needing any human input may bring enormous benefits in fields of science where it could conduct research and make discoveries independently, but it needs access to data.

Unsurprisingly, tech companies are lobbying against greater regulation, emphasising the importance of laws keeping pace with the evolving AI landscape. The kinds of AI that we live with in future may be moulded by whoever wins the battle for control of our data.

**The AI odyssey**

It is impossible to ignore the extent to which our perception of AI is rooted in the science-fiction of the mid 20th century. Creatives with outsized expectations and experts with extraordinary predictions make for a rich creative soup, and films such as *2001: A Space Odyssey* were wildly successful and informed generations of the public what they could expect from AI.

Today much of the public’s perception of AI remains disproportionately informed by fiction. AI means far more than the anthropomorphised, humanoid forms we see in films. It reaches into all corners of our lives and has been worked on, incrementally, by computer scientists for decades.

The coming “AI revolution” will affect us all, and it will be as disruptive to society as the Industrial Revolution. It arguably offers far more benefits than threats; but those threats exist, and we will have to watch carefully for them.

For more on the future of AI with Sir Nigel Shadbolt, and to hear many other discussions on the future of our changing world, visit rathboneslookforward.com
Highly strung

Instruments from the violin family can sell for sums akin to those commanded by famous pieces of art. But what is it that gives these particular instruments – perhaps above all others – so much value and an allure that captivates players, collectors and investors alike?

Angus Kerr, Investment Director, Rathbones

A delicate violin sits on top of a large loudspeaker in a converted chapel. In an unlikely combination of the holy and the infernal, the speaker is blasting out AC/DC’s *Highway to Hell* – heavy metal at its most raucous. The scene marks an unusual stage in the restoration of a 400-year-old instrument, but then this is a story full of surprises.

Perhaps the first is that the villages around Newark, Nottinghamshire, have become a focal point for a number of the country’s finest luthiers and restorers. Although its members are too humble to admit it, the resulting community is the UK’s equivalent of the celebrated Italian *comune* of Cremona.

It was in Cremona that the prototype of the modern violin was invented in 1566. It was also in Cremona that many of the precious instruments that today’s experts are now painstakingly bringing back to life were first given form.

In Balderton, three miles from the centre of Newark, John Gosling and his fiancée Sally Nicholas own Chapel Violins. Thanks to the exquisite skills of the couple and their team, what was once a place of worship now reserves reverence for hundreds of thousands of pounds’ worth of string instruments.

Many of these are resting on small, hand-woven rugs that are themselves draped over benches; others are receiving the full heavy metal treatment. Their bodies have stiffened over the centuries, and it seems there are few better ways to relax the wood than to subject it to pounding rock tunes.
Age and provenance

These instruments are so valuable that they are stored in an off-site vault when not being worked on. Alongside his brother Paul, who runs his own workshop nearby, John is currently restoring a Montagnana cello that could easily sell for £1 million. What is it about these instruments that means they attract such extraordinary valuations?

The name of the maker is arguably the most important determinant of a violin or cello’s value. Renowned names like Stradivari, Guarneri and Montagnana regularly sell for millions. But discovering who an instrument was made by takes serious detective work.

“You very quickly learn to pay no attention to the labels,” says Paul. Instead, he says, he and his colleagues look at myriad factors. They examine the shape of the body and the distinguishing scroll of the Fs carved into it. They will also run dendrochronology tests and use ultraviolet lamps to differentiate original wood and varnish from previous restoration work.

The instrument’s provenance — how distinguished the lineage of its ownership is — is another important consideration. The right combination of these factors can give rise to stratospheric valuations. Take, for instance, the Vieuxtemps Guarneri. The violin was made by Giuseppe Guarneri almost 300 years ago, played by renowned 19th-century composer and violinist Henri Vieuxtemps and now by best-selling player Anne Akiko Meyers. It sold for £10.5 million in 2012.

But this still does not fully answer the question of why these particular instruments are so valuable. Any

A Vieuxtemps Guarneri violin sold at auction in 2012 for £10.5 million.
instrument can be old, made by a renowned maker and played by renowned players, but most never reach the price of a fine violin or cello. Even an example as musically and culturally significant as the Steinway piano used by John Lennon to write *Imagine* only auctioned for £1.67 million. While Lennon’s piano may only be a quarter of the age of the Vieuxtemps violin, it is unique in the truest meaning of the word, whereas there are thought to be around 150 Guarneri violins in existence.

John Gosling says the reason why the Guarneri violin is so much more valuable than Lennon’s piano is that it is a work of art with a purpose. He says: “A Guarneri violin is less like a piano than it is a da Vinci painting, and one of those recently sold for $450 million at auction. You could buy an orchestra of Guarneris for that; in fact, you could buy a few.”

As with fine art, the value of a violin or cello has a lot to do with the rarity of people with the right skill and technique required to create them.

**Techniques and materials**

The precision and attention to detail required to make these instruments, where tenths of millimetres can make a huge difference to sound, mean this is a highly skilled craft. So is restoration. And it requires enormous patience.

Crouching over a bench in a corner of the workshop, Florian Forconi is fixing a tiny crack in a 400-year-old Maggini violin. She applies a slither of water using an ultra-fine sable-hair brush across the crack and then, holding either side of the instrument, gently bends the wood to flush the crack clean before applying glue made from rabbit ligaments to seal it shut. It could take her a year to finish the restoration — the instrument might then sell for as much as £150,000.

No expense is spared in sourcing the right materials. Some restorers will seek out wood that is centuries old for repairs. One theory suggests the sound of Stradivarius violins and cellos — famously inimitable — is due to the wood from which they were carved. Stradivari worked in a time known as the Little Ice Age, a period of global cooling that led to slower, more uniform tree growth, which in turn is supposed to have led to a richer tone.

**Sound**

For all the impressive craftsmanship and heritage, do these instruments actually sound better?

Blind tests comparing Stradivarius violins to other models have often gone against the old maker, with even audiences of experts unable to discern the difference.

John says: “It’s so difficult to say what a ‘good’ sound is. You can have an instrument that three or four people love and then one person hates it. Even with a Stradivarius there’s no guarantee the sound will be to your taste. Many professional players prefer to play a Guarneri or a Montagnana.

“A good historic instrument can give an elite player an edge. Because of the craftsmanship and the history behind these instruments, there’s a whole ceremony attached to playing them. The player feels it and so, through the player’s performance, the audience can too. With something like a Stradivarius, a Montagnana or a Guarneri, the player will understand the history behind them so they know that as they play they are becoming a part of that instrument’s history. It all adds to their value for the player and the audience.”

**Investment**

And, fortunately, for the owners too. In other fields of art investment the owner is often tempted to keep their treasure hidden away from the public eye, but for owners of violins and cellos there is more opportunity of enhancing the value of an instrument by having it played by a famous musician.

The prices these instruments command may be eye-watering and perplexing to some. But for the players, the owners and the audiences, the rich heritage as well as the maddeningly precise labour and painstakingly sourced materials that go into making and restoring them mean these works of “fine art with a purpose” are worth every penny.
The shaking was mild to begin with – gentle vibrations travelling up through the floor of Richard Lloyd Parry’s 10th-floor office in Tokyo shortly before 3pm on the cold but sunny afternoon of Friday 11 March 2011.

Rather than fading away as usual, though, the shaking continued. Through his rattling windows Lloyd Parry could see part of the building flexing visibly. Japan was used to tremors, but this was the biggest earthquake ever recorded in the country – and the fourth most powerful in the history of seismology.

The quake, which had its epicentre off the Japanese coast, registered a magnitude of nine. Such was its power, it shifted the axis of the Earth by six and a half inches and moved Japan 13 feet closer to America.

120-foot wave

The shockwaves triggered a tsunami that hit the coast north of Tokyo. At its peak the water was 120 feet high. As it swept inland, houses were carried along, structurally intact but spinning in the water. Cars were thrown on to the roofs of tall buildings, and a 330-ton fishing boat was deposited half a mile inland.

When the water receded more than 18,500 people had been drowned, crushed or burned to death. Half a million people were forced from their homes.

Three reactors at the Fukushima Dai-ichi nuclear power station melted down after cooling systems were knocked out. Radioactivity spread across the countryside in the worst nuclear accident since Chernobyl.

The earthquake and tsunami caused £160 billion worth of damage, making it the most costly natural disaster ever and Japan’s greatest crisis since the Second World War.

‘Atmosphere of apocalypse’

Lloyd Parry, who is Asia Editor of The Times, drove to the devastated Tohoku region the morning after the tsunami hit. The journalist, a veteran of conflicts in Afghanistan, Iraq, East Timor and Kosovo, found an atmosphere of apocalypse.

Already the author of books about violence in Indonesia and the murder of Lucie Blackman in Japan, he realised that, while he could describe aspects of the disaster in newspaper reports, only a book could tell the story properly.

Conducting hundreds of hours of interviews, he unearthed remarkable accounts from survivors. One man swept away by the tsunami described it as like being inside a washing machine, though the water was black and full of deadly, swirling debris. He was sucked underwater repeatedly and spent more than two hours clinging to a wooden panel before swimming exhaustedly to safety.

“These stories of possessions and hauntings are a rich expression of pain, anguish and unassuageable loss.”
From the outset, though, Lloyd Parry knew the scale of the disaster meant it would be too much to try to catalogue everything that had happened.

“I needed stories that I could tell in close detail,” he said. “Accounts that would convey what it was like for the people who experienced this terrible event individually and personally but which also told you something about the disaster as a whole."

A school’s tragedy

Then he learned of the tragedy of Okawa Primary School, where 74 pupils and 10 teachers died.

"In some ways, natural disasters are difficult to write about because they’re nobody’s fault, but what happened at Okawa school was a man-made tragedy, too. There was a hill the teachers could easily have taken the children up to escape the water, but they didn’t. So those children’s deaths were unnecessary. It was a way of telling a story about a natural disaster but also about human failings and their consequences."

He also recounts stories of hauntings and spirit possessions in the tsunami’s aftermath. Lloyd Parry says that whether there are more scientific explanations for people’s experiences is not the point.

“For me what these stories express is nothing to do with ghosts or spirits. It’s the intense, overwhelming psychological trauma experienced not just by the victims but by society as a whole. These stories of possessions and hauntings are a rich expression of pain, anguish and unassuageable loss."

Lloyd Parry, who has lived in Japan for 23 years, also provides insights into the country and its people. Jim Crace, chair of the judges of the Rathbones Folio Prize, said: “When I finished reading this book, not only did it close the gap between me and Japan, it also closed the gap between my understanding of my culture and every other culture in the world.”

A unique prize

The prize is the only literary award in which all books — fiction and non-fiction — are judged, strictly on merit, by an academy of nearly 300 writers. The Folio Academy nominated 60 books in 2018, from which Crace and the other judges, Nikesh Shukla and Kate Summerscale, selected the shortlist and winner.

Lloyd Parry said: ‘It’s very, very flattering to be recognised by one’s fellow writers, and for me the other significant thing is that this is the second year in succession that the prize has gone to a work of non-fiction."

“Sometimes there can be a feeling that, in literary terms, journalism and non-fiction are second best to novels and poetry. I’ve never believed that’s the case. Language can be used just as well telling a true story as a fictional one. So for that reason, too, this award is an important one for me.”
A peculiarly British blend

Will Rugg, Content Marketing Editor, Rathbones

Livery companies were first established in London as early as the 12th century, yet they still play an important part in the life of the modern City of London, supporting the professions they are built around and raising astonishing amounts for charity.

The City of London and the livery companies have grown up together, their histories intertwined. Though they may be largely unnoticed, the livery companies continue to play a vital role in training and educating young people and maintaining the vibrancy of the UK economy.

The mark of the livery companies is indelible and ubiquitous in London’s Square Mile, but it can easily escape your notice coming in on the daily commute, head down along with the rest of the crowds pouring off the trains and out of the tube stations. These ancient companies are woven into the City’s fabric, a unique and seamless blend of past and future, preserved in the architecture of the great halls and street names like Cloth Fair, Ironmonger Lane, Mason’s Avenue, Poultry, Milk Street and Bread Street.

The earliest livery company on record was the Weavers, granted a Royal Charter in 1155, though livery companies probably had their origins in this country before 1066. They may be perceived as reactionary – perhaps best known for upholding centuries-old traditions and wearing medieval costumes – but in fact they have an eye on the future.

Some represent long-established callings, like the Master Mariners, Solicitors and Farmers. Newer companies have formed around trades and industries – Firefighters, Air Pilots, Chartered Surveyors, Chartered Accountants, Marketors, International Bankers, Management Consultants and Security Professionals. There is even a Worshipful Company of Information Technologists, though if they are anything like their fellow livers they may be the antithesis of the disruption associated with technology today.

In the broader sense, livery companies still play the same role as they have throughout their history – supporting and in some cases regulating their trades. That includes helping to educate and train young people. Today’s companies are also involved in charitable work across the country and around the world. They are diverse in age, size and wealth, as well as the trades they represent, but united by an ethos of fellowship, education, supporting their trades and working for the welfare of the communities where they operate.

Role in the City

London’s livery companies have an historical and continuing role in the governance of the City as well as the regulation of trade. The early guilds, which eventually formed the original Great Twelve Livery Companies, exercised control over much of the manufacturing and provision of goods and services in the City, protecting customers, employers and employees and ensuring quality control. The ‘baker’s dozen’, with its 13 loaves, comes from these early days of regulation, and the word “hallmark” dates back to the 15th century when precious metals were tested for purity at the Goldsmiths’ Hall.

The Mercers’ Company, which jointly owns the freehold of the Royal Exchange with the City of London Corporation, uses the income from its property portfolio and other investments to finance charitable work and other activities.
A peculiarly British blend
The City’s present-day constitution rests on the ancient rights of its citizens, set out in a Charter of King William I in 1067. The City of London Corporation, its main governing body, is older than Parliament itself and provides local authority services for the City. Its structure today is rooted in a history that is intertwined with that of the livery companies.

The liveries are not without their critics. A Telegraph editorial from 2006 remarked: “They are some of the most powerful organisations in the City of London, controlling billions of pounds of assets [an estimated two billion, according to the same article]. Their members dress up in medieval costumes at every opportunity and are loyal custodians of traditions and ceremonial practices laid down more than 600 years ago.”

Charitable work

As the article also went on to say, though, these “powerful organisations” use their wealth to make substantial contributions to charitable causes, not to mention substantial giving in kind of time and other resources. An estimate from 2010 of the financial giving of all the livery companies put the figure at £42 million — and this has probably risen since then.

The charitable activities of the livery companies are diverse as well as substantial. Around a thousand people reside in almshouses owned, funded and governed by them. They also provide for other welfare needs of their communities, support environmental and trade initiatives and give to affiliated churches. The lion’s share of giving, a little over half, goes to education.

“An estimate from 2010 of the financial giving of all the livery companies put the figure at £42 million.”

Education and training

Primary and secondary schools, tertiary and further education colleges and city academies all receive direct support in finance and in kind from the livery companies. The relationships are long established and likely to continue growing as the existing companies expand their activities and more are established.

In the interest of full disclosure, my two sons, Jonny and Henry, have both benefited directly from livery company involvement in education, in particular from the Worshipful Company of Brewers. As well as actively supporting the brewing industry and supporting a number of almshouses, it is a trustee to major charitable trust funds supporting two schools. One of these is Dame Alice Owen’s School in Potters Bar.

The school, which my sons attend, is named after Alice Owen. Having narrowly escaped being shot with an arrow in her youth, Alice vowed that if she ever had the means she would endow a charitable foundation. As the widow of a Brewer, a Mercer and finally a judge, she was able to fulfil this promise, and in her will of 1613 she entrusted a school to the Worshipful Company of Brewers.

The leader of a recent OFSTED inspection commented that the school today has “the most extensive programme of extracurricular activities I have ever seen”. None of these would be remotely possible without the help of the Brewers.

The Brewers have supported the building of the Edward Guinness Hall, a great venue for the incredibly talented young musicians and brilliant music teachers that the school has attracted over the years. There is enough depth of talent to fill full junior and senior orchestras, concert bands, big bands and soul bands, several choirs, a percussion ensemble and numerous other groups and ensembles — a lot of them formed by the students themselves. My sons both love music, and it is a wonderful privilege for them to be involved in the music scene at Owen’s. If I had not been there myself, I never would have believed school concerts could be so good.

More recent building projects — thanks to the Brewers — have included a cricket pavilion, a science building (a separate science building must be fairly unique among state schools) and another new purpose-built venue for drama, languages and learning support. Just in the few years my sons have been at Owen’s, thousands of young lives have been enriched enormously — a credit to the Worshipful Company of Brewers and this pleasing blend of past and future that characterises the livery companies.
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