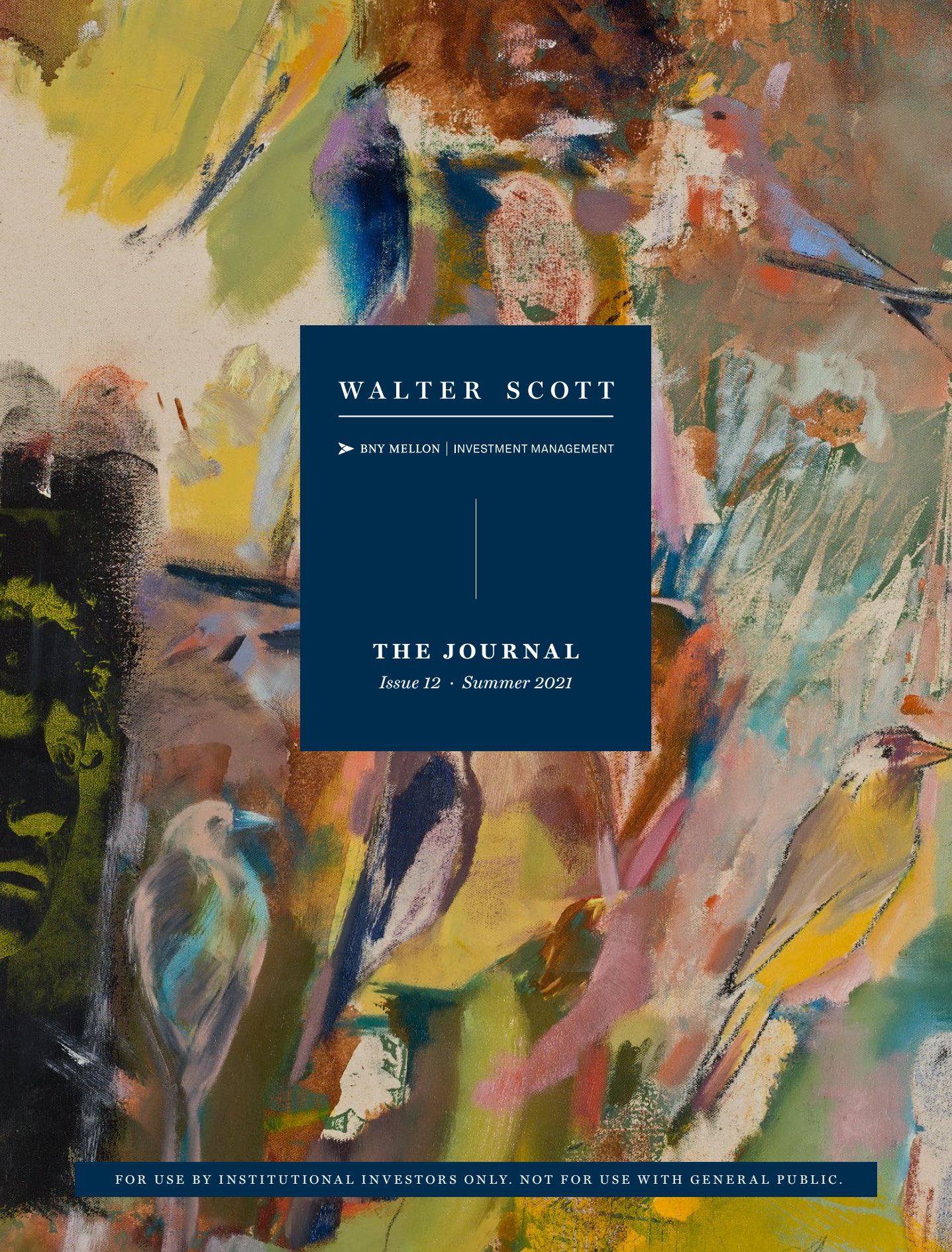

WALTER SCOTT

BNY MELLON | INVESTMENT MANAGEMENT

THE JOURNAL

Issue 12 · Summer 2021

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FOREWORD

As we look back over the past 18 months, there are hard lessons to be learned. Equally, however, we should look forward with optimism. The speed of development of the Covid-19 vaccine reminds us of what is possible. In so many areas, innovation and investment implemented today will change the way we all work and live in the decades ahead. Our focus, as always, must remain on that long-term potential and opportunity, avoiding the constant distraction of short-term speculation and noise.

In this edition of our *Research Journal*, we reflect on what we've learnt from the limitations imposed by the Covid-19 pandemic. The Research team are very eager to start travelling again, and to visit companies in their headquarters, facilities and factories around the world. But virtual trips have had their positives, and we will seek to integrate these as an important new tool as we plan future research visits.

Likewise, for everyone at Walter Scott, working at home has brought challenges alongside notable benefits. We are now developing a hybrid working model that, we hope, will allow many to continue to benefit from the advantages of working remotely. The interview with Jane van Zyl, CEO of the charity Working Families, is a timely reminder of the business case for flexible working, and the need to create workplaces for all.

Elsewhere, we assess how industries are using technology to address society's biggest problems. Travel has been curtailed in a way few would have thought possible, and the industry faces unprecedented challenges. But we believe that the outlook is positive and, here, our Research team explore the potential for innovation to create a more sustainable future for aviation – and the planet.

In recent times, we have seen what healthcare companies around the world can achieve under immense pressure. Medical advance is one of the areas that we are most excited about as we look for long-term investment opportunities. In this edition, we consider the huge potential of genomic sequencing.

Amid the opportunity, we recognise the inevitability of risk. Our approach to risk has been constant over time: it has always been based on the principle of keeping things as simple and straightforward as possible. We walk away, not only when risk is too great, but where it is too complicated, lacking in transparency, or where there is any doubt in the minds of anyone on the team. It is a timely subject for us to reconsider as risk management rises on the agenda of every corporate board.

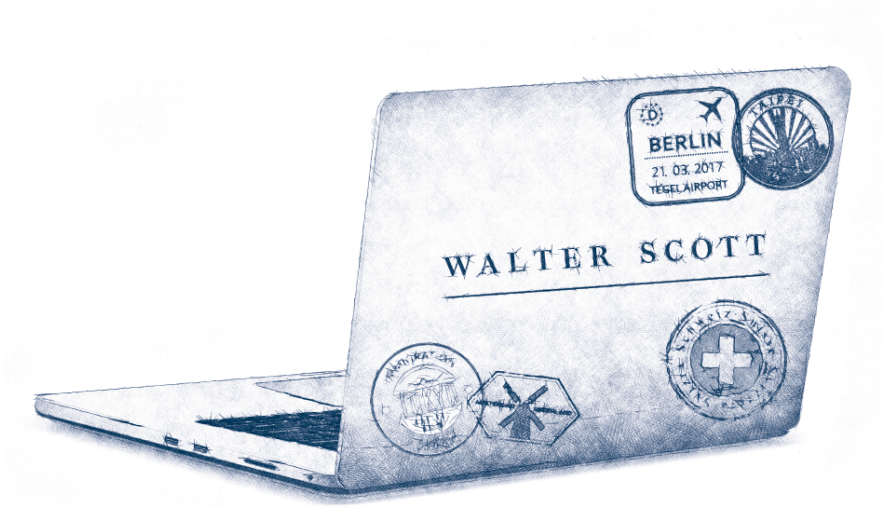
I very much hope that you enjoy this 12th edition, as we pause at what remains an uncertain juncture to look both back and ahead. While challenges remain, as we talk to management teams and look at where investment is being made today, we remain as optimistic as ever about tomorrow.

If any of the articles spark questions or cover subjects that you would like to discuss further, as always, please do get in touch.

With best wishes,

Jane Henderson, Managing Director

CONTENTS

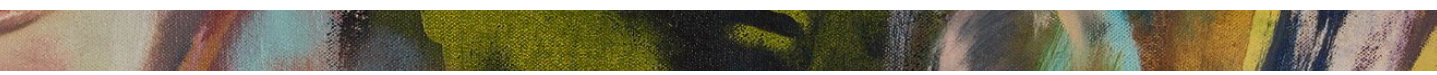


ON THE VIRTUAL ROAD

Despite physical travel being severely restricted by the pandemic, our Research team set out to explore Central Europe, Taiwan and Japan – through virtual tours, video calls and packed desktop itineraries.

What, if any, are the advantages of a virtual research trip over a physical one?

Ashley-Jane Kyle (Taiwan and Central Europe): You don't have to travel hundreds and thousands of miles! We saved the cost of a 6,000-mile journey to Taiwan. But we were 'out of the office' for a full five days. We took leave from our day jobs to focus on the company meetings, and we managed to pack a lot of company meetings into the week. We were able to dig deeper into those companies and immerse ourselves in the 'trip'. During our virtual trip to Central Europe we met with representatives of 19 companies and found that innovation is alive and kicking. It's great to meet some of these businesses at the early stages of their journeys.



Tom Miedema (Central Europe): Efficiency. We were able to cover distances across Europe that would have been impossible on a physical research trip. It also makes scheduling much easier, as you no longer have to consider which companies are in which location. There are fewer complications, less time away from the family, and a smaller carbon footprint. Access to management has also been excellent. I attended three investor days in a week – in person, that would have meant travelling to three European cities in three different countries.

Alan Edington (Taiwan): Lack of travel time and related emissions. This is double-edged though – travel time is useful for working, writing up notes, and it can be fun!

Alistair Ceurvorst (Japan): Freed of location-constraints, we were also freed of the usual logistical issues and were able to flip back and forth between cities virtually for meetings.

How does the process of selecting meetings and planning the itinerary change for virtual trips?

AJK: The planning process is very similar. For Taiwan, the only change we had to make was to our time zone. We had to shift our day forwards, and work 6am-3pm. Otherwise, we went through the same selection process as we would have done if it was in person. We were a bit more flexible in terms of adding meetings at the last minute, though.

TM: If we were there in person and there was just one company of interest in a particular city, we might consider adding a few meetings in that city. Sometimes, these end up being interesting, but not always. For a virtual trip, you naturally think about things differently. This probably means that the quality of companies that we are meeting on a virtual trip is generally higher.

AC: When you're bound to a city for a certain number of days you might find you have to make trade-offs between travel itineraries, management calendars and companies available in that city, not all of which neatly align. The selection process hasn't changed but it does allow one to be more discerning in prioritising companies.

How else can you immerse yourself in a city/country without physically being there?

AE: Watch a lot of YouTube! For Taiwan, we took in an evening food market and temple tour, as well as a more general tour. I was surprised at how much of a feel for the place I could get. We also did some retail-store tours for research, with a man walking around the stores and surrounding area with a smartphone. He even took us for a spin between stores on his scooter.

AJK: We did a virtual walk around almost every city we had scheduled for a visit and tried to see iconic Taiwanese locations, like a street-food market at night, the Taipei 101 tower, the National Palace Museum (the Chinese Ming Dynasty ceramic collection was a highlight for me!).

TM: There is no substitute for the real thing. However, to tie-in with our meetings with German companies, we went out for German food and treats twice during the week. Coincidentally, a local German *Bierhaus* was reopening its doors around the start of the trip, so we took advantage and grabbed some German specialties and a German beer, of course.

AC: This was the most challenging aspect. It's akin to the difference between learning from a textbook and immersing oneself in the real world. Some concepts and ideas are better experienced live to truly appreciate their significance.

Is it possible to pick up signals – an intuitive sense of company culture, for example – over a video call?

AJK: It takes more than one meeting to get a feel for culture. You have to meet different people and have a bit of a wander around. I get a good feeling over a video call when the person we are meeting is genuinely excited to talk about what they do, or what the company does, and offers to spend more time than allocated talking to you about it. One example was a health-supplements manufacturer. When we talked to the founder and CEO, you could see his passion and excitement for the business that his family had built from scratch.

AE: You get a great sense of some people via video – people who are close to the screen and are natural on video. With those who sit in groups or far from the camera, you get much less. But meeting companies at their facilities can be a mixed bag, too. You meet some companies and you see very little – a few examples of bits of kit – you sit at one end of a building in what feels like an office reserved for meetings and you do not get much of a feel for the culture by being there. But when you walk around a facility – one of my recent ones was [heating ventilation and air-conditioning specialist] Belimo – you can talk

to employees and get a real sense of how the place works. In the end, understanding a company's culture is about trying to build a picture using all the resources at your disposal, and a virtual meeting is only one of those.

TM: There were a few meetings where we felt a clear sense of the individuals we were speaking with, some very positively and others negatively. You can also sometimes pick up on the dynamic between individuals in the team, how they interact; are they comfortable speaking on the call when the CEO is in the room, for instance?

AC: You also pick up additional insights when walking through offices to get to meeting locations and, of course, site visits – be they factory tours, retail formats or business parks – also play an important role in a Walter Scott research trip; this 'on-the-go' research is more difficult to incorporate into a virtual research trip.

How have you evolved your approach to research trips and how will you approach them over the coming year?

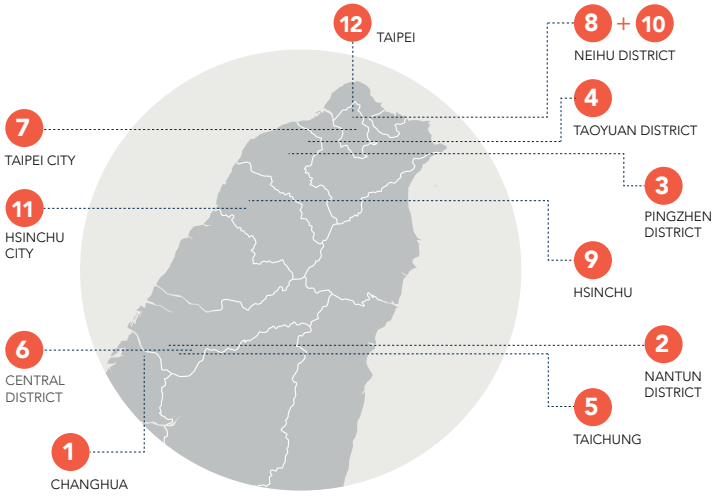
TM: We have proven that virtual trips and conference calls can be very useful additions to our research. I think it is likely that, next year, I will have a combination of virtual and physical trips.

AJK: I'm still keen to get out on the road as soon as it's safe to do so. In the current environment, virtual trips make sense, but you do lack that on-the-ground feeling. You don't get to see the trends we talk about playing out in real life, and you don't necessarily get a feel for the economy. I'd love to do a compare and contrast with an in-person trip to Taiwan. I'm keen to get out there as soon as I can and meet many of these companies in person.

AC: The concept of an industry-specific global/cross-border research trip is one that's much easier to do virtually and is something that I am exploring as an option. Virtual research has highlighted the value and differentiation that site and asset visits bring to the investment process, so I'll be looking to do more of these on future trips.

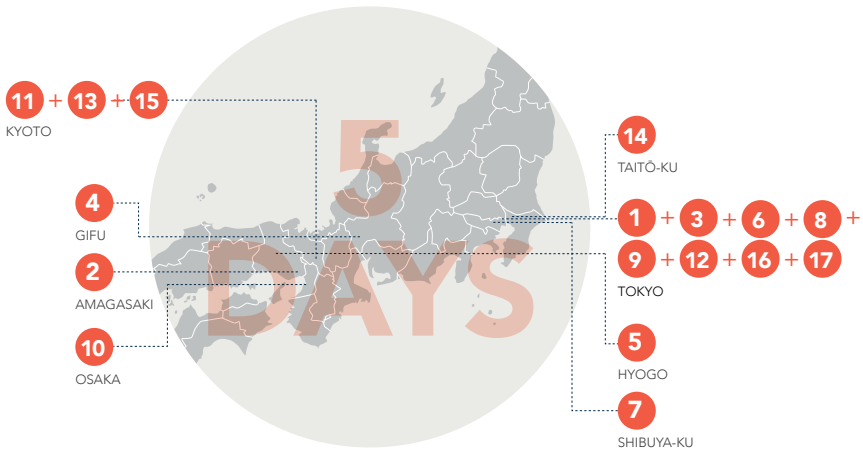
TAIWAN
(AUGUST 2020)

12
COMPANY MEETINGS



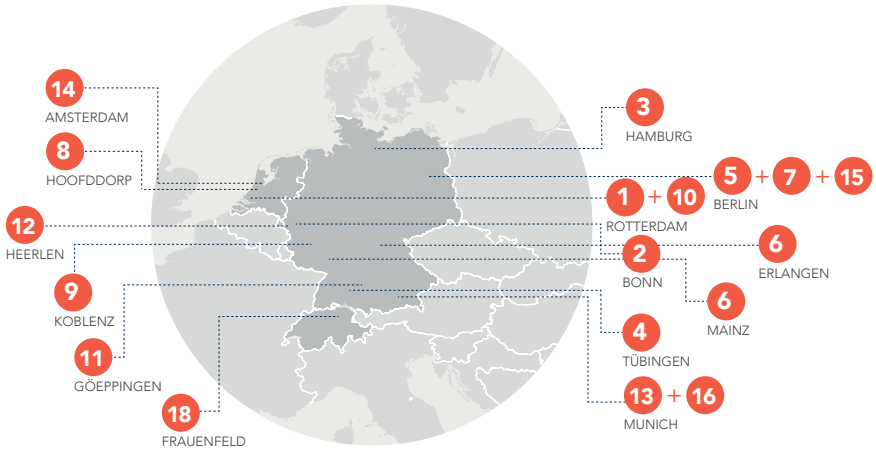
JAPAN
(MARCH 2021)

17
COMPANY MEETINGS



GERMANY, SWITZERLAND, NETHERLANDS
(MAY 2021)

18
COMPANY MEETINGS



HAVE LAPTOP, WILL TRAVEL

As Scotland entered lockdown in March 2020, Investment Manager Fraser Fox left Edinburgh to work remotely from wherever the pandemic restrictions would allow him to. After spending four months in the Highlands, he left the UK in August 2020. By the time he returned in July 2021, he had dialled in from three countries, visited another, walked more than 1,500 miles and stayed in 35 different hotel rooms and apartments. Here are some excerpts from his diary.

SEPTEMBER 2020: ICELAND

I am ambling down a quiet mountain road near Siglufjörður, Iceland's northernmost town, when a minibus screeches to a halt beside me. It contains a football team from Keflavík heading home from a big match in the next fjord. They've mistaken me for a local and want to know if there's an off licence in town where they can restock for the journey home. Three of the team, it transpires, are Scots living in Iceland.

Celtic connections are everywhere. The first settlers, apparently, were cave-dwelling Scottish and Irish monks. When the Vikings arrived, they brought with them captured women from Ireland and the Western Isles, so there's a lot of Celt in the Icelandic gene pool. The accents and sense of humour feel strangely but pleasantly familiar.

Akureyri: The small-town city

I have based myself in Akureyri, Iceland's unofficial northern capital, which is 60 miles from the Arctic Circle. Nestled at the end of the country's longest fjord, Eyjafjörður, it's a dramatic spot, surrounded by hills that have some of last season's snow still on the peaks.

Most Icelanders live in the southwest around Reykjavík, and the rest of the country is sparsely populated. With 19,000 residents, Akureyri is a city by Icelandic standards. Despite being not much bigger than my home town of Linlithgow, it has its own airport, university, hospital, concert hall and botanic gardens. But the vibe is more small town: cars stop for pedestrians and the red traffic lights are heart-shaped. Some people have little turf houses for elves at the ends of their gardens.

So far, my transition to remote working has been remarkably easy: internet and phone reception are far better than I get in my usual abodes in Pitlochry in Highland Perthshire and Edinburgh's Leith. And I have even managed to have coffee with the one other Scot currently living in Akureyri.

The Scottish Highlands or another planet?

The highlight of my time in Iceland has been the 54km Laugavegur ('hot spring route') trek. Parts of this trail resemble the Scottish Highlands; in others, it's like stumbling onto another planet. The route passes lava fields, black sand deserts, multicoloured mountains and volcanoes, shimmering glaciers and steaming sulphur pools.

Laugavegur normally gets busy in the summer, and accommodation has to be booked months in advance. But things are very different in 2020: when I stop for lunch, another hiker appears every 15 minutes or so. The crisp, clean air and deafening silence prove to be the perfect antidote to months of coronavirus madness.

I leave Akureyri for Reykjavík in early October for some in-person meetings with local companies (a rare treat) and to delay the onset of the Icelandic winter. Not my smartest decision. I move in just as Iceland's third Covid-19 wave gets going and within days of my arrival the streets are emptying as the city closes down again. With nothing to do and the mercury dropping, it's time to go.

DECEMBER 2020: CYPRUS

Not quite ready to return home to work in my flat, I roll the dice. It turns out there's only one place that's open, hot and has a workable time zone and decent internet. Cyprus is one of the few places open to UK holidaymakers seeking winter sun.

Lockdown fugitive

I move into a resort in Paphos with swimming pools, restaurant and supermarket. It's hardly intrepid travel, but maybe I could get used to it. Occupancy is probably less than 10%, and we're an odd community of remote-workers, career-breakers, families and sun-worshipping retirees – all hunkering down for a winter in exile.

I start to feel settled. I should have known better.

Covid-19 cases are rising at an alarming rate, and the authorities announce complete bans on movement in and out of the district. But there are 24 hours before the new restrictions take effect, so I flee town – racing for the district border before the roadblocks go up.

Nicosia: The divided city

Given its strategically important location, Cyprus has a long history of domination by foreign powers. Many of the great civilisations have left their mark on the capital, Nicosia. Behind the old town's Venetian walls is a maze of alleyways, squares, churches, mosques, hammams and colonial buildings. It's a vibrant place, even during a pandemic, with hipster coffee joints and cocktail bars spilling out onto graffitied lanes.

But Nicosia is a divided city. A UN buffer zone, the Green Line, slices through the old town. To the south is the EU member state and majority Greek-speaking Republic of Cyprus. To the north is the self-declared Turkish Republic of Northern Cyprus, which is only recognised by Turkey. The city was divided in the Sixties using a map and pencil, and the uninitiated can wander down a pretty lane to find a barricade and armed gunmen. This only seems to add to the city's edgy allure: many of its most stylish bars are nestled among the sandbags and razor wire.

In 2003, the border reopened after 30 years, and reunification talks have taken place. But Covid-19 could set this back: the crossing points closed again in March 2020 to stem the spread of the virus, interrupting the lives of Cypriots on both sides who had grown accustomed to passing back and forth.

The end of freedom of movement

Since I've been here, Cyprus has gone from having some of Europe's best Covid-19 metrics to some of the worst. New nationwide restrictions have been announced for the rest of the year, which include the closure of bars and restaurants and a strict curfew.

So I get on yet another bus – this time to the easterly port city of Larnaca, which is where I spend Christmas 2020. With text message preapproval I'm allowed out twice a day to exercise and buy essentials. For the best part of three months I finish work at 7:30pm, dart along the promenade, and get home in time for the 9pm curfew.

The next obstacle is Brexit. I'm entering the 11th year of an 11-year passport, and from 1 January will no longer be allowed to enter another EU state. I'm also waiting to hear whether, as a non-EU citizen, I need to/can get a visa to remain in Cyprus into the new year. If not, I may have to expedite Foxit...

Sure enough, my post-Brexit passport complications will get me cast out of the EU by the end of March. I have been plotting potential destinations since well before Christmas, but more doors are closing than opening. There's only one realistic option left.

MARCH 2021: THE UAE

I arrive in Dubai to find hotels, restaurants and bars operating with reduced capacity, socially distanced seating, hand sanitisers, QR code menus and contactless payment everywhere. There are temperature checks entering my hotel and disposable gloves for picking out supermarket vegetables. Mask compliance was initially 100%, although it has dipped recently as temperatures have risen well into the forties.

Dubai is actively courting digital nomads to base themselves here during the pandemic. After jumping through various hoops (proof of employment, bank statements, biometric data collection, chest x-rays, blood samples, etc.), I am eventually granted short-term residency.

Dubai: The city of superlatives

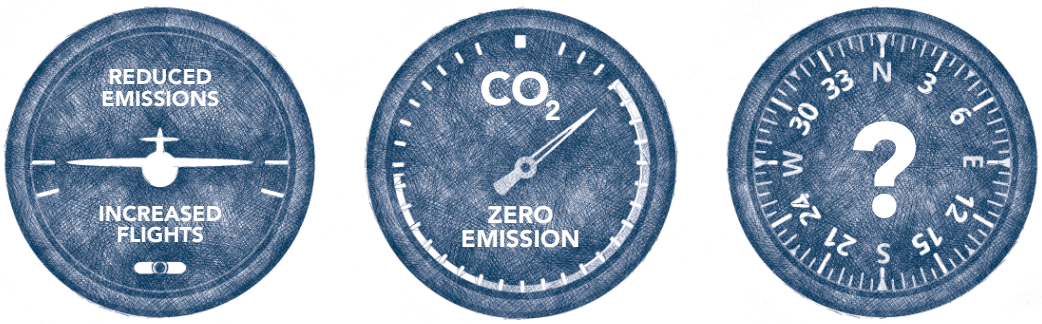
Dubai is a place of superlatives. It's hard not to marvel at the ambition and audacity of a desert city that barely existed a few decades ago now spending $1.5bn on a skyscraper stretching nearly a kilometre into the sky.

Having packed all those months ago for autumn hiking near the Arctic Circle, I arrive in the intense heat and near constant sunshine with a backpack full of waterproofs and winter woollies. Much as it pains me, I have to go shopping. The city's many malls are often the size of Wales and contain more shops than anyone could possibly ever need. And in one of the world's most cosmopolitan cities, these temples to consumerism are also great places for people-watching. Wealthy locals, expats and tourists alike are drawn in their droves by the allure of every luxury-goods brand on the planet.

TIME TO GO HOME

On my way home, I stop off for a short holiday in Bosnia and Herzegovina. Basing myself in Sarajevo and Mostar, I hike to remote mountain villages and lakes, and visit a spectacular dervish temple. Sarajevo itself offers a fascinating glimpse into the country's complex history – from the Ottoman and Austro-Hungarian empires via communism to the bullet-holed buildings attacked during the horrors of the breakup of Yugoslavia. That history prompts pause for reflection, but (despite a relative lack of tourists) the bustling cities strike an optimistic note as my last stopping-off place.

With my fate left largely in the hands of the Covid-19 travel gods, life over the past year has been by turns frenetic and monotonous. Living on Zoom and out of a backpack can be exhausting, and at times I've woken up with no idea where I am. But I have no regrets: this adventure has been a great distraction from all the bad news out there. And I'm very aware of how fortunate I am to have done all this – particularly during a time of suffering for so many. But all good things must come to an end. And now it's time to go home.



FLIGHT OF FANCY?

The aviation industry is not exempt from Net Zero targets. But cutting emissions – and keeping the world flying – is a complex undertaking.

It's the age-old conundrum – how to get more for less. In this case, more flights, while polluting less. The demand for more flying – economically, commercially, personally – is set to keep on growing, while at the same time all eyes are on the aviation sector's drive to cut emissions on an unprecedented scale.

Let's start with the numbers. According to a 2020 IEA report,[1] aviation has generally been cleaning up its act over the past couple of decades, with the percentage rise in CO_2 emissions (2% per year) much lower than the percentage rise in passenger numbers (5% per year). But that still leaves a rapid overall rise in emissions for the industry, which reached 1 giga-tonne of CO_2 in 2019 and accounted for 2.8% of global emissions. A major revolution needs to happen to

"On a more fundamental, human level, aviation is a sector that allows people to keep in touch with distant friends and family, explore the world, bring together different cultures, or just take a well-earned holiday on the beach," he adds. "There's another aspect. Currently 1% of the world's population is responsible for half of all carbon emissions from air travel."

satisfy the contradictory demands of both increasing passenger numbers and meeting 2050 net zero targets.

Addressing the glaring contradiction in the predicament first, isn't the obvious answer to reducing emissions – particularly after a sustained period of drastically reduced global air travel during the Covid-19 pandemic – for everyone to simply fly less? Are the industry and passengers burying their heads in the sand by continuing to advocate for more flying?

"Long-term growth in global air passenger numbers is something to be celebrated," says Walter Scott Investment Manager Fraser Fox. "Continued growth in air travel is a huge positive for society. Economically, travel and tourism accounts for about 10% of global GDP, and about 1 in every 10 jobs either directly or indirectly."

"On a more fundamental, human level, aviation is a sector that allows people to keep in touch with distant friends and family, explore the world, bring together different cultures, or just take a well-earned holiday on the beach," he adds. "There's another aspect. Currently 1% of the world's population is responsible for half of all carbon emissions from air travel."

The average North American flies roughly 50 times further than the average African each year. Is it fair that we discourage or put up obstacles to people in developing economies, as they grow wealthier, from starting to enjoy the benefits of travel that we all take for granted?

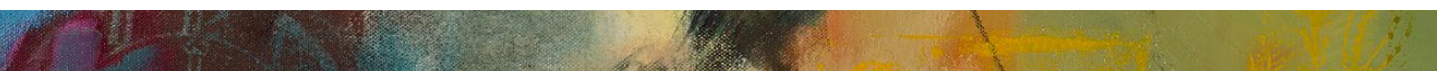
If air travel growth is here to stay, what's the solution? For Fox, innovation is the key. "We need to be more ambitious, more creative, and look for better solutions," he says. "It's manufacturers like Airbus and Boeing designing aircraft that are more aerodynamic, it's more efficient engines, it's lightweight materials, it's sustainable aviation fuels, it's transformational new technologies like electric, hydrogen aircraft."

SUSTAINABLE FUELS

If flying less is not an option, the second most obvious solution is to move away from fossil fuels and advance the use of sustainable alternatives, such as biofuels and hydrogen. But while sustainable fuel development is a prime aim of the major aircraft manufacturers (see Fuelling Speculation on page 15), meaningful cuts to emissions from a fuel revolution are still years away.

"Nothing ever happens quickly in the commercial aerospace industry," says Fox. "Today's R&D at Airbus and Boeing won't be commercialised until probably the end of this decade at the very earliest. There's then a huge regulatory burden to test and qualify every little tweak that you make to be absolutely certain that everything is safe, and there's then massive investment required to develop and to manufacture any new model."

Walter Scott Investment Analyst Joseph Friedland agrees. "Even if you place an order today with Airbus, for example, you're not going to get your plane until 2030. And the useful life of a plane can extend beyond 25 years," he says. "Therefore planes being ordered now for delivery in 2030 are going to still be in service by 2050, and you're always going to have a huge part of the fleet that is still relying on old technology, even if we start to see hydrogen aircraft being sold in 15 years' time.



BIOFUELS AND HYDROGEN – FUELLING SPECULATION

Biofuel blends, mixed directly with conventional jet fuel up to a 50/50 ratio – the maximum currently allowed – are already in use. Some airports in Scandinavia, the US and Australia supply it, while United Airlines, Air France, SAS, BA, Lufthansa, Virgin Atlantic, FinnAir and KLM have all flown services on biofuel blends.

Boeing, meanwhile, has said it will deliver commercial aircraft with 100% biofuel capacity by 2030.[2] This ties into the manufacturer's broader aim of halving carbon emissions by 2050, as the pipeline dictates that aircraft remain in service for around 25 years. Boeing has already run the first fully biofuelled flight on a cargo 777 model, in 2018, but the ongoing R&D requires Boeing to develop, test and then get international safety approval for its biofuel specifications.

While on the face of it a plane that could run only on 100% biofuel would be a major step, there is another take that sees biofuel as merely shifting the carbon footprint to other sectors – chiefly agriculture.[3] Biofuels are derived from a combination of materials such as vegetable oils, animal fats, wood and sugar cane. Burning them still releases carbon into the atmosphere (at about half the rate of fossil fuels), but the theory is that the carbon is then absorbed by the next batch of biofuel crop – a virtuous neutral circle, if you like.

But the production of the biofuel material can itself have a heavy environmental impact. This includes the release of carbon, and the reduced capacity to absorb it, through land-clearing deforestation, and the intensive transportation and manufacturing processes. Aviation counters by saying the biofuel supplies can come from existing farming waste products, but that still has its potential problems; the initial crop of, say, palm oil, still has a big environmental impact, which could ramp up to satisfy huge airline demand, while some agricultural waste has a more positive carbon absorbing potential if it is composted back into nature's carbon stores, the soil.

"I think the only way to accelerate churns for those fleets is for the government to help support airlines in retiring a plane."

But John Grant, senior analyst at OAG, thinks there has been an opportunity recently to speed up that old-fleet phase out – thanks to the Covid shutdown. "In some ways what has happened in the last 18 months has accelerated the emissions journey for the industry, because many of the ugly, horribly inefficient aircraft have been moved into retirement earlier than was originally expected."

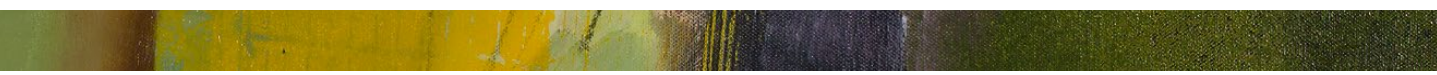
Airbus, meanwhile, last year announced ambitions to put commercial hydrogen-powered aircraft 'zero-emission' into service by 2035.[4] When liquid hydrogen combusts with oxygen, it puts water vapour rather than carbon into the atmosphere, so is effectively a 'clean' fuel.

Prototypes being considered for development include turbofan and turboprop designs that incorporate a modified gas-turbine engine running on hydrogen, with capability to carry up to 200 passengers on short-haul trips, and a futuristic wide-bodied model with both cabin and fuel storage built into the wing.

The development is at a much earlier stage than biofuel development, and would require major airport infrastructure investment, as well as, potentially, state finance to aid airlines to upgrade existing jet fuel fleets earlier than planned.

EFFICIENCY

With a complete fuel overhaul still years away, other innovations and efficiencies that are already having an impact will become ever more



important in the coming decade. One crucial advancement has been lightweighting. Simply put, lighter aircraft consume less fuel, and therefore produce lower emissions. Hexcel, a leading supplier in this area, manufactures carbon fibre and other composite materials for the commercial aerospace industry, which significantly reduce the weight of aircraft.

"Producing this stuff is highly complex, it's extremely capital intensive with a huge amount of intellectual property and manufacturing know-how involved," says Fox. "There are only really two companies doing this – Hexcel and Japanese company Toray. And of the two, Hexcel is the only pure play and the clear technology leader."

"It's not just the aircraft where efficiencies can be made. Airports, apparatus and scheduling can all be further streamlined too."

"Every kilogramme of fuel saved by an aircraft reduces CO_2 emissions by more than 3kg. So lighter materials are helping airlines and will continue to help airlines meet their sustainability objectives. They also help the bottom lines by reducing fuel cost and reducing maintenance costs, because these materials are so tough and long lasting. And so, for all these reasons, every new generation of aircraft design contains a higher proportion of carbon fibre composites than that which went before."

While composite materials are a long-term answer, they are also a present solution. "The first aircraft to use these materials was the Boeing 767, which entered service in 1983 with an airframe that contained about 6% composites," says Fox. "Fast forward to today, and the Airbus A350, first delivered in 2014, has 53% composite content. No other model comes close to that. So, there's a lot of scope for others going forward to catch up with the A350. And that 53% composite content isn't the limit – there's plenty of potential for that to increase as we move through the generations of aircraft."

Developing engine efficiency is another key progression. "Making conventional aircraft more efficient is going to be the backbone of the improvement that we see in the coming years in terms of the emissions profile of the industry," says Friedland. Manufacturers such as Pratt & Whitney (a subsidiary of Raytheon) "have been working on [efficiency] for decades, and we've seen a lot of progress in every iteration of the engines that have come out."

It's not just the aircraft where efficiencies can be made. Airports, apparatus and scheduling can all be further streamlined too. Better management of routes, for example, has both significant environmental and economic benefits, states Friedland. "Better managing airspace to cut down on emissions from the planes also helps to minimise congestion at the airport – you can get more planes through in a day and that saves the airlines money on having to burn fuel when circling the airport."

Reducing environmental costs incurred before passengers even board might not seem like something that would make much of an impact, but multiplied by millions it becomes significant. Fox thinks parts of the industry are operating in the "dark ages" with the paper requirements and inefficient processes that must be "ripe for a digital upgrade".

OAG's Grant thinks there *has* been progression in this area – with more to come. "Pre-Covid, there were lots of good experiments going on; the industry wants to move to a biometric, paperless environment," says Grant. "When you travelled 25 years ago, everyone had to have a paper ticket, a boarding pass and all of those sort of things. The best airlines in the future will be those where you don't actually see or engage with anyone until you get on the aircraft."

But what will the raft of new travel restrictions in the post-Covid era do to this streamlining process? "It's going to be really interesting to see where we go once people are flying again [with the added bureaucracy]," says Fox. "Will it necessitate a huge investment in IT if holidaymakers are in disarray and missing flights? That might give the industry the shake it needs to really up its game in this area."

"But with the voluntary nature of the scheme, how does positive airline action filter through to eco-conscious passengers? Fox says that without good data, consumers are not always able to make an accurate low-emissions choice. Personal circumstances and priorities differ too."

OFFSETTING OR OFF-PUTTING?

With implementation of innovation a slow progression, it falls to offsetting to help airlines make immediate emissions reductions. The concept is not without its flaws though, with some viewing it as little more than passing the buck. "Offsetting is controversial – it's far from perfect," says Fox. "But at least it has the benefit that it can be implemented a lot more quickly than some of the technological solutions."

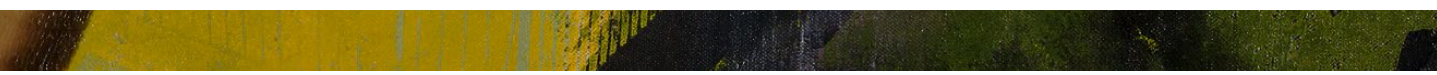
Due to the international nature of air travel, implementing industry-wide regulation on offsetting is not easy. The UN, though, has introduced a global scheme for international flights, CORSIA (Carbon Offsetting and Reduction Scheme for International Aviation),[5] under which airlines and other aircraft operators will offset any growth in CO_2 emissions above 2020 levels – plugging that gap until the new technology comes into play. The scheme, which starts this year, is voluntary until 2027, and is expected to offset around 2.5 billion tonnes of CO_2 between 2021 and 2035.

It works by calculating emissions generated from flights and converting that into purchased credits associated with projects that work to remove the equivalent amount of emissions from the atmosphere elsewhere.

But with the voluntary nature of the scheme, how does positive airline action filter through to eco-conscious passengers? Fox says that without good data, consumers are not always able to make an accurate low-emissions choice. Personal circumstances and priorities differ too.

"A lot of people just want to get to Majorca the cheapest way possible, and are not interested in the carbon impact, while for others [the carbon footprint] will be an important factor in whether they make a trip at all. So the availability of good information, to allow those that are interested to make an informed choice, is key," says Fox.

One of the conclusions of a recent OAG report (*How Green is your Airline?*),[6] which explored the impact of environmental concerns on airlines, airports, online travel agents and other providers, was that passengers who want to travel responsibly struggle at present to get the data they need to make such decisions. Not all airlines provide it, and even when they do, the variables such as route length, passenger



load, aircraft configuration, age and model make it very difficult to make a meaningful comparison.

Building clear, data-based technology into distribution channels – whether that's online flight comparison and booking services or travel agents – is required to help drive consumer offsetting, says Fox.

"One of the key things Spanish company Amadeus IT, for example, is working on is giving estimated emissions per passenger per flight. So, before any booking is made that information is available to someone considering various flight options and they can then potentially factor that data and those comparisons into their decision-making process."

Friedland agrees the onus should be on the industry to provide clearer information. "There's some scepticism [among consumers about offsetting and emissions data]. It's important for the industry to be able to explain methodologies and why one option is better than another. As consumers become more educated, you'll see people more willing to take a slightly longer route or pay slightly more for a ticket if it helps to mitigate the negative impact of flying."

MISSION: POSSIBLE?

The overall feeling is that getting to net zero is not going to be an easy process – far from it – but it's an essential target to strive for – and with co-ordination and commitment, it's potentially possible.

"There is no one solution – it's going to require a combination of factors: new technologies, airlines changing their operating practices, incentive structures, and individual responsibility," says Fox. "Everyone has to play their part – but if they do, and it can be co-ordinated in some way, then it's not beyond human ingenuity to get us there."

Grant agrees: "The industry is very conscious of what it has to do and the obligations that are set, and it will achieve them... it may be 2040, it may be 2050, but it will get to zero."

[1] https://www.iea.org/reports/aviation

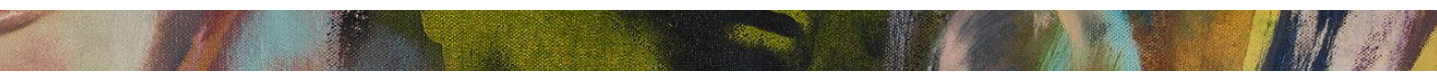
[2] https://www.theguardian.com/us-news/2021/jan/23/boeing-says-it-will-make-planes-able-to-fly-on-100-biofuel-by-2030

[3] https://www.wired.co.uk/article/biofuels-aviation-carbon-emissions

[4] https://www.theguardian.com/business/2020/sep/21/airbus-reveals-plans-zero-emission-aircraft-fuelled-hydrogen

[5] https://aviationbenefits.org/environmental-efficiency/climate-action/offsetting-emissions-corsia/corsia/corsia-explained/

[6] https://www.oag.com/reports/how-green-is-your-airline-sustainable-flights



TRAVEL WITH CARE

Business and leisure travel has been severely, and unavoidably, impacted by the pandemic. Innovation can help it bounce back, says Investment Manager Jamie Zegleman.

How do you assess the future of business travel?

Despite the everyday technical glitches and perennial failures to press unmute that we are all so familiar with, video calls have undoubtedly proven to be an efficient way to conduct meetings. That can only negatively impact business travel.

At Walter Scott, we've seen an increase in access to some senior management teams and the second tier of management teams of companies that we invest in. And it's because these individuals, who are normally flying around the world, can sit down and have more half-hour, one-on-one calls.

Companies will look at business travel in a very different way. Some trips will still be made because there are some things you must do face-to-face. We understand the value in being on the ground, visiting factories, facilities and offices, but there will be certain travel situations where the cost-benefit analysis has changed. And there will be a big reduction.

It's not just that technology has improved, it's that the world has become more aware of the environmental impacts of travelling. One has allowed the other to become more of a business concern. The fact that digital technologies have improved and been shown to be effective means that people can try to address any climate-related concerns they have with long-haul travel by using virtual meetings as a low-carbon alternative.

What about the outlook for leisure travel?

We continue to be strongly confident that travel remains a growth market in the long term. The basic driver is growing income around the world. There's an appetite for higher levels of disposable income being spent on experiences, rather than material goods – travel being one. That's a trend that has been going on for some time.

The issue is how long it takes for international travel to become more readily available and open. And the problem is that the pandemic is a global issue and not a single- or even multiple-country issue. The whole world moves at the pace of the slowest, in some respects. It means a return to open skies is still some way off. Booking Holdings, the global online travel agency, believes this is a multi-year problem, not a quarterly issue. Assuming we get out of the pandemic, 2023 is when they think they could start to see pre-pandemic levels of demand again. There was significant growth in 2021 relative to 2020 and there should be growth again in 2022 relative to 2021, as things open up and get better, but, in my view, it will probably be 2023 before we surpass 2019 levels of revenue. I don't think, structurally, the leisure market is impaired over the long term but, for the next few years, there's a huge amount of uncertainty as to how quickly it will recover.

How are companies evolving their offer in response to customer demand?

What companies like Booking want and need is for people to go on holiday. They will help facilitate the booking of that place; it doesn't have to be a hotel. Alternative accommodation is becoming more popular and is an area in which Booking has been investing, building an equivalent to Airbnb within its infrastructure. If you want to stay in a yurt or a canal boat, you can.

It is also looking at ways to add greater service value to the customer. One is example is The Connected Trip. It wants to offer users of the platform not just places to stay, but everything that you might need on holiday: make it easy to book your taxi, pick you up from the airport, book your airline ticket. It wants to help you get a restaurant. It can facilitate art-gallery entry.

It's at a very early stage, but they're adding a lot of capacity to make this happen. In the very long run, they aim to become an AI-led, automated travel companion. Through an app, it knows that you're on a flight, it knows that the flight's delayed, so it changes your hotel booking, or it forwards a message to the hotel to tell them that you're going to need a late check-in, and a new slot for the evening dinner reservation.

How can technology and data fuel other travel trends?

Digital meetings have allowed businesses and individuals to think about their carbon footprints, but you're not going to do your city break to New York via Zoom. The environmental impact of travel has become more prominent since the pandemic, but it's very difficult to know whether consumers will change their travel habits on account of their concern around climate change. Absolutely, some people will, but I think the vast majority probably will not.

From Booking's perspective, its position at the centre of the travel industry brings the opportunity to drive positive change in relation to environmental impact. There's not much it can do about how much carbon is emitted by a plane flying to the US, but it can encourage hotels to adopt more environmentally friendly policies, even basic steps such as asking hotels, 'do you have LED light bulbs or not?'

Because Booking is the gateway to many platforms, it is trialling a system that flags up to the end-customer which hotels are meeting, or considering, a variety of environmental impacts and trying to do things more efficiently. It's at an early stage but, if customers want to consider the environmental impact of their holidays, Booking can show them data to inform their decisions. This has a knock-on impact of encouraging holiday providers to think about their policies. It also has the potential to differentiate Booking's platform as a useful source of information for people who want to evaluate the positive or negative environmental or social impacts of their travel.

Cleanliness, and health, hygiene and safety are also likely to become more important considerations when travellers choose a destination. Booking is providing more information to help travellers differentiate hotels based on these metrics, for example, traveller review scores and information on the extra measures put in place by the hotel.

WE'RE ONLY HUMAN

In a polarised world, we need more empathy and understanding of other points of view, says Gillian Tett. In her new book, *Anthro-Vision*, she reveals how anthropology could save us.

Do you think many people today understand what anthropology is?

People think anthropology is like Indiana Jones for grown-up academics – that we go off and dig up bones. But cultural anthropologists don't do that. Physical anthropologists do, because they look at human evolution and biology. Cultural anthropology looks at the current state of people, and anthropologists today are as likely to study an Amazon warehouse as the Amazon jungle.

Anthropology started off in the 19th century by looking at 'exotic people' – they used to call them 'primitive' – or cultures in far-flung places who were considered somehow inferior to Western Europeans. In the 20th century, it did a complete U-turn and

"Anthropologists today are as likely to study an Amazon warehouse as the Amazon jungle."

began to champion the idea that all cultures are valid and if we think that people in other countries are weird and exotic, then we are weird and exotic to them. And so there is just as much merit in studying ourselves as there is in studying other people.

You spent time in Tajikistan when you were studying anthropology. What did it teach you?

The best way to get a sense of Tajikistan is to imagine the pictures you've seen of Afghanistan with big snowy mountains, add in electricity and take out the black veil for women. I lived there for a year in a village up in the mountains, wearing Tajik clothes, which are very brightly coloured stripey tunics and headscarves, sleeping on the floor with the kids – basically living like a Tajik girl. I was studying marriage rituals, which sounds esoteric, but I was using the ceremonies and the rituals to try to understand how Tajik villagers at the time navigated Islam and communism – the two very different bits of their lives.

You might say that that seems completely irrelevant to Wall Street or Washington or anything I have gone on to do with the *Financial Times*, but the truth is that we are all humans, and human beings – wherever they're found, in whatever context – tend to create tribal patterns, social groups with boundaries and rituals and shared cultural assumptions. And these shape how we see the world very fundamentally. And we tend not to notice those cultural assumptions, but they matter enormously. And it really pays to think about them – whether you're in Tajikistan or Tokyo or anywhere else.

When did you recognise the power of anthropology when it comes to journalism?

It was quite soon after I started writing about economists and financiers and investors in the City of London back in the early 1990s. And then when I became the *Financial Times* Tokyo correspondent and covered the financial crisis there in 1997. The issue of how culture intersected with finance was very, very important, because there was a big clash between Japanese and American financial assumptions and their visions of how markets and capitalism worked. The first book I wrote was about that clash between Japanese and American culture.

After that, I went and worked on the *Financial Times's* longstanding Lex column, which seemed to have nothing to do with culture. But then two things happened.

First, the editor asked me to draw up a list of all the topics we needed to cover on Lex. And I thought, "What if I act like an anthropologist and try to look at the ecosystem of the City of London, and focus not on what people are talking about, but on what they are not talking about?" Because one of anthropology's key precepts is to think about social silences: the things we ignore because we think they are dull or taboo. It made me think about the credit derivatives world, which was growing fast but was not being talked about, and that started my interest in the whole wave of financial innovation that happened from 2004 onwards.

"I thought, 'What if I act like an anthropologist and try to look at the ecosystem of the City of London, and focus not on what people are talking about, but on what they are not talking about?'"

The second key moment was in 2005 on the French Riviera: my first-ever conference on credit derivatives and securitisation. I walked in and realised that it was just like a Tajik wedding.

"They had this creation mythology, as every social group does, which was all about the cult of liquification."

"Investment managers should be asking themselves, 'Am I prone to groupthink? Am I prone to lazy tunnel vision? What am I ignoring?'"

Investment banking conferences play the same function in finance as a Tajik wedding does in the Hindu Kush: they draw together a scattered tribe, reaffirm social ties and, most importantly, recreate a shared worldview through the rituals and symbols.

And when I analysed the rituals and symbols I saw there, I realised that the bankers who were developing innovation in finance – those credit derivatives – spoke a language that no one understood; had a shared creation mythology, which sounded very exciting but was full of holes; and were disconnected from real life. And I thought, "Something is going badly wrong in this corner of finance."

Why exactly did you think something was wrong with finance? Can you explain that in more detail?

What I saw at that conference was this tribe of financiers – highly educated, very bright and often very well-meaning people – who were creating all these products called things like CDOs [collateralised debt obligations]. And they had this creation mythology, as every social group does, which was all about the cult of liquification. They believed that the whole point of innovation was to create the perfect free market, and if you have perfect free markets, risk will be distributed in a way that makes the system safer, and everybody can get a loan perfectly priced to their situation. But there were at least two problems with that creation mythology.

One was that, although the people peddling it said they had a desire to create the perfect free market where everything was traded, in reality the CDOs they were creating were so complicated that they could not be traded freely in markets. So typically they were created and then stuck on the balance sheet of a large asset manager, and often priced according to models, not free markets, because they were not free market prices. And that was a huge contradiction, but no one talked about it at the time because there was an echo-chamber effect.

Similarly, people kept saying that the securitisation was going to make financial systems a lot safer by distributing risk. But the techniques they were using to distribute risk were so opaque and untested that they were introducing more risk back into the system in new ways.

Their vision of finance was abstract and detached from real life. In the movie The Big Short based on Michael Lewis's book there is a scene where a hedge-fund trader goes and meets a pole dancer in Florida who has sub-prime mortgages, and they are shocked that she has these mortgages. But what was really shocking was that so few financiers had bothered to meet anybody at the end of their food chain.

They had groupthink, and there was nobody challenging them with common sense – nobody who was not an expert. And that pattern is at risk of being played out over and over again in the financial sphere and in the areas of business that people in investment analyse.

So investment managers should constantly be asking, "Are the companies I am investing in prone to tunnel vision? Do they have checks and balances? Have they thought about how culture is shaping how the company behaves?" And they should also be asking themselves, "Am I prone to groupthink? Am I prone to lazy tunnel vision? What am I ignoring?"

"Anthropology is not just a tool that enables you to have empathy and understand people who seem different from you – to look at the so-called 'other'. It also enables you to look back at yourself and see yourself more clearly."

And my last point is this: 2008 was a big wake up call for many people in the investment management world about the dangers of tunnel vision – the stuff that is outside their model sometimes comes back to bite them. It matters to look at externalities, things outside the balance sheet. This is being expressed in terms of a search for sustainability in ESG. We want to embrace a stakeholder vision, not a shareholder vision. We want to have a wider view. And that overlaps with anthropology, because anthropology is about risk management. It is about having checks and balances.

So are businesses now applying anthropology to their strategies and the way they make decisions?

The good news is that some companies are trying to use anthropology to understand the public policy context in which they're operating. Google is using anthropologists to look at misinformation and how to counter that. Intel, meanwhile, has been looking at how AI is perceived in different cultures when it develops its tools.

But the bad news is that this is still not a dominant practice. And the other bad news is that companies have been slow to flip the lens and use anthropologists to look back at themselves. It is really important to stress that anthropology is not just a tool that enables you to have empathy and understand people who seem different from you – to look at the so-called 'other'. It also enables you to look back at yourself and see yourself more clearly.

There is this wonderful Chinese proverb that a fish cannot see water. None of us can see the cultural assumptions that shape us clearly until we step out of our own water and go to another fishbowl and look back. Anthropology can do that.

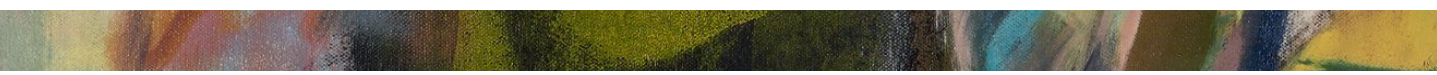
And what is lacking is CEOs using it to study their own cultures and patterns, or engineers and other technocratic experts using anthropology to see how they interact with other pieces of the ecosystem or their own cultural peculiarities. General Motors used an anthropologist to study its internal processes, but it is still very rare.

Why do you think businesses are so resistant to the idea?

It is partly those misconceptions about anthropology. But also anthropologists are bad at telling other people about the incredible value of their messages. And that is because anthropology tends to attract people who like watching other people. You have to be very patient to observe other people and humble enough to be able to fade into the background. And anthropologists tend to be quite cynical about power and money, because when you have studied it it is hard not to be. All of this makes it quite hard for anthropologists to get a voice or to hustle effectively enough to be recognised.

And when companies do understand what anthropologists do and the insights they can offer, it can make people in power quite uncomfortable. Because if you seem successful and you have your nice corner office, the last thing in the world you want is someone to come with a mirror and point out all the self-deception and blind spots in your life, because that threatens your vision of who you are.

That is precisely why anthropology is so powerful. It is a way of seeing around corners and paying attention



to the parts of the world and life that you normally ignore. It is about having checks and balances to all the other intellectual tools that you navigate the world with, such as economic models or big datasets. And that makes it really, really useful.

Finally, what are the social silences we need to focus on right now?

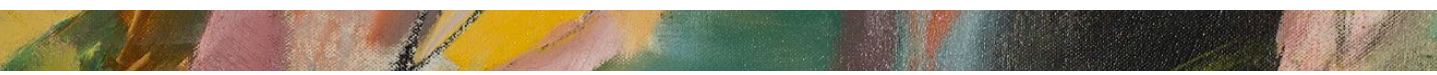
The big one is debt, and the fact that the debt burden keeps growing and growing and growing. I do not see any way that national debts are ever going to get repaid, except through either some form of soft default through inflation or harder default through actual restructuring or financial repression. And all of those potential outcomes are equally scary.

I am very open in the book about the numerous mistakes I have made. I got Brexit wrong, and I was arrogant about Donald Trump. But I did also used to say that one social silence was epidemics and pandemics – I wrote about that in 2018.

Today, I am concerned about antibiotic resistance. Also the lack of scrutiny in the field of AI. Once again, as with the financiers in 2005, you have geeks who could be running amok.

"Anthropology is about having checks and balances to all the other intellectual tools that you navigate the world with, such as economic models or big datasets."

Gillian Tett is the Chair of the Editorial Board and Editor-at-Large, US, at the *Financial Times*. She holds a PhD in social anthropology from the University of Cambridge and her book *Anthro-Vision* is available from Penguin Books.



THE EURO VISION

Can the EU's massive Recovery and Resilience Facility put the bloc's 27 economies on the fast track to recovery?

Unprecedented was once a word that was called on sparingly to describe extremely rare events. In a post-Covid world, it is common parlance. We are indeed living in unprecedented times, and they call for governments and business to take unprecedented measures.

Even so, the EU's audacious €672bn[1] Recovery and Resilience Facility (RRF) has made headlines. The European Commission announced last year that it would make these funds available to the 27 EU nations as part of its NextGenerationEU programme. The aim is to pump life back into the European economy, which has been levelled by the pandemic as tourism disappeared, spending dwindled and businesses shut down indefinitely – and in

many cases permanently. This scenario has been replicated all over the world, of course, but Brussels is keen to be proactive to avoid a repeat of the eurozone's slow recovery after the 2008 global financial crisis.

The RRF will be powered by common EU debt issuance, and differing fund amounts – in the form of both grants and loans – have been allocated to each nation based on economic need and the impact of the pandemic. Italy is the biggest beneficiary of the fund, with access to €191bn in grants and loans, and Spain is second with €140bn. When compared against GDP, however, Greece has received the most generous allocation: €30bn in grants and loans.[2]

These are enticing numbers, but access to the pot is neither automatic nor straightforward. The European Commission requires every country to submit a detailed recovery plan that must be signed off by the Commission and the EU Council of member states. The first tranche of funds is expected to be released in late summer 2021, and further funds will be disbursed periodically up to the end of 2026, when the RRF expires.

DIFFERENT COUNTRIES TAKE DIFFERENT ROADS TO RECOVERY

Each country's recovery plan must not only describe its vision for economic regeneration, but also set out how it will support the European Commission's bloc-wide goals. For example, at least 37% of the funds must be allocated to climate change and reducing carbon emissions, and 20% needs to go towards digitalisation (e.g. 5G infrastructure), social inclusion, education and healthcare. Countries also have to allocate a portion to delivering on the EU's country-specific recommendations. Many of these are about managing the pandemic, but they also include implementing structural reforms to, for example, judicial and administrative systems.

"In France and Italy, the focus is on developing greener rail infrastructure, while Germany and Spain are prioritising the rollout of electric vehicles."

Not surprisingly, given how politically, economically and culturally eclectic the EU27 are, every plan is different in its approach, priorities and even structure. The Brussels-based think tank Bruegel has compared the RRF submissions of the four biggest EU countries – France, Germany, Italy and Spain – and has found intriguing differences.[3]

Germany has dedicated more than half of its pot to digitalisation, compared with about 20% by the other three countries. Italy, meanwhile, has earmarked almost 40% of its budget to social inclusion, education and healthcare projects. Spain has also allocated a sizeable 30% of its budget to this category, including a commitment to "boosting culture and sport".

France has allocated the largest proportion (50% of its overall budget) to sustainability and the environment, compared with about 40% by the other three countries. In France and Italy, the focus is on developing greener rail infrastructure, while Germany and

€672bn[1]

Value of the loans and grants available under the EU's Recovery and Resilience Facility

Spain are prioritising the rollout of electric vehicles. All four countries have allocated 20 to 30 per cent of their sustainability budgets to green-energy initiatives.

Greece has attracted praise for the far-reaching and well-planned goals set out in its 'Greece 2.0' plan.[4] The country's economic woes of the past decade are well documented and, with its reliance on tourism, the pandemic has hit the country particularly hard; in 2020, it saw a 10% drop in economic output. However, Greece 2.0 details how the country intends to use its EU funds to increase GDP by 7% and create 180,000 jobs by 2026.

"Morgan Stanley expects the RRF to spark a 3.5% increase in GDP across the EU. Other economists forecast increases of 4% and over."

WHAT COULD GO WRONG?

It all sounds very promising, and Brussels is certainly confident. It has predicted that the RRF will help all EU27 members recover to pre-pandemic economic outputs by the end of 2022.[5] And many economists share this enthusiasm. One recent report even estimates that GDP will be back to its pre-Covid level in the first quarter of 2022.[6] Morgan Stanley expects the RRF to spark a 3.5% increase in GDP across the EU. Other economists forecast increases of 4% and over – especially if nations take advantage of the €386bn in loans available to them alongside their grants.[7]

But the programme also has its sceptics both in terms of the feasibility of some of the national plans and whether the plans will actually come to any degree of fruition.

It seems counterintuitive, but actually spending the money that is available could be the biggest challenge. Spain, for example, may have indicated that it will absorb all of its allocated grant money (€70bn) within three years – but the country has one of the worst track records in the eurozone when it comes to spending its funding provisions. Italy and Greece share a similar reputation. EU member states routinely receive structural funds as part of the bloc's seven-year budget cycle, but in the 2014–2020 funding round, the average spend across all nations was less than 50%; Spain spent just 39% of its allocation.[8]

When it comes to the RRF, it is likely to be even harder for many countries to use it before they lose it. The funding window closes at the end of 2026, and over the preceding five years money will be meted out by the commission based on biannual reviews and clear progress having been made against the country's recovery plan. This means that setbacks and subsequent poor performance reviews could shrink that country's purse and potentially leave many projects partially completed, if started at all. There is also the question of whether countries will end up using the funds to further the EU's collective sustainability and digitalisation causes. They might have diligently set out how they intend to do this, but in practice the money could be channelled towards more immediate economic concerns.

TIMING IS EVERYTHING

According to experts writing for the London School of Economics

"It seems counterintuitive, but actually spending the money that is available could be the biggest challenge."

180,000

The number of jobs Greece hopes to create with EU funds

(LSE), this is where the timing of the funding disbursements will be crucial in order to maximise countries' chances of successfully absorbing their allocations. And so far, they say, the timing looks about right.[9] The first tranche of funding is due to be released by the end of summer 2021 to those countries whose plans have been approved. This coincides with three critical factors: a peak in the vaccine rollout across most of the eurozone, its collective emergence from lockdown, and the resulting economic reawakening.

The LSE piece says that France, Germany, Italy, Greece, Hungary, Luxembourg, Belgium, Denmark and Portugal – a third of the EU27 – are in particularly strong positions to make the most of this convergence of RRF success factors. Conversely, they expect Bulgaria and Ireland to struggle because their vaccination rates are expected to still be low (below 75%) – which will restrict their economies – when they receive their initial disbursements.

Timing and Covid-19 challenges aside, all countries will need dedication and discipline in delivering their plans. Bruegel says that each country will need to have a strong and aligned RRF governance and administrative framework, for instance.[10] It suggests that this will help to ensure that projects are planned and implemented efficiently, both in terms of time and value for money, and avoid countries simply focusing on absorbing the funds as quickly as possible.

For its part, Greece seems only too aware of the economic failings behind it and the immense task ahead, but it is determined to leverage this unprecedented level of funding to change the course of the country. "This is both a historic opportunity and a unique challenge because we have to change the efficiency and culture of the state itself to succeed," said Finance State Secretary and Greece 2.0 lead Theodoros Skylakakis in April.[11] "It won't be an easy task, but we are confident in our plan and in the country's future."

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[1] The Recovery and Resilience Facility, European Commission

[2] 'EU Recovery fund officially ready for take-off', Rabobank, 1 June 2021

[3] 'Setting Europe's economic recovery in motion: a first look at national plans', Bruegel, 29 April 2021

[4] 'EU fund gives 'Greece 2.0' chance to reset economic model', *FT*, 15 April 2021

[5] 'Brussels backs first wave of €800bn EU pandemic recovery fund', *FT*, 16 June 2021

[6] 'EU Recovery fund officially ready for take-off', Rabobank, 1 June 2021

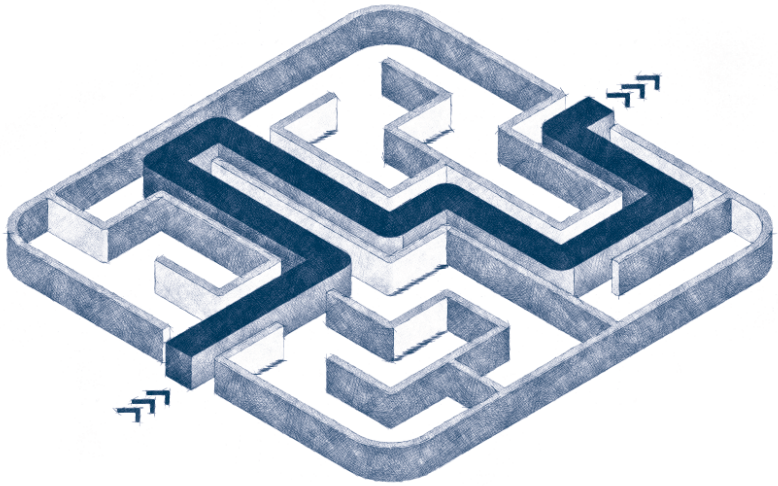
[7] 'Recovery fund set to drive EU rebound, say economists', *FT*, 10 May 2021

[8] 'Will European Union countries be able to absorb and spend well the bloc's recovery funding?', Bruegel, 24 September 2020

[9] Renato Giacon and Corrado Macchiarelli, 'The EU's recovery funds should be released when Europe's economies can reopen', LSE Blogs, 18 May 2021

[10] 'Will European Union countries be able to absorb and spend well the bloc's recovery funding?', Bruegel, 24 September 2020

[11] 'EU fund gives 'Greece 2.0' chance to reset economic model', *FT*, 15 April 2021

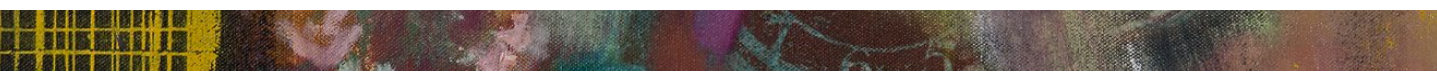


THE RISK CALCULATORS

The Covid-19 pandemic and new urgency around climate change are shining a spotlight on investment risk and exposure. But are they changing how Walter Scott thinks about its portfolio? Three members of the team tell us about the firm's approach, how disclosure is getting more important, and why data might not be all it is cracked up to be.

How would you describe the Walter Scott approach to investment risk?

Charlie Macquaker, Investment Director: Our principal mindset is to protect our client's hard-earned savings and capital. Secondly, we're investing in companies, so we need to understand their ability to deliver on our objective in terms of delivering 7–10% real rates of annualised return over time. So, the risk from a portfolio perspective is that we don't maintain the purchasing power of those assets over time. And from an investment standpoint, we manage risk through our research. It is literally company decision by company decision.



Alan Edington, Investment Manager, Responsible Investment: What differentiates us is the depth of our research. We get to know companies deeply. We use a few tools to make companies comparable across sectors and geographies: we're able to take a global perspective and then use consistent signposts for what we think great businesses look like.

The other differentiator is the long-term nature of what we do. We take a big-picture view in some ways, but a considered, granular consideration of risks and opportunities in other ways. This helps us to understand what the business is likely to do and how it's likely to perform over the long term.

"During the time you spend digging around in the financial accounts, trying to understand the business model and applying our stringent criteria it's quite easy to put yourself off a company."
Jamie Zegleman

Jamie Zegleman, Investment Manager: The process of analysing a company is detailed. And during the time you spend digging around in the financial accounts, trying to understand the business model and applying our stringent criteria, it's quite easy to put yourself off a company – because the job is almost to find as many problems as you can. And then you try to fix all the problems. And when you do that, you can turn lots of small unlikely issues into what feels like lots and lots of issues. Problems that might make you say, "Well, actually, maybe this is just too much."

The role of the investment manager or analyst is to identify and understand all the potential pitfalls in any investment and explain them clearly to the rest of the team so in turn they can come to a measured conclusion about those risks. No company is risk-free, so it's about understanding the risks and thinking about them in the context of the wider investment case. There may be risks, and they will have a probability of occurring, but how comfortable do we feel about that probability? And how exciting are the other attributes of the company?

Has that approach evolved at all over the years?

CM: The process – the spreadsheet, the financial analysis – is broadly unchanged. The seven sisters analysis and research framework that we regularly talk about was created when my generation were investment trainees. On one sheet of paper, it is a checklist of seven key items to think about. And it is a live document – it continues to evolve.

JZ: I think it is always evolving, because over time different metrics will become more relevant. A good example is gearing. Historically we've focused on net debt to equity, but a lot of US companies have bought back a lot of shares over time with excess cash flows. It's not something we are that fond of, but the fact is a lot of companies have done it, so the equity base has been eroded. And if they have any debt on the balance sheet, the net debt to equity, which is the traditional metric we look at, has gone through the roof. At face value, we can look at that and say, "Well, this is now a very indebted company that we shouldn't be owning." Or we can try to understand what's happened by

"The seven sisters analysis that we talk about was created when my generation were investment trainees."
Charlie Macquaker

looking at other metrics like net debt to cash flows and interest cover. I wouldn't say that was a broad change to our view on gearing risk, but we're using slightly different and tweaked methodologies to understand it.

AE: Almost four decades ago, when the firm was founded, people understood that there was potential for climate risk. But it wasn't something that every management team had to focus on in order to understand the risks and opportunities for their business, because we didn't have a net zero target for 2050, and the science wasn't necessarily nailed. I know not everyone believes it today, but world leaders seem to have reached a consensus about this being a problem that we need to act on.

"As the world around us changes, so does the way a company sees risks and opportunities."
Alan Edington

When something like climate risk comes along, we tend to think of it first as a project around the portfolio. We did a carbon project last year, where we really challenged our views and thinking around the big-picture risks and opportunities, then applied that work to the portfolio to assess any stand-out risks and opportunities. And that filters through to our analysis: how are the business's metrics tracking? What about possible Scope 3 emissions? How is the carbon intensity of that business varying over time? How are they planning for both physical and transition risk and associated cost and benefits? As the world around us changes, so does the way a company sees risks and opportunities.

On that note, how do you respond to the potential threat of emerging risks?

CM: There are risks in every facet of a business. There's the financial risk profile, the markets it's addressing, the customers, the way the company is run.

We don't want to be distracted, we must focus on the material, and often simple, facets. A good example was the Fukushima earthquake in Japan back in 2011. There was a moment following that earthquake when the car industry was brought to a complete standstill because one key manufacturing plant for Renesas, the Japanese silicon chip manufacturer that supplies key components of cars, was knocked out of action. The same sort of issue is happening now with supply chain issues and blockages within the semiconductor industry. So part of our analysis is to make sure that our companies aren't too reliant on one supplier or one customer, because it could mean the end of the business.

AE: As I mentioned earlier, one of the areas that's evolving and will evolve quickly is environment and climate, where companies are going to have to start producing information on what a rapid transition scenario means for them as a business – both risks and opportunities. What physical risks of global warming could impact that business, if the rapid transition to net zero doesn't happen? Companies are going to have to start demonstrating how they think about those risks, estimating potential costs in various scenarios and giving us that information.

"Companies are going to have to start demonstrating how they think about [climate change] risks, estimating potential costs in various scenarios and giving us that information."
Alan Edington

Where does data come in?

CM: Some people think reams of wonderful data are going to provide the answer, but for us, the heart of what we're doing is understanding the financial profile and the qualitative aspects of the business, and then the data that stems from that is residual. I would apply the same mindset when I'm going to meet a company. I'll have the financial analysis, but I use that as a toolkit for asking questions and understanding the risks implicit in the business.

"Some people think reams of wonderful data are going to provide the answer, but for us, the heart of what we're doing is understanding the financial profile and the qualitative aspects of the business."
Charlie Macquaker

AE: When I started at Walter Scott, we wrote to companies for annual reports. Now, the data comes to us and there is a torrent. In the sustainability space, there's a lot more data suddenly being produced; European regulation is one of the drivers. And there's pressure to access that data, ensure that it is decision-relevant and incorporate it into your decision-making. The world is moving very fast – particularly around climate. And a lot of data is short term and it's noisy, so we need to pick out the data points that we think are relevant to whether a business is sustainable.

So just how important are qualitative insights?

CM: In our interviews with companies, it might seem at points that there's a softer line of questioning, or the management might ask: "Why are they asking that question again?" But that is deliberate: for us to see if management are answering a question in a similar way to how they've answered in previous meetings. Because if it's starting to move a little bit off-piste, we might think that the company is at risk of going off track from where we expected it to be.

AE: I think there's a risk that people underestimate soft skills in finance. There's a lot of focus on numbers, but it's not just a numbers game. A lot of it is about judgement, soft skills and understanding of culture. That said, increasingly there are measures and metrics and things that we can track. We have a number of signposts in our analysis around human capital and the social aspects of the way that a business operates. But, ultimately, some of it does come down to softer factors and gaining a good understanding of a business, knowing the management team and trusting it.

In some ways, it's like the legal system: you build a body of case law and you follow some very simple precedents. When we look at an industry, or a business in a certain niche, there are things we look for that are likely indicators of success. Then, of course, there are our softer skills, where we've got some institutional knowledge within our research team: "I've heard management teams speak like this before, and it's likely that there's a challenge coming."

What challenges do you get from clients on portfolio risk?

AE: Four or five years ago, a lot of clients were asking about an accelerating pace

"I think there's a real risk that people underestimate soft skills in finance. There's a lot of focus on numbers, and it's not just a numbers game."
Alan Edington

of change and asking if that meant businesses would not be successful for nearly as long. They were keen to find out how that sat with our long-term perspective? And we replied, "We haven't seen anything to demonstrate that long-term success isn't as possible as it has always been." Yes, there are these unicorns that may be disruptive, that spring up from time to time and demolish an industry. And we're not immune to that risk, but the barriers to entry and the qualities that we see in the companies we choose to invest in make that much less likely. And they make it much more likely that these businesses are going to be successful long term.

You go through cycles of hot topics, such as artificial intelligence or electric vehicles. Because that's the next big thing. We recognise that the world around us changes and that evolves our process and the investable universe, and we do make changes to our analysis over time. But we can't get caught up in that noise.

CM: We are conscious of our broader positioning, but the older hands in the business know that at times we will be out on a ledge. There will be certain sectors that we're not exposed to that will be in favour. But that doesn't mean we have to change our long-held approach, tried and tested over all sorts of conditions, trends and fashions.

How important is your team approach in assessing investment risk?

CM: We have a collection of very diverse characters and intellects and you get that challenge – part of the job description is to ensure challenge. It might be the youngest member of the team right through to our Investment Executive. We've got to keep challenging.

JZ: We're not a team of economists or MBA grads. We've got all sorts of different backgrounds and interests. And I think that's important for building up a diverse group of individuals who think slightly differently. And as a result of that, you get lots of different opinions thrown into the mix on all these things.

AE: For us to buy something we have to convince everybody in the team – a diverse group of people with different perspectives. So, it's quite difficult, and it's quite conservative, but it's designed to ensure we really understand a business and avoid risk. It's also designed so that when we see an opportunity, it's an opportunity that a broad range of people fully understand and have conviction in.

How has the pandemic affected your view of investment risk?

AE: At the outset of the pandemic, Italy was arguably hardest hit. So, we said, " Let's look at what's happening economically in Italy. Let's look at what's happening to businesses. Let's look at the lockdowns, in particular. What could it mean for our companies if the whole world looked like Italy?" We went away and performed analysis based on a worst-case scenario.

We challenged the portfolio. We looked at valuations and how earnings were likely to get hammered globally – and our companies weren't immune. So, we asked ourselves, what does their recovery look like? Is there anything that's really out of whack, where we either have an opportunity to add to positions or should be thinking about selling or reducing positions. But that's

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"At the outset of the pandemic, Italy was arguably hardest hit. So we said, 'Okay, let's look at what's happening economically in Italy. Let's look at what's happening to businesses.'"
Alan Edington

like any issue that comes up for us. We challenged the portfolio and then it's back to business as usual.

CM: Quality companies held their own for much of 2020 particularly in the thick of Covid-19 concerns in financial markets. Those with strong balance sheets, stronger business franchises and strong margin structures had the resilience to deal with it. As the pandemic evolved, in market terms, so much government money was pumped into the system and people simplistically switched from quality to value.

Now, when people ask us, "What do you think of value and aren't you too exposed to quality?" We say, "It's what we do." We like to be with strong, high-quality businesses. We're not going to change our tune and switch to seemingly cheap businesses. We had confidence that the companies held would, in the main, prove their resilience through this unprecedented pandemic. Thanks to strong management, financial health and market leadership. And they did, through one of the riskiest periods of all our careers.

"When people ask us, 'What do you think of value and aren't you too exposed to quality?' We say, 'It's what we do.'"
Charlie Macquaker

THE FUTURE OF FUTURISM

Asked to identify the central characteristic of life in the 21st century, many of us would nominate uncertainty. Where does that leave the futures industry, which makes its living predicting what comes next? David Mattin tells us how the industry can deal with volatility – and why in the end it all comes down to human nature.

Foresight professionals have an uneasy relationship with the pandemic, and it is not hard to see why.

Many people still view Covid-19 as a 'black swan' – an event that arrives out of the blue – but we know the truth: a pandemic of this kind has been widely predicted for years.[1]

But foresight professionals and the organisations that rely on them also have to contend with another truth. Despite the warnings, the reality of a pandemic barely featured, if at all, in the foresight products offered by most in the industry and in the strategic planning conducted by most businesses. It did not feature in any of the trend reports I produced when I was Head of Research at a leading consumer trends firm, and neither did it feature in any of our competitors' reports.

All of this raises big questions about the futures industry. If its work did not help businesses to foresee the events of 2020 in any practical sense, then what use is it? And with the world now entering the fabled 'new normal', how should the futures industry adapt to remain relevant?

Scanning the foresight landscape in mid-2021, I see three emerging answers. First, businesses are doubling down on methods such as scenario planning that enable them to prepare for multiple possible futures and so increase their resilience. Second, we are moving to an intriguing next stage when it comes to data-driven foresight. And third, organisations are turning to experimental foresight methods.

BRANDS REACH FOR SCENARIO PLANNING

When the pandemic arrived in 2020, foresight professionals noticed that clients rushed towards scenario planning. Developed by the RAND Corporation in the 1950s to help the US government plan for different nuclear war scenarios, scenario planning offers frameworks that allow us to plan for multiple possible futures. Last year, brands turned to this method to help them navigate unprecedented uncertainty.

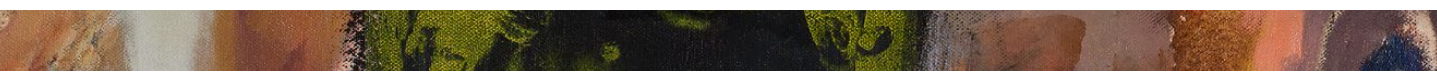
Billie Ing leads trends and futures work in the UK at market research giant Ipsos[2], and she says they saw a glut of scenario-planning requests in the second half of 2020. "Clients realised that if they had been more proactive with scenario planning in the past, they would have been better prepared to capitalise on the opportunities the pandemic threw up, and more resilient against the challenges and threats too."

But now, she says, clients are also more willing to push their thinking in fruitful ways when it comes to possible futures. "The briefs we are getting from clients take a more holistic approach than they used to," she says. "Pre-pandemic, many private sector organisations struggled to see how the macro environment impacted their business. That has changed. A fast-moving consumer goods brand, for example, will now come to us wanting to think about how planetary health may impact their business and consumers."

Scenario planning is a qualitative method. But data, and its promise of truly evidence-based foresight, has been the big story inside the futures industry over the past decade.

SIMULATE THE FUTURE USING DATA

The drift towards foresight backed by quantitative evidence



will continue. But in the wake of the pandemic, there is a new focus: we are swimming in data, but how do we turn all that unstructured information into meaningful pictures of possible human futures? It is a puzzle we urgently need to solve.

"We are swimming in data, but how do we turn all that unstructured information into meaningful pictures of possible human futures?"

Insurgents in the industry are turning to simulations. Established during the pandemic, Parallel[3] is a startup that specialises in what it calls 'simulation intelligence'. "The instrumentation of the world using connected sensors and computer vision is opening up new ways to observe, analyse and predict today's complex systems," says Founding Partner Matthew Falla. "By pairing data from these sources with simulation modelling, we help clients with a wide range of challenges, from optimising people's emotional states within virtual environments, to predicting crop yields at a global scale, to maximising safety in post-pandemic workplaces."

By turning data into immersive realities we can see and feel, simulations raise the possibility of a foresight method that combines the best of qualitative and quantitative approaches.

THE GREAT SCIENCE FICTION EXPERIMENT

Finally, as we emerge tentatively into some form of new normal, clients are demonstrating a new appetite for niche and experimental forms of foresight.

One of these is 'science-fiction forecasting', whereby corporations hire science-fiction writers to imagine possible futures. The leading proponent of this technique is a California-based agency called SciFutures.[4] It is perhaps no surprise that in a world that can seem stranger than fiction, organisations are turning to fiction to make sense of what lies ahead.

"Organisations are turning to fiction to make sense of what lies ahead."

The best fiction – sci-fi or otherwise – has always examined human nature in the context of a changing world, and that ties into a deeper truth. As we look at the world around us in 2021, the central challenge we face is complexity. The world has become one vast interconnected system that defies any attempt at comprehensive understanding.

THE ONE CONSTANT IS US

In that environment, the best foresight strategy is a counterintuitive one: to focus on what does not change, which is us. Humans share a fundamental nature that remains stable over time.

Basic human needs, such as security, social connection and status shaped the ancient world just as they will shape the world 2,000 years from now. So we should view a changing world through the lens of those needs. In particular, we must ask how all this change – including powerful emerging technologies – will unlock new ways to serve fundamental human needs and values and fuel new habits and expectations.

"The best foresight strategy is a counterintuitive one: to focus on what does not change, which is us."

Grounding futures work in the human is the best way to make sense of near-term uncertainty in the coming post-pandemic decade. Longer term, it might even help us to build a future in which we can thrive.

David Mattin writes a weekly newsletter on trends, technology, and our shared future called *New World Same Humans*.

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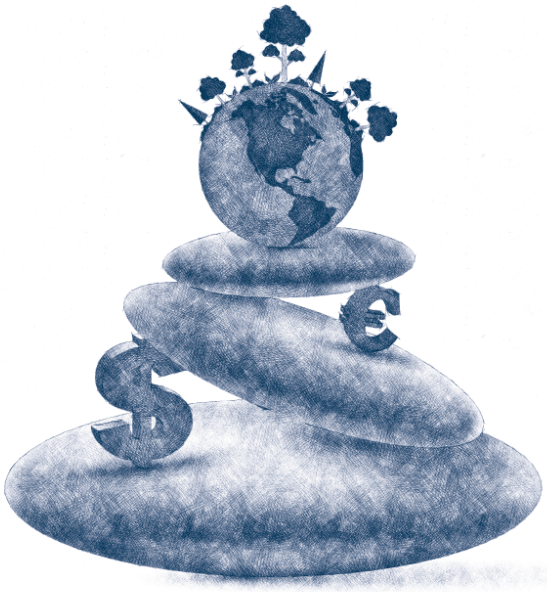
[1] https://www.youtube.com/watch?v=6Af6b_wyiwI

[2] https://www.ipsos.com/ipsos-mori/en-uk/ipsos-mori-trends-and-futures

[3] https://parallel.systems/

[4] https://www.scifutures.com/

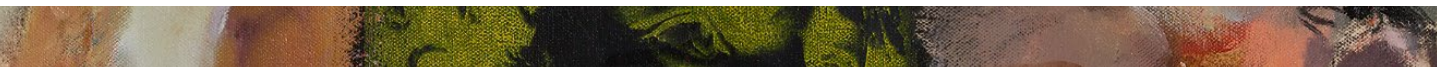


"WE'RE FIDDLING WHILE THE FORESTS BURN"

Focusing on rising temperature while ignoring our emptying natural habitats makes no sense. An approach that takes the hand of nature while forcing climate change to slow down is the best way forward, says Oliver Balch.

Seven minutes. Allegedly, that's how long it takes for an Oxbridge graduate to let slip the name of their *alma mater* on first meeting. Biodiversity advocates are similarly predictable but, in their case, you can expect to hear their favourite phrase within sixty seconds: 'tipping point'.

To be fair, they have good reason. Mother Nature is groaning under the weight of nearly 8 billion people running around our finite planet – building cities, planting crops, making plastic – and, in the process, turning natural habitats on their heads.



"As a population, we are living beyond Nature's means. Earth Overshoot Day[1] – the point after which the planet can no longer replenish the resources we consume – occurred on 29 July this year. Three decades ago, the fateful date didn't land until early October."

The headline stats say it all. Wildlife in freshwater habitats is down 84% since 1970. Total species decline is 68% over the same period. One million species threatened with near-term extinction.

Nor is there any question whose fault it is. As a population, we are living beyond Nature's means. Earth Overshoot Day[1] – the point after which the planet can no longer replenish the resources we consume – occurred on 29 July this year. Three decades ago, the fateful date didn't land until early October.

So what? For a profit-seeking company legally going about its business, it's a legitimate question. Of course, no-one wants to see the pandas die out or our oceans clogged with rubbish. Yet, is protecting the world's biodiversity any more relevant to a private corporation than, say, solving world hunger? Either way, is there any point in making the effort?

The response is deceptively simple: businesses do not operate in a vacuum. From the water used to till farmers' fields to the rivers tapped for power generation, nature assists companies in a myriad of ways every single day (and, invariably, for free).

In hard-nosed economic terms, a staggering $44 trillion of annual value generation is dependent to some degree on what economists refer to as nature's "ecosystem services", a report by the World Economic Forum[2] finds.

As Cambridge University's Professor Partha Dasgupta puts it, the global economy is "embedded within Nature... not external to it".

Less succinct, but no less powerful, is the econometrically robust 610-page independent report[3] that Dasgupta recently oversaw for the UK Treasury. The landmark review refers to nature as an asset, "just as produced capital (roads, buildings and factories) and human capital (health, knowledge and skills) are assets".

If nature is an asset, then logic holds that damaging it represents a financial risk. That's certainly the conclusion of the Central Bank of the Netherlands, which finds that over a third[4] (36%) of Dutch financial institutions' portfolios are exposed to biodiversity-related risks.

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CLIMATE CONNECTIONS

Notably, nature lovers are not the only ones to use the term 'tipping point'. In fact, climate scientists have long been warning about a point of no return.

Indeed, the idea of a scenario becoming irreversible after a certain moment in time lies at the heart of the 2015 Paris Agreement and its goal of keeping average temperature rises "well below" 2°C.

This common language is no coincidence. Experts are increasingly of the opinion that tackling biodiversity without conjointly addressing climate change is not just muddle-headed, but actively counter-productive. Either both get solved together, or, to put it colloquially, we're all fried.

Maria Mendiluce, CEO of the company-led climate coalition, We Mean Business, makes the case clearly: "Taking action on climate means we cannot ignore nature and nature cannot ignore climate change. Integrated policies will lead to solutions that are win-wins for both and also create efficiencies for business."

The timing is also auspicious. In the upcoming months, political leaders will meet for major UN conferences on biodiversity (in Kunming, China, in October) and climate change (in Glasgow, Scotland, in November), respectively.

The political winds also appear to be converging around – well – convergence. The UN's chief bodies on both subjects – the climate-oriented IPCC and the biodiversity-focused IPBES – have recently been workshopping the idea.[5]

G7 leaders went one step further, launching an ambitious Nature Compact[6] at their recent meeting. The announcement included pledges to fund projects that explicitly deliver "co-benefits" for both the climate and biodiversity.

Their enthusiasm derives in part from the knock-on economic benefits. According to the World Economic Forum, shifting global systems onto a more nature-friendly, low-carbon footing could generate 395 million new jobs by 2030[7] – a welcome boost for the G7's pandemic-pounded economies.

SYNERGIES IN ACTION

For all the positive talk, however, practical examples of such a synergistic approach remain limited.

The reality on the ground is a "patchwork approach", says Jeremy Oppenheim, Co-Founder of the advisory firm SYSTEMIQ and former Programme Director of the global New Climate Economy commission.[8] As he puts it: "We're fiddling while the forests burn."

Business for Nature[9] (BfN), a relatively new private-sector coalition, is more optimistic. Eva Zabey, the group's Executive Director, says "momentum is building" for convergence, pointing to "decisive action" by half a dozen or so leading firms.

Her list includes Anglo-Dutch fast-moving consumer goods firm, Unilever, which last year launched a €1 billion Climate and Nature Fund.[10] A core component of the ten-year initiative is a "regenerative[11]" approach to agriculture that includes steps to restore damaged landscapes and prevent deforestation.

More common among Zabey's exemplars is action at strategic level, with companies targetting climate and nature together in their environmental policy commitments. UK pharmaceutical company GSK[12] and US retail giant Walmart[13] are two notable cases in point.

Just because a connection between nature and climate may have moved towards cliché, it doesn't mean that connection is no longer valid. Planting trees is a prime example. The photograph of happy volunteers planting saplings in their local park is now a CSR staple. Yet, few interventions generate greater long-term positives for both climate and nature than growing trees.

Trees and photosynthesizing plants are masters of climate control. Forests, grasslands, mangrove swamps and other terrestrial 'carbon sinks' (including oceans) collectively sequester about 45% of all the carbon dioxide emitted by human activity every year.

When trees are felled, not only is this sequestration function surrendered, but the carbon they have stored is

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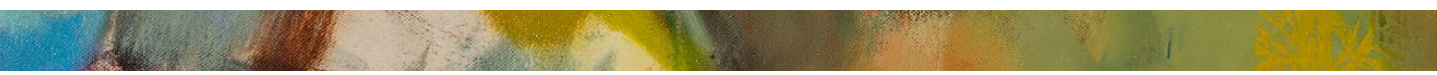


released into the atmosphere. Up to 10% of current greenhouse-gas emissions occur in this way, according to Jonathan Foley, Executive Director at US-based climate charity, Project Drawdown.[14]

The effects of deforestation on biodiversity are no less profound, he adds: "It is one of the principal drivers of biodiversity losses worldwide... not to mention its terrible impacts on watersheds, air quality, and people in forest regions."

Protecting the world's forests has edged up the business agenda in recent years. This is especially true for companies reliant on primary materials such as palm oil, soya and beef, which are closely associated with rainforest depletion.

Despite public pressure, however, corporate efforts to stem the tide of forestation loss remain sluggish at best. A string of big brand names, including Nestlé and P&G, missed self-imposed deadlines to eliminate deforestation from their supply chains by 2020. Allegations of 'greenwashing'[15] quickly followed.

Not that business has given up. A group of nine global companies – including Amazon, Salesforce and Nestlé – recently launched a joint initiative to mobilize over $1 billion to end tropical deforestation, for instance.

NATURE-BASED SOLUTIONS

Where climate and nature are most explicitly linked, however, is in cap-and-trade initiatives, also referred to as 'offsetting'. Such mechanisms offer companies a way of balancing out their carbon footprint by generating or acquiring carbon 'credits' (for example, by reducing carbon emissions). The same concept undergirds voluntary efforts to achieve 'net zero'.

Moves are underway to tighten up the nascent offset industry, Smith emphasises. He points to organisations such as the Natural Climate Solutions Alliance,[19] which are pushing for independent quality-assurance standards and certification for individual offset projects.

Of course, climate advantages are not always the objective of nature-based solutions. Take a project that aims to prevent human activity degrading coral reefs. In such a case, carbon benefits don't even feature as a secondary biproduct.

GIVING BACK TO NATURE

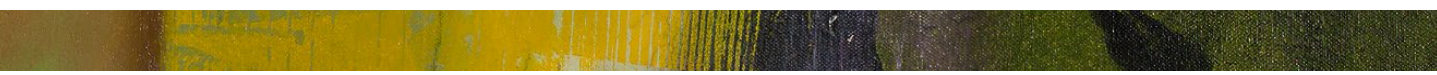
Recent years have seen a boom in what project developers describe as 'nature-based solutions'. Typically, such projects focus on land-management activities aimed at conserving or improving forests, agricultural lands, and other areas rich (or once rich) in biodiversity.

"Framing nature-based solutions through a climate lens facilitates flows of private-sector investment into nature for climate approaches," notes James Smith, a climate expert at the World Business Council for Sustainable Development.

Magali Anderson, Chief Sustainability and Innovation Officer at Holcim, the world's largest cement manufacturer, is also a fan of nature-based approaches. Her firm's own catalogue of solutions includes replanting its end-of-life quarries[16] and commercialising a permeable concrete[17] that helps sustain urban forests by conserving rainwater.

"Nature-based solutions not only reduce the impacts of climate change, such as flooding and the 'heat island effect' in cities, but they also increase resilience against those impacts. So, in one action, we can tackle two critical challenges society is facing," Anderson adds.

Carried out effectively, nature-based solutions could deliver over a third[18] (37%) of all the emissions reduction required to achieve the Paris Agreement targets. Not all deliver combined benefits, however, either because of poor initial design or weak execution.



LESSONS FROM CLIMATE

Generating co-deliverables for both biodiversity and climate is certainly the ideal, but it is not the only example of a useful synergy between the two themes. Business management, for example, is another area where considerable overlap lies.

If corporate efforts to manage their climate-related risks teach anything, it's the critical importance of having a strong 'north star' to follow and a set of clear measures to get there.

"Isolated actions alone are not effective," Smith suggests. "Business needs to put in place a coherent strategy that speaks to all levels of the mitigation hierarchy [i.e., avoid emissions and nature loss above all], as well as reverses loss of nature through restoration and regeneration activities." Any such strategy must also look beyond a company's own direct impacts. In the case of carbon, that means businesses reaching out to suppliers and customers to reduce emissions related to their products or services. The same is equally true for companies' indirect impacts on nature.

As well as being inclusive in scope, biodiversity goals also need to be business-relevant and community-backed, advises Alison Thompson, Programme Director, Nature and Business, at the Cambridge Institute for Sustainability Leadership.

Corporate climate leadership also teaches the importance of employee ownership, Thompson adds: "Companies need to embed this approach across their entire business, making all departments responsible for change and resourcing them to do it."

Another lesson from climate management centres on the critical role of internal targets and measurement. The first without the second is puffery; vice versa, it's bookkeeping and nothing more. Yet, when combined, the two elements are invaluable for assessing progress and establishing priorities.

With respect to targets, corporate goalsetting has historically been a rather arbitrary affair. That's slowly beginning to change, owing in large part to guidelines set by the non-profit Science Based Targets Network.[20] Adapted from a tried-and-tested methodology on climate, the protocol takes companies through a more empirically robust decision-making process.

As for data collection, biodiversity is tricky. Unlike climate change, where greenhouse gases are measured in standard units wherever they occur in the world, natural phenomena are both hugely diverse and highly localised.

Such variability complicates measurement, as well as making comparability hard. Which is worse, for instance, the beverage company that extracts 1,000 litres of water from a drought-hit region or the farmer that consumes 100,000 litres but in a healthy watershed? And how should habitat depletion in one ecosystem be judged versus air pollution in another?

All the same, monitoring and measuring cannot be ignored. Fortunately, tools are now emerging to help. A recent EU Commission-endorsed guide[21] for investors picks out six examples, including ENCORE,[22] a protocol for integrating biodiversity goals into financial portfolios.

Another recent example is the Biodiversity Impact Metric.[23] Launched

"Which is worse, for instance, the beverage company that extracts 1,000 litres of water from a drought-hit region or the farmer that consumes 100,000 litres but in a healthy watershed?"

by the company-led Natural Capital Impact Group[24] in 2020, the tool is designed specifically to help companies that source raw agricultural materials to identify nature-based risks in their supply chains.

A final insight from the climate playbook relates to disclosure. Staying silent on your biodiversity risks and impacts is fast becoming a non-option. Not only do consumers, investors, regulators, and local communities want to know; as ever-tighter climate norms indicate, they have a right to know.

Again, the biodiversity field has borrowed from the climate change field in its search for standardisation. The Taskforce on Nature-related Financial Disclosures,[25] launched in June, is set to release a final set of voluntary rules disclosing nature-related risks in 2023.

Consistent, comparable disclosure is "essential" for building a market-based solution to nature loss, according to the taskforce's Co-Chair, David Craig. The ability of financial institutions and companies to make data-driven decisions is, he says, "how we will solve the global ecological crisis".

POLITICAL DIRECTION

However, the market is not a self-policing entity. Nor is business the only player in town. Governments have a role to fulfil in replenishing nature and mitigating climate change, as well as helping companies do theirs.

So says Business for Nature at any rate. In the run-up to the UN's biodiversity conference in October, the membership organisation is putting forward five big asks of government.

First and foremost is that political leaders agree clear targets and timelines for a "net zero, nature positive, and equitable economy" – all backed up by mandatory reporting.

Eliminating government subsidies for nature-harming activities also features prominently. Public incentives would be redirected towards the promotion of emission-reducing, nature-preserving activities, the group argues.

Redirecting all subsidies that are harmful to biodiversity would incentivise and reward business leadership to design innovative, circular, profitable business models that deliver for nature, climate, and people," says Eva Zabey.

Demands four and five hammer home the convergence message; namely, incorporate climate and nature action into post-pandemic recovery plans; and ensure close alignment between today's major global conventions on climate, biological diversity and desertification.

COMBINED ACTION

The 2020s have been pitched as the "decade for action". It's not too late to stop nature from tipping over the proverbial cliff, scientists and conservationists argue. Even so, we're hovering horribly close to the edge. The same is true for climate change.

Climate and nature are not in perfect sync. Gaps and trade-offs will be inevitable with a joint approach. Yet, with resources tight and the clock ticking, you don't need an Oxbridge degree to realise that today's siloed approach makes no sense.

Oliver Balch is an author and writer specialising in the role of business in society. He has written for *The Guardian* and the *Financial Times* among others.

[1] https://www.overshootday.org/

[2] https://www.weforum.org/press/2020/01/half-of-world-s-gdp-moderately-or-highly-dependent-on-nature-says-new-report/

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[4] https://www.dnb.nl/en/actueel/dnb/dnbulletin-2020/indebted-to-nature/

[5] https://ipbes.net/sites/default/files/2021-06/20210609_workshop_report_embargo_3pm_CEST_10_june_0.pdf

[6] https://www.g7uk.org/wp-content/uploads/2021/06/G7-2030-Nature-Compact-PDF-120KB-4-pages.pdf

[7] http://www3.weforum.org/docs/WEF_The_Future_Of_Nature_And_Business_2020.pdf

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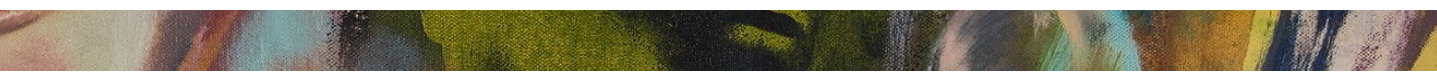
HEALTHCARE'S NEW ORDER

Genomic sequencing has helped us to find a way out of the Covid-19 pandemic. Now, scientists are ready to apply it to other healthcare problems. But is society ready to be sequenced?

It took less than two days at the start of January 2020 for a laboratory at the Shanghai Public Health Clinical Center to sequence the genome of SARS-CoV-2.[1]

The mystery virus had triggered a wave of respiratory illness in the Chinese city of Wuhan, and by the end of January would have travelled to 18 other countries around the world. Now, scientists had identified its genetic make-up in a move described by Sir Jeremy Farrar, Director of the Wellcome Trust, as a "really important moment in global public health" that "must be celebrated".[2]



Farrar was right. Without advanced genomic-sequencing technology, authorities would have been unable to track the spread of the virus. They would have had no idea whether control measures were working. They would not have known about the variants that have since developed or how their symptoms differ. And scientists would have been powerless to adapt the vaccines to respond to new strains of the disease. Genomic sequencing identifies the enemy; without it, we are fighting in the dark.

A STAR ON THE RISE

This sudden rise to fame has made genomic sequencing a serious target for investment. Analysts predict that the global market for DNA and genomic sequencing, worth $8 billion in 2020, is set for accelerated growth over the next decade: by 2030, it is expected to be worth $40 billion.[3]

For investors, part of the attraction of sequencing is the way the technology itself has evolved. The original method, known as Sanger sequencing, involves taking nucleotides, which are the building blocks of genetic material like DNA and RNA, and tagging them with fluorescence to identify the exact sequence of these blocks. Now, next-generation sequencing allows millions of strands to be sequenced simultaneously, instead of just one at a time.[4]

According to Des Armstrong, Investment Manager at Walter Scott, that increase in computational power has made this technology more affordable, which opens up a world of potential applications in healthcare. For Armstrong, the sequencing of the Covid-19 virus that led to the development of a vaccine in record time, was a "man-on-the-moon moment".

"What sequencing does is allows biological matter, which is a tricky thing to process, to essentially be converted into a digital code," he explains. "We're now talking about the cost of sequencing a whole genome being around $600, whereas before it was $10,000. We're still in the early stages of its adoption, but this is only going to increase – and I think quite rapidly – as the cost of sequencing continues to fall."

Armstrong adds that there is a lot of excitement in the industry about the way "sequencing is being democratised". He says it promises to drive "greater and greater scientific discoveries that can then be applied in real-world settings".

ATTACK OF THE VARIANTS

Sequencing technology has played a vital role in monitoring the continuously evolving mutations of Covid-19. Towards the end of 2020, scientists in the UK had tracked Covid-19 virus mutations in 9% of tests, outstripping other countries.[5] By March 2021, in the US, the number of genomes shared in online repository GISAID[6] represented just 1.6% of positive Covid-19 cases that month.[7]

That is why US President Joe Biden has committed to increasing "surveillance and genomic sequencing to monitor for Covid-19 hotspots, variants of concern and emerging infectious disease threats" as part of his administration's plans to tackle the pandemic.[8] The Biden administration has announced $1 billion of investment from the American Rescue Plan to expand genomic sequencing, in order to improve the detection and mitigation of variants.[9]

$10,000

Approximate cost of sequencing a genome, 2010

$600

Approximate cost of sequencing a genome, 2021

LIQUID BIOPSIES: A TURNING POINT FOR CANCER DIAGNOSIS

As next-generation sequencing grows in popularity, there is an associated analytical process that could also boom: liquid biopsy.

Liquid biopsies are the non-invasive alternative to surgical biopsies. They allow for analysis of tumours, or the risk of them, by sampling biomarkers collected with blood tests. This promises a cancer-screening process that would allow people to be examined for the risks of the disease at a much earlier stage, which could boost their chance of survival.

"The survival rate past a certain point is only about 20%," says Des Armstrong. "Simply increasing early detection, without any new drug therapies or other treatments, could increase survival rates by about 70%."

This kind of test has historically been a challenge because of a lack of accuracy, but advances in sequencing mean that liquid biopsies can start to identify cancer signs with unprecedented accuracy.

"What genomic sequencing can bring about is this liquid biopsy opportunity," says Armstrong. "It can be an absolute game-changer – these technologies could really reduce the cancer risk for people."

The US Centers for Disease Control and Prevention, meanwhile, has signed partnerships with a number of firms in order to stay on top of more transmissible variants. One of these companies is Illumina, a US biotechnology business that develops next-generation sequencing solutions. Its MiniSeq System, for instance, was used by the research team at the Shanghai laboratory that sequenced early samples of Covid-19.[10]

SEQUENCING BEYOND COVID

Sequencing is also a significant breakthrough for medicine beyond Covid-19. Cancer researchers, for example, can use next-generation sequencing to study the gene mutations that cause malignant tumours.

Parents, meanwhile, may be worried about an unborn child's risk of inheriting conditions such as muscular dystrophy and Huntington's disease. Illumina claims it can screen embryos using a process called preimplantation genetic diagnosis,[11] which is a type of genetic profiling of an embryo that can determine whether it has an inherited condition.

"Companies such as Illumina, which provide this enabling technology, will power these exciting areas of genomic research and their clinical applications," says Armstrong.

INVASION OF PRIVACY?

Health data is highly sensitive and has to be protected. But, as more and more genetic information is documented, the most granular information about individuals is going to fall into the hands of private companies and governments – which must prove that they can look after it.

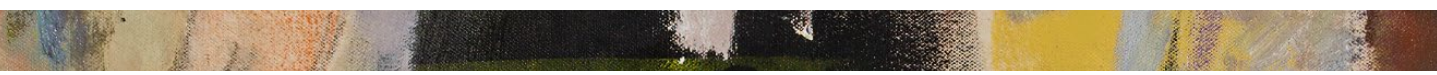
There have been some efforts to prevent misuse of genetic information. In 2008, the US Congress passed the Genetic Information Nondiscrimination Act to prevent companies from accessing and misusing the genetic information of any given individual in a way that could lead to discrimination. But the rapid expansion of sequencing technology and its applications since 2008 mean that authorities need to revisit the way genetic information is shared and used.

"Data is one of the most sensitive areas in terms of people having confidence in institutions being able to manage it properly," says Armstrong. "Whether it is companies, institutions or governments, they are going to have to work hard to ensure that society has the necessary confidence in data management."

Patients will also have to consider the trade-offs. To improve healthcare services and increase preventative measures, researchers need a detailed understanding of individuals' health. Next-generation sequencing gives them a way to gain that understanding. So, patients need to consider the fact that, by offering scientists access to more information about them, they could be increasing their chance of receiving life-saving treatment in the future.

"People need to understand that there is nothing about the data that links it to the individual," says Armstrong. "And that, ultimately, you can benefit from the large amount of data being captured to deliver more actionable clinical insights."

They will also need to know that their health data is going to be looked after. This is where emerging technologies that promise to ensure privacy by



default come in. Fully homomorphic encryption, for instance, is an advanced form of encryption that allows data to be processed without the need for decryption keys.[12] This means that the data, which, in the case of genomic sequencing would be the billions of DNA base pairs that make up the human genome, would remain scrambled to stop it from being identifiable.

If these privacy concerns can be handled with care, there is huge potential for next-generation sequencing in healthcare.

The Covid-19 pandemic, says Armstrong, has made people much more mindful about health risks, and this has led to a shift in mindset about the technologies and treatments that could reduce those risks. Could the pandemic be the trigger that encourages more people to share their genetic information?

"Whether it is companies, institutions or governments, they are going to have to work hard to ensure that society has the necessary confidence in data management."

Des Armstrong

Armstrong notes that people are much more willing to take responsibility for their health "in a way we have not seen before". However, he is conscious that some in the West may decide to opt out of offering up such data – in a democracy, it is their right to do so.

What has proven undeniable, however, is that, in countries where citizens have less of a choice about how their data is processed – where governments take a more top-down approach on data – innovation has come on in leaps and bounds.

"China seems to stand out as a country that's starting to deliver much higher levels of innovation," Armstrong says. "We know that the Chinese population is forced to provide data in a way that we aren't in the United Kingdom or in the United States. As a result, they get access to real-time data that is just so critical in terms of helping the overall R&D system in healthcare improve."

Western nations are unlikely to follow in Beijing's footsteps, but an inability to convince the public of the benefits of data-led healthcare will be a drag on progress. And, as we've seen with the sequencing of the genome of SARS-CoV-2, time is of the essence.

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[1] Novel 2019 coronavirus genome, Virological.org, 10 January 2020

[2] @JeremyFarrar, Twitter, 11 January 2020

[3] DNA Sequencing Market Size to Hit Around US$ 40.64 Bn by 2030, Precedence Research, 24 February 2021

[4] Key differences between next-generation sequencing and Sanger sequencing, Illumina

[5] US plays catch-up on genomic sequencing to track Covid variants, FT, 19 January 2021

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[8] National Strategy for the COVID-19 Response and Pandemic Preparedness, The White House, January 2021

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[10] The MiniSeq System, Illumina

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FAMILY MATTERS

Jane van Zyl is CEO of Working Families, a charity that aims to remove the workplace barriers faced by people with caring responsibilities. As the remote-working revolution topples some of those barriers – while raising new ones – van Zyl tells us where things now stand for families that work.

Flexible working practices are often presented as the way to improve the work-life balance. Why is that, and what's in it for businesses?

Organisations are doing it because there's a business benefit. They are competing for talent – those people who will earn them more than they pay them – and research shows the benefits to businesses of having a diverse team. It is that diversity that flexible working will introduce.

Almost everyone is likely to benefit in some way from flexible working at some point in their lives. People who are disabled by society will more often want to work flexibly to help them manage their conditions. For

people who have a mental health illness or struggle to maintain good mental health, flexible working can be really helpful. And flexible working is much more attractive to younger people, who might have a side hustle. So it gives businesses a much more diverse talent pool. That's why they do it.

Here's an example. Zurich Insurance worked with the Government Equalities Office and the Behavioural Insights Team and, as a result, it incorporated terms like 'job share', 'part-time', 'flexible' and 'remote working' into its job adverts. All new jobs were advertised as flexible, unless there was a really good reason why they couldn't be.

Zurich saw a significant increase in the number of people applying for jobs – men and women. The proportion of applicants who were women rose to 42%, and there was a 33% increase in the number of women appointed to senior roles. Within insurance companies, there are some quite esoteric roles that demand a particular skillset, but generally there was an increase in the number of people applying and the quality of the applicants. There was also a 10% increase in how valued those people felt who were already working part-time and flexibly.

What has the pandemic taught us about flexible working?

For the companies we have been working with, the pandemic has given them an opportunity to really live the policies they have been putting in place with our support. And they have found that productivity has either stayed the same or increased, which has had a really good effect on some of the line managers who were perhaps less enthusiastic about these policies.

However, anybody who has a place-based job has been completely left out of any kind of improvement in flexible working. That means all key workers – from everybody employed by the NHS to the people who sort out our bins. We already knew that women bear the brunt of childcare and unpaid, invisible labour. That might not be true of every family, but it is still true of society. We know that women are generally in less-secure and lower-paid jobs, and that a lot of them are the people we consider to be key workers.

TRUST IN FLEXIBILITY

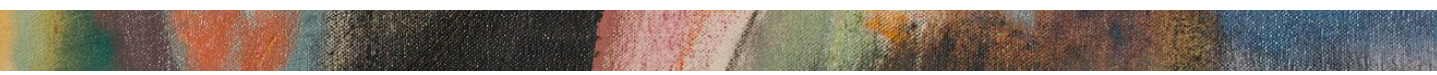
Richard Barry, Head of Executive Initiatives, Walter Scott

I blame the industrial revolution. We work the hours we do because of a working construct developed in the 19th century – 35 hours a week in the office to show that you're putting in the hours. Over a hundred and fifty years of management style was based on watching people work. If you can't watch someone, then how can you trust them to do the work? It's a multi-generational habit.

Flexible working has been growing for years, albeit not without understandable resistance given so many years of collective, ingrained working behaviour. But the pandemic turned those behaviours and our idea of an office on its head. We can't see each other working, we only know we're working when we meet on a Teams call or we produce something valuable. If proven output is the only true way to know we're working, we must trust each other.

Last summer, we introduced training sessions for all staff focussed on that vital element of trust. The trust that we have in our colleagues is the glue that binds us, just as our clients trust us. Rather than trying to find a reason to trust someone, we find ways to build trust. It makes the conversations we have with colleagues different too. A new approach to performance development that we introduced last year focusses on frequent, open conversations and, most importantly, trust.

Will this lead to greater flexibility? I believe the pandemic experience will see more flexibility as employers focus on output and as flexible working moves beyond its typical confines of mothers and carers working part-time. Now we are learning to be more focussed on what each of us gives. This takes time. Old habits die hard.



So the pandemic has been quite a mixed bag. It has been difficult for people who were working from home during the lockdowns and were in shared accommodation or did not have a laptop or any other kind of IT kit supplied by their employers, and therefore had to share devices among family members. And for anyone who was living in a flat without access to any kind of green space through the hot summer, it was problematic.

For the past five years, people working part-time and most working parents have told us that there is a problem with the 'always-on' culture. This is not new, but it is now affecting many more people because of remote working. And when children are sent home from school, remote working just does not work. If they have spent a couple of hours looking after their children in the afternoon, employees end up working a couple of hours in the evening – they feel they have to.

We see line managers as absolutely critical. And we want jobs to be designed so that what you are looking at are the outputs – not how many hours the employee spent getting to that point.

On the subject of gender imbalance, what can be done to improve parental leave and childcare?

There are some organisations that provide a good stretch of paid leave for both mothers and fathers, which is a game-changer. Aviva, for example, introduced 26 weeks' paid parental leave in 2019. It is a truly flexible employer, and as a result it has a job share in one of its most senior positions – two men sharing a job at director level.

These are significant, encouraging signs. One of the things we encourage our employer members to do is to look hard at the way in which they allow men to take time off and then to allow them to work flexibly.

I gave a speech at one of the professional-services companies in 2019, and there were men in the room who were working for this organisation and they had had 26 weeks' paid parental leave. And the vast majority of them were married to professional women, so they had had a year off between the two of them. But then, when the men came back to work, there was a very clear culture of, "Well, you can't ask for flexible working." The women were being treated entirely differently – they were able to ask for flexible working and their requests were understood.

"One of the things we encourage our employer members to do is to look hard at the way in which they allow men to take time off and then to allow them to work flexibly."

So there is a big societal change that needs to happen there. But in terms of shared parental leave, if men were given the two weeks and they could take it whenever they wanted to, and firms didn't worry about what was happening with the mothers' maternity leave, that would be a game-changer. An organisation called The Fatherhood Institute has conducted research into the reduction in divorce among couples where the fathers stay at home for a period of time compared with couples where the fathers don't, and it is extraordinary.

"There is research into the reduction in divorce among couples where the fathers stay at home for a period of time compared with couples where the fathers don't, and it is extraordinary."

There is a gender imbalance, and that is the society we live in. It is significantly better in the UK than in many other countries, but it is still quite sexist. For example, when working parents have children and both parents are working, they will rarely look at childcare costs in the round; they will assign those costs fully to the salary of the mother, which then means that the total cost can often mean it is not worth it for her to work. If the family was looking at those costs over their full working lives, and as a share of household income, the picture would be entirely different.

Are you optimistic about the future of work?

The big thing for us is encouraging flexible working for everybody, because that leads to more diversity. Five or 10 years ago, the conversation looked very different. Our last Modern Families Index, in 2020, showed that flexible working had stalled: 90% of the working parents we interviewed wanted to work flexibly but, according to the Timewise Flexible Jobs Index 2020, only two in 10 jobs are advertised flexibly.

As the Zurich Insurance case illustrates, there is more demand for flexible jobs than there are flexible jobs

"There is more demand for flexible jobs than there are flexible jobs out there. So change is going to have to happen, because businesses will start losing too many of the people they want to keep."

out there. So change is going to have to happen, because businesses will start losing too many of the people they want to keep. There is change happening, but it is not happening fast enough.

I think it will take 100 years to fix the gender pay gap, and the government is not helping by suspending mandatory reporting on it. There are many organisations that have reported and continue to report but, of course, those are the good guys – the ones that are interested in improving the situation and want to get the best out of their staff.

[1] https://www.zurich.co.uk/en/about-us/media-centre/company-news/2020/zurich-sees-leap-in-women-applying-for-senior-roles-after-offering-all-jobs-as-flexible

SPOTLIGHT ON WORKING FAMILIES

How do organisations benefit from being a member of Working Families?

We look at policies and help to make them live within the organisation. We point out anything that doesn't work. We ask all of our employer members if we can use them as case studies for the benefit of other employers – either within or outside their sectors – so they can see what works and doesn't work.

How exactly did you help individuals and organisations during the pandemic?

We operate a line that provides free legal advice on employment issues and in-work benefits. We helped more than 3,000 working parents individually, and we also had 1.6 million unique views of the advice pages on our website.

And those are all related to flexible working and Covid-19 – the furlough and the rights of, for example, pregnant women. Seventy-two percent of the people who contact us work for small or medium organisations, and the issue for a lot of those people is they do not have access to justice.

When people call us to get advice about how they can negotiate with their employer, they want to keep their jobs – but the changes that are being imposed, or requests that are being refused, mean that it is going to be incredibly difficult for them to do so; they will either be in a position of being managed out or forced to resign.

It is very difficult to have a one-to-one conversation with your line manager when either they are being bound by a policy that they do not agree with, or they don't agree with the flexible-working request. Employers have so many reasons they can decline a flexible-working request, and requests can only be put in after 26 weeks of service. All of that implies that flexible working is an earned favour that is bestowed by the organisation.

How do you measure progress?

For large organisations, we have an annual benchmark where they complete a set of questions. We then score those questions and let them know where they sit compared with others in their sectors, so they have a sense of how attractive their benefits are to the people they want to recruit. And we point to the things other organisations do that would get them the same benefit.

The other thing we do is our Best Practice Awards. For instance, last year we had a Best for Mothers award, which went (jointly) to The Army because of the changes it had made to make itself much more attractive as a recruiter for women.

For more information about Working Families employer membership and its benefits see workingfamilies.org.uk/employers

WHAT SUGAR TELLS US ABOUT SUSTAINABLE CAPITALISM

The sugar trade was an early example of an industry that brings great wealth and prosperity, but also relies on unsustainable exploitation – of people or the planet. Mimi Goodall explains how as the world grapples with the transition to sustainable capitalism, we could learn a lot from the sweet stuff.

For four days in September 1666, the Great Fire of London swept through England's capital. It gutted the medieval city, destroying an estimated 70,000 homes and wreaking havoc on the country's commercial centre. The fire incinerated many of the imports and future exports stored in warehouses along the river.

The diarist and politician Samuel Pepys stepped out into the wreckage in the following days. Wandering among the cinders, he came across groups of

"The Atlantic trading nexus between Europe, Africa and the Caribbean, which was known as the 'Triangular Trade', wove a sticky web that traversed oceans and continents and reached most parts of England."

"By 1700, refineries, or 'sugar bakers', had popped up across the length and breadth of the British Isles. Sugar refining was one of the first industrial activities and it stimulated both the domestic copper and coal trades."

workers clearing up the mess. They had broken open large barrels of sugar that had been stored in the now-destroyed Customs House, and were scooping up the powder and adding it to their beer. The intoxicating combination of sugar and alcohol would have made their grim job a little easier.

TRADE TAKES OFF

In the latter half of the seventeenth century, sugar was not the ubiquitous, mass-consumed product we know today. But it was well on its way to getting there, which is why there was so much of it available to those workers after the fire. The sugar industry was just taking off.

English and Scottish merchants were setting up sugar plantations in the Caribbean Islands and trafficking enslaved Africans to farm the cane. Greater and greater volumes of the crop were shipped back to ports in the British Isles, and like Pepys' fire clearers, consumers could not get enough of it. Sugar soon became the lifeblood of British commerce, generating vast profits and giving rise to a number of subsidiary industries.

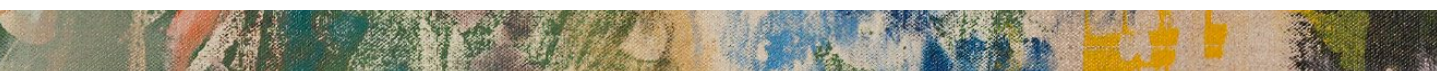
However, 141 years after the fire, the sugar trade was no longer the jewel in the crown of the country's commercial activities. It had become a stain on its reputation.

SUGAR SPREADS THROUGHOUT THE BRITISH ISLES

Sugar first came to Britain in the 11th century, brought back by soldiers returning from the Crusades. Over the next 500 years it remained a luxury, until Portuguese colonists began producing it at a more industrial level in Brazil during the 1500s. Financed by Dutch merchants, they began to traffic enslaved Africans to farm the sugar.

In the mid-seventeenth century, two decades or so before the Great Fire of London, British colonists adopted the same business model, using slaves to plant cash crops in Barbados, Jamaica and other smaller islands. This is when the British relationship with sugar accelerated. Just as the industry was evolving in the Caribbean, so too was the trade back to Europe. The Atlantic trading nexus between Europe, Africa and the Caribbean, which was known as the 'Triangular Trade', wove a sticky web that traversed oceans and continents and reached most parts of England. Suddenly, sugar was available from a local grocer in Lancaster.[1]

Sugar generated wealth across many different sectors. The juice from sugar cane needs to be boiled and cooled repeatedly to achieve the crystals we are familiar with today. The first part of this process was done on the plantations, but the final steps in the refining process were completed in Europe. Vast quantities of semi-refined sugar were shipped across the sea, where they were turned into a valuable white sugar in England and Scotland. By 1700, refineries, or 'sugar bakers', had popped up across the length and breadth of the British Isles. Sugar refining was one of the first industrial activities and it stimulated both the domestic copper and coal trades: the process used the fuel to heat the large copper pans which boiled the sugar.



The Crown supported this burgeoning industrial activity. Protectionist taxation policies subsidised imports of semi-processed sugar, which encouraged the domestic industry. Refining was so successful that British merchants began to export their surplus to countries in Europe, as well as re-exporting large amounts of brown sugar around the world. This helped to solidify the nation's balance of trade.

Consumers met this increase in supply with enormous appetite. By the mid-eighteenth century, once it had dropped enough in price, sugar was on almost every table. By 1780, per capita consumption was 10kg a year – from 2kg a century earlier.[2]

But the mood was changing. Information about the exploitation of the enslaved Africans who farmed the cane, and the number of slave uprisings on the islands, had started to trickle through to the public at home.

CONSUMER SENTIMENT FORCES A RECKONING

In 1789, William Wilberforce introduced the abolition bill to Parliament. However, it was blocked by those who had a vested interest in the continuation of the slave trade and sugar production. Frustrated by this inaction, in 1791 another abolitionist, William Fox, published *An address to the people of Great Britain, on the utility of refraining from the use of West India sugar and rum*. The pamphlet became the century's most popular, with over a quarter million copies printed on both sides of the Atlantic.

Fox forcefully implicated the consumer in the perpetuation of slavery: "If we purchase the commodity we participate in the crime. The slave dealer, the slave holder, and the slave driver, are virtually agents of the consumer, and may be considered as employed and hired by him to procure the commodity … In every pound of sugar used we may be considered as consuming two ounces of human flesh."

The text precipitated a huge consumer boycott of slave-produced sugar. At its height, more than 400,000 people took part in the boycott across the country, and grocers reported that demand had dropped by a third.[3] It was also a powerful way for women, who did not have the vote but were influential consumers, to express an opinion.

LEGISLATORS LAG BEHIND CONSUMERS

A similar shift in consumer sentiment is happening today, as the effects of climate change become more visible. CNBC has found, for instance, that 76% of older millennials are worried about climate change and its impact on how they spend their money.[4] Nearly three-quarters of Generation Z, meanwhile, say they are willing to make dramatic changes to their lifestyles to help the planet.[5] There has also been increased pressure from the divestment movement: some $14.6 trillion has been divested from fossil fuels by institutions and $5.2 billion by individuals.[6]

As with the fossil fuel industry today, at the end of the eighteenth century many people who were financially invested in the sugar and slave trade had influential positions in governments and were able to block legislation in order to protect their financial interests. Sugar was a profitable industry that had received large amounts of regulatory support, so it was a monumental mission to try to move away from the forced labour on which the trade was built.

"It took 15 years after the first boycott for the law requiring the abolition of the slave trade to pass, and a further 26 years for one requiring the abolition of slavery altogether."

"Over the past 18 months, accelerated by the Covid-19 pandemic and the increasingly visible effects of climate change, much of the world has begun to recognise that capitalism needs to be sustainable and responsible."

But a new century was dawning, and the economic structure of the UK was changing. Sugar was no longer a growth industry, and the manufacturing sector – textiles and the production of iron and machine tools – was where progress and profits were centred. The economy no longer relied on the Triangular Trade, which meant that the voices of the pro-slavery groups held less weight in Parliament.

It took 15 years after the first boycott for the law requiring the abolition of the slave trade to pass, and a further 26 years for one requiring the abolition of slavery altogether. The second of these acts finally forced sugar planters to free their remaining labourers and to pay them proper wages. Government regulation, which had encouraged the sugar trade, was now forcing it be more responsible.

FROM SUGAR TO SUSTAINABILITY

Historians are still debating what led to these laws being passed – an increasingly religious society and the threat of further slave revolutions were two important factors. But the interplay of consumer sentiment and alternative sources of wealth were key.

We can see the same dynamic today. Consumer sentiment is driving companies to take their carbon footprints seriously, and innovation in sustainable businesses – such as electric vehicles and renewables – is creating opportunities for financial success outside carbon-intensive sectors. And as it did, eventually, in the early 1800s, regulation also plays a vital role. By creating standards with which all companies have to comply, regulation will create a fair playing field.

Let's return to the image we began with: men and women gorging themselves on beer and sugar in the ruins of an incinerated city. We could see this as a picture of human greed in the face of smouldering ruins, and that is an image that resonates today. Over the past 18 months, accelerated by the Covid-19 pandemic and the increasingly visible effects of climate change, much of the world has begun to recognise that capitalism needs to be sustainable and responsible. We need to support businesses and commerce that are working towards the goals of net zero greenhouse gas emissions and limiting global warming to 1.5°C. We don't want to be eating sugar while our cities burn.

Mimi Goodall completed her PhD at Brasenose College, University of Oxford, and was the recipient of the 2020/21 Walter Scott & Partners Doctoral Studentship. Her PhD looked at sugar in the early Atlantic world 1650–1750.

Walter Scott has partnered with the University of Oxford since 2018, sponsoring and supporting a PhD student within its 'Global History of Capitalism' initiative. The case studies written by these students are used within the University's MBA curriculum and as part of Walter Scott's ongoing research training programme.

[1] J. Harland (ed.), *The Autobiography of William Stout of Lancaster* (London, Simpkin Marshall & Co., 1851)

[2] Carole Shammas, 'Changes in English and Anglo-American consumption from 1550 to 1800', in John Brewer and Roy Porter, *Consumption and the World of Goods* (New York, Routledge, 1993)

[3] Clare Midgely, 'Slave sugar boycotts, female activism and the domestic base of British anti-slavery culture', *Slavery and Abolition*, 17(3), 2006

[4] CNBC, '76% of older millennials are worried about climate change—and it's impacting how they spend their money', 28 May 2021

[5] Wunderman Thompson, Generation Regen

[6] https://gofossilfree.org/divestment/commitments/

[7] David A. Wiss, Nicole Avena and Pedro Rada, 'Sugar Addiction: From Evolution to Revolution', *Frontiers in Psychiatry*, 9:545 (2018)

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[9] Amy Reichelt, 'Your brain on sugar'

[10] Public Health England Press Office, 'Third year of industry progress to reduce sugar published', October 2020

[11] Public Health England Press Office, 'Soft Drinks Industry Levy comes into effect', April 2018

SUGAR TODAY: FROM DESIRABLE TO DAMAGING

British people have been consuming sugar in large quantities for more than 300 years. And just as sugar proved controversial in the past, in recent years public opinion has turned against it. We are seeing more and more investigations into how it affects us both psychologically and physiologically. The studies demonstrate just how positively the human body and brain respond to sugar, and the ways in which we are biologically hardwired to consume more of it.

Humans have evolved to seek out sugar.[7] Our primitive ancestors were scavengers, who needed food to be in high in calories. Sweet foods are an excellent source of energy and easy to digest, so early human brains adapted to respond to them positively. Today, the human brain is functionally the same as our primitive ancestors', so when we consume sugar, the taste receptors in our bodies send the same signals to our brain. These receptors are not just in our mouths: researchers have found them in the intestinal tract, the central nervous system, the skin and even the lungs. Our entire bodies are primed to register sugar.[8] Consuming sugar activates the 'mesolimbic dopamine system', which is the brain's reward system. The taste receptors initiate the secretion of dopamine on encountering sugar, and when dopamine is released we register that an event was a positive experience. Put simply: we feel good when we eat sugar.

We also want to repeat the experience. As one scientist has put it, "dopamine 'hits' from eating sugar promote rapid learning to preferentially find more of these foods".[9] The brain rewires itself in response to this activity, so the more sugar we consume, the higher our tolerance for it.

So we now know that we are biologically predisposed to consume sugar. We also recognise that over-consumption is linked to a range of health problems – most significantly obesity and diabetes. As in the 19th century, there are calls for the government to regulate and to level the playing field for the companies that do not want to encourage sugar dependence in their consumers.

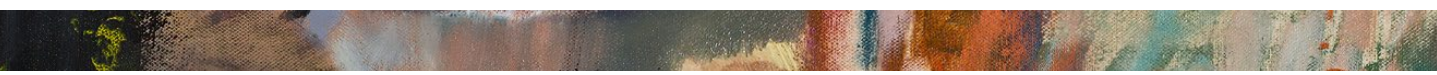
In 2016, Public Health England challenged the country's food and hospitality industry to reduce the amount of sugar in foods by 20%.[10] In 2018, the Soft Drinks Industry Levy – known as the 'sugar tax' – came into effect.[11] And in summer 2021, the National Food Strategy, led by Henry Dimbleby, co-founder of the restaurant chain Leon, released a report calling for a tax of £3/kg on the wholesale cost of sugar and for funds from the levy to be ringfenced to provide children with healthier school meals. These initiatives are intended to encourage producers to cut the amount of sugar in their goods, rather than pass on the cost to the consumer, and companies seem to be willing to do this. In response to the 2018 levy, many of the beverages sold by Coca-Cola were reformulated to sit below the tax threshold of 5g of sugar per 100ml, and sales of the drinks did not drop in response.

A HOSTAGE SITUATION

The rise of ransomware presents a serious threat in a digital-led, post-pandemic world.

It is an unlikely origin story for a sophisticated cyber crime now responsible for extracting millions of dollars from even the most vigilant organisations, but the first documented case of ransomware involved floppy disks, the Panamanian postal service and the spread of HIV in the 1980s.

In 1989, at the height of the HIV/AIDS epidemic, some 20,000 disks purporting to contain a survey designed to inform patients of their risk of contracting the virus were sent to unsuspecting health researchers in 90 countries. For those who inserted the disk into a computer, their files would soon become encrypted by another kind of virus that left them with no way to regain access unless they acquiesced to demands to send $189 to a postal box in Panama.[1]



Fast forward more than three decades, and ransomware has become as frequent as it is disruptive. It is wreaking havoc on businesses both large and small and has drawn the attention of the world's leaders. During a speech at the Office for the Director of National Intelligence in July, US President Joe Biden voiced concerns that, given their capability for causing damage and disruption, attacks using ransomware and other cyber weapons could trigger a "real shooting war with a major power".[2]

"Ransomware has been with us for a long time, but you often wouldn't hear about it," says Emily Taylor, Chief Executive of cyber intelligence firm Oxford Information Labs and Associate Fellow of independent policy institute Chatham House. "The victims would just quietly pay the ransom and brush it under the carpet."

Now, the menace of ransomware looms large and its impact is far from a secret. We examine why global leaders are growing increasingly sensitive to its threat, and what can be done to keep it in check.

AN ESCALATING PROBLEM

In essence, ransomware is malicious software ('malware') used to infect a computer system and encrypt the data it holds so that it cannot be accessed or is rendered completely useless. In order to restore access and unlock their data, victims must pay a (typically high) fee to the hackers, who effectively hold their victims hostage until they give in to the demands.

It is a threat that demands urgent attention. As the Covid-19 pandemic has accelerated the digitisation of infrastructure that underpins the modern world, governments and corporations risk greater exposure to bad actors seeking a back door into their critical systems. While technology and the ever-increasing connectedness of the world has allowed the global economy to continue in the face of huge disruption, it has proven a double-edged sword. The threat of cyber attacks is now ever present for our major corporations and public institutions.

"We're more and more connected, through things you wouldn't even think of – your vending machine or your aquarium in your lobby might be connected to the network," says Taylor. "Everything is smart and smart things are usually not that secure."

The consequences of a ransomware attack in the connected reality of today can be devastating, with high-profile cases bringing the issue to light in recent months.

Colonial Pipeline is the largest pipeline carrier of refined oil products in the US, via a 5,500-mile pipeline system. It fell prey to a ransomware attack in May that effectively brought its operations to a halt. That meant the delivery of 2.5 million barrels of fuel a day to major cities on the US East Coast could no longer take place.

Though the pipeline operator was able to restore operations five days after being compromised, to do so it was left with no choice but to pay the $4.4 million ransom fee demanded by the attackers.[3] It was also forced to deal with a subsequent period of chaos that saw panic-buying of fuel in some parts of the country, leading to shortages.[4]

THE INCENTIVE

For hackers, the incentive to focus on ransomware (alongside related

THE FRIGHTENING REACH OF RANSOMWARE

There are many other instances of ransomware attacks in recent memory that have caused security experts to sound the alarm. Ireland's healthcare system found itself in a critical condition in May after it had been infected by ransomware that brought the national IT network of the Health Service Executive to a halt.

"According to SonicWall, a California-based internet security firm, in 2020 alone 305 million ransomware attacks were registered globally, jumping 62% from 2019."

Meanwhile, Sao Paulo-based JBS, the world's largest meat-processing company, revealed in June that it had paid $11 million to cyber criminals after its North American and Australian systems had been compromised.[5]

According to SonicWall, a California-based internet security firm, in 2020 alone 305 million ransomware attacks were registered globally, jumping 62% from 2019. North America and Asia were particularly vulnerable, as the incidence of ransomware attacks rose in these regions by 152% and 455%, respectively. SonicWall confirms that ransomware thrives when there is a "pool of victims – which the pandemic provided in spades," as legions of people "oblivious to security best practices" logged on to employer systems away from their usual place of work for the first time.

"There has also been a rise in ransomware-as-a-service (RaaS) – a 'hacker-for-hire' system in which criminals pay hackers who respond to requests for attacks they list on malware forums, typically on the dark web."

methods, such as denial-of-service attacks) comes down to a few different factors.

According to James Sullivan, Director of Cyber Research at the Royal United Services Institute (RUSI), hackers have found ransomware very lucrative. "We've observed a new way that criminals are doing this now, through so-called 'double-extortion attacks'," he explains. "Not only do they make your data unavailable, they also take it and sell it."

There has also been a rise in ransomware-as-a-service (RaaS) – a 'hacker-for-hire' system in which criminals pay hackers who respond to requests for attacks they list on malware forums, typically on the dark web. "This is where the criminal enterprise conducts the attack on behalf of someone who has given them money to do so," says Sullivan, "so it looks like an affiliate did it." This means more work for hackers, who start to generate regular incomes by working on commission.

Indeed, some hackers claim no motivation other than money and claim to have a social conscience. The criminal group identified by the FBI as being behind the Colonial Pipeline attack, for example, said it regretted "creating problems for society".[6]

But perhaps what has made ransomware truly appealing to hackers is another digital invention: cryptocurrency. The digital currency market has seen unprecedented growth since the start of the Covid-19 pandemic, with Bitcoin, the world's most valuable cryptocurrency, reaching a record high of around $65,000 in April 2021, marking a more than 600% increase from its value a year earlier.[7]

The surge in value of the digital currency market, along with the anonymity offered by the blockchain technology that underpins cryptocurrency payments, has served to incentivise attackers even more. In the Colonial Pipeline hack, 75 Bitcoin, worth almost $5 million, was the ransom demanded by the hackers to unlock IT systems.

GEOPOLITICAL TENSIONS

Cyber security experts stress that the actors peddling ransomware do not operate within a vacuum, but are, in fact, actors on an increasingly complex geopolitical stage. The drama unfolding between Western nations, led by the US, and their antagonists is approaching a climax.

Notably, the Biden administration has alleged that China is responsible for a series of cyber attacks targeting organisations including US tech giant Microsoft, after officials unsealed an indictment alleging the involvement of individuals linked to China's Ministry of State Security.[8] Officially, China has denied all allegations as a "malicious smear".[9]

Following the G7 summit at Carbis Bay in Cornwall in June, whose agenda was predictably dominated by the Covid-19 crisis, political leaders of the seven member states nevertheless made it a point to address the "escalating shared threat from criminal ransomware networks".[10]

Despite calling on all states to "urgently identify and disrupt" these networks, Russia, the country where many of the most notorious attacks in recent memory are alleged to have originated, was specifically called upon to "hold to account those within its borders who conduct ransomware attacks, abuse

virtual currency to launder ransoms, and [commit] other cyber crimes".

Worryingly, experts suggest there is a complex relationship between the Kremlin and cyber criminals conducting their operations from Russia, with security officials willing to turn a blind eye to their activities, provided that domestic agencies, businesses and infrastructure are left untouched. Earlier this year, for instance, the US Treasury claimed Russian state intelligence agency, the FSB, "cultivates and co-opts criminal hackers," including one of the world's most prolific hacker groups, Evil Corp.[11]

"Because the crimes go unpunished, criminals are acting with impunity," says Sullivan. "There's very little deterrence, so the criminals are benefitting."

Another reason criminals behind ransomware avoid punishment is down to the difficulty of policing a problem that is global in scope. According to Taylor, the current criminal justice system, which was designed to deal with incidents in local jurisdictions, is not fit to tackle cyber crime, in which bad actors can use "a constellation of services" across multiple countries to target victims who could be scattered across the globe.

This was exactly the case in July, when ransomware was used to compromise Kaseya, a Florida-based IT firm that serves as a 'managed service provider" for hundreds of small businesses and organisations globally that lack resources for their own in-house IT departments.[12] The attack, for which Russian hacker group REvil claimed responsibility and demanded $70 million to reverse, forced 800 physical stores of Swedish supermarket chain Coop to suspend trading.[13]

Experts see better international coordination as the key to cornering these criminals at global level. The Budapest Convention, an international treaty on cyber crime signed in 2001, goes some way towards bringing collaboration among nations. However, to date, it has only 67 signatories and, as Taylor points out, there are notable absentees in Russia and China, as well as many Gulf states.

CLEANING UP

Despite the high-stakes game that cyber security and ransomware have fast become, organisations will need to consider what can be done at individual level to minimise risks.

"It's suboptimal to be paying out ransoms," says Sullivan. "But organisations are kind of left with no choice, so what do we need? We need to find alternatives to making the ransomware payment."

Though policymakers are yet to come up with viable alternatives, there are certain areas that experts think businesses should focus on to ensure reduced vulnerabilities to issues that Alex Younger, former head of MI6, describes as being "not so much a technology problem as a human problem".[14]

Sullivan says investing in "good cyber education and awareness training" is a must, as employees no longer working in offices will need to be better trained to identify anything untoward in their inboxes.

He also thinks corporations must do more to ensure cyber security is an integral part of governance structure, with cyber issues placed prominently on risk registers, while ensuring sufficient investment is directed towards strengthening all defence mechanisms, from firewalls to employee best cyber security practice. "It's still a bit of an afterthought for businesses, who see it as being down to the techies to deal with," says Sullivan. "This is a business policy issue, and we can't shy away from it."

Finally, as Taylor notes, no matter how much cyber security is in place, "you're never going to get 100% protection". That means organisations must have a robust plan in place in the event that they are compromised, which includes backing up data.

It is a problem that can't be ignored. In July, INTERPOL Secretary General Jürgen Stock claimed that "much like the pandemic it exploits, ransomware is evolving into different variants." This, Stock confirmed, means that "ransomware has become too large of a threat for any entity or sector to address alone".[15] Everyone will need allies in the unavoidable war on digital extortion.

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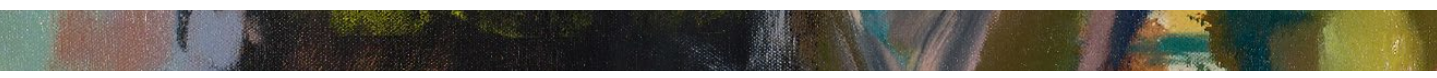
[1] Floppy disk ransomware
[2] Joe Biden on ransomware
[3] Colonial Pipeline ransom fee
[4] Colonial Pipeline 2
[5] JBS ransomware attack
[6] Colonial Pipeline apology
[7] Cryptocurrency market boom
[8] US accuses China of cyber crime
[9] China denies accusations
[10] G7 communiqué
[11] US Treasury accuses FSB
[12] Kaseya attack
[13] Coop closure
[14] Alex Younger
[15] Interpol comments



AN EVER-PRESENT RISK

Corporates are now better prepared for the evolving cyber security threat, but there is no room for complacency.

How do you assess the response to cyber threats from corporates?

Alan Lander, Investment Manager – Co-Head of Research: Everybody has upped their games to a great extent over the past 10 years. A decade ago, if you looked outside the IT sector, you wouldn't have found a Chief Technology Officer sitting on the executive management committee. As the world has become increasingly digital, technology infrastructure has become a major strategic driver for many businesses. It's gone from being considered a cost-centre to an area of investment that management focus on.

At the same time, the scale and frequency of cyber disruption has increased rapidly. According to a 2012 Trustpilot report, 30% of data breaches were being picked up by the companies themselves, the rest by third parties. And the median time between intrusion and detection was 87 days. That's a huge period for a breach to go unnoticed. Fast forward to the same survey in 2019, and 60% of breaches were picked up by the companies themselves. And there were 11 days between intrusion and detection. That shows companies have better processes and policies in place.

Where are the greatest vulnerabilities within an organisation?

Matthew Gerlach, Investment Manager: If you've got the right systems in place, and you're patching them correctly, breaches tend to happen because of human error, rather than a piece of security software not being up to scratch.

AL: The more points of access to a network, the more vulnerabilities there are. But a lot of attacks aren't extremely sophisticated. They are cases of sending an email or a text message to someone and getting them to click on a link. Human interaction is still the main route for hackers to get into people's systems. The volume has gone up, but the average employee of a major corporation is much more aware of their responsibilities today. However, there is no room for complacency, when you start to feel comfortable about cyber security risk, you're doing something wrong.

MG: One layer of cyber security is the actual network, and that's the firewall-level protection. But then there's a whole other layer, which is the application level. In other words, the security integrity of software has become increasingly important. A growing number of cyber attacks happen on the application layer. This isn't necessarily reflected in the level of investment that companies are putting into their own cyber security; they're focusing much more on network-level security, rather than the application layer. This changes the way that companies approach software development: development teams are having to reconfigure themselves, because cyber security is being worked on at every level of the functional development and not just at the end.

How can companies mitigate the impact of a breach?

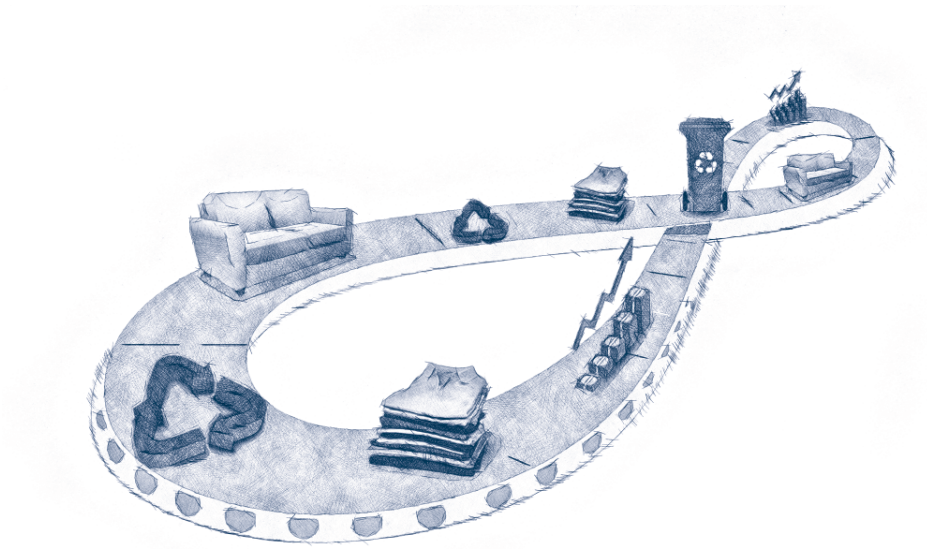
AL: Instant-response planning is what matters today: that attacks are dealt with effectively and with a minimum of fuss, reassuring clients and customers. Not all data breaches are equal. What the data is and where it's taken from clearly makes a big difference, but also the root causes of the breach.

There is a real understanding, especially in the B2B environment, that this is an ever-present threat. And, at some point, you're going to be on the wrong side of it. Due diligence around cyber security has become standard practice between interacting companies. I think there's a very strong understanding today between large corporates of the risks that they face and the need to protect themselves.

Where people are doing the right things and there is still a breach, I think people can be sanguine about that. The headlines can be sensationalist, but if you were doing the right things, your partners will understand. When there starts to be more of an issue is when there have been clear failings in terms of your internal controls.

And what does this all mean from an investment perspective?

AL: It's important that we don't become complacent about this as a risk. It must be factored into our investment decision-making process. It ranks quite highly in our thinking around risk for a business, especially when it relies heavily on data or is technology-based. We rarely get good visibility on what companies are spending on cyber security versus other technology, so, to some extent, it's a qualitative assessment based on their culture and track record of preventing and planning for attacks.



THE CIRCULAR ARGUMENT

Can businesses make the circular economy work for consumers wedded to waste? It will take technology, partnerships, incentives – and boldness, says Peter Marsh.

"Our corporate customers are more interested in circularity [as a business model] than ever before," says Mart Drake-Knight. "They are taking the concept extremely seriously – which makes them enthusiastic about working with us."

The 34-year-old is a co-founder and director of Isle of Wight-based Teemill, a 130-person company that makes T-shirts from sustainable resources. It encourages customers to return their T-shirts when they have finished with them so that the materials can be used to make new ones.

This is what Drake-Knight means by circularity, which is now part of many businesses' efforts to make sustainability and environmental impact a bigger part of their corporate approach. Teemill is among hundreds of businesses globally that have introduced substantial circularity strategies – not just

manufacturers, but also businesses in areas including design, waste handling and specialist software.

But all these companies face a big challenge. They must somehow turn around our reliance on the traditional linear or 'take-make-waste' approach to goods production and energy use, in which vast amounts of materials are discarded rather than reused.

"The outlook for closing the circularity gap [increasing the volume of materials that is reused] looks bleak under the dead hand of business as usual," says Circle Economy, an Amsterdam-based research group. "We desperately need transformative and correctional solutions."

FIGHT THE PUSHBACK

Many of the companies promoting circularity strategies would counter that gloomy view. Take Herman Miller, the US maker of office furniture, which is at the opposite end of the commercial spectrum to the fledgling Teemill. Scott Charon, the company's Sustainability Manager, says that circularity is one of the "three Cs" – the others being carbon and chemistry – that "are becoming more central" to how manufacturers make their operations more environmentally benign.

But although she is upbeat about the possibilities of circularity thinking, Kelly Hall, who is Managing Director of Netherlands-based Niaga, is someone else who is frank about the challenges. Niaga is an unusual business that has devised a set of technologies and materials to implement circularity used by 15 other businesses in three core areas of carpets, mattresses and furniture.

"Today's production systems and supply chains are very efficient and effective after 30 to 50 years of work on lean and optimised factories and distribution networks," says Hall. "The transition from the linear economy to a circular world comes with short-term inefficiencies and new investment. So for every person excited by the idea of change, there are 10 others who are focused on optimising the status quo.

"I've become more optimistic that a circular economy will be realised over the long term," she adds. "But we [Niaga and its partner companies] are all frustrated that product development, consumer engagement and regulatory change to support a circular economy all take time."

Circle Economy says that the amount of materials used in the global economy each year – for everything from building bridges to heating people's homes – is just over 100 billion tonnes. Of this, it says, less than 9% is re-used, giving a 'circularity percentage' of 8.6%. Circle Economy says this number is much too low, and it has identified ways to double it over the next 15 years through embedding new circularity initiatives.

NOTHING NEW

Circularity is far from a new idea. Throughout history, once the 'life' of a product is over, people have often sought to find new uses for it, either as a complete item or by using its constituents. The idea of passing on products such as clothing from one generation to another is common to most families, and charity shops and antiques markets are parts of the circular economy.

Over the centuries, metals have been melted down to make new items. Medieval paper mills used as raw materials old fabrics and cloths

WHAT IS THE CIRCULAR ECONOMY?

A business model whereby products and processes are redesigned to create a systematic way to cut materials use and pollution.

Unlike the linear, 'take-make-waste' business model, the circular economy is regenerative – it is 'make-use-reuse/remake'.

discarded from earlier uses. Today, metals including steel and copper are widely recycled in routine large-scale operations – as is paper.

So what is different now? 21st-century circularity is a departure because the companies that practise it have embedded into their operations a system that links waste to new products through a 'closed loop' approach, which encourages re-use. The Ellen MacArthur Foundation, a charity that promotes the circular economy, says companies that follow this path are "regenerative by design".[1]

There are two key elements – technology and partnerships – at the centre of most circularity strategies. When it comes to the first, most companies that have implemented circularity have devised some form of proprietary technology to simplify how materials in certain products can be broken down into useful elements and then reused. The second element, partnerships, is based on the construction of an ecosystem in which the circularity business is the main player but it depends on partners for the entire system to work.

HOW TECHNOLOGY ENABLES THE CIRCULAR APPROACH

In the case of Teemill, the company has developed processes to economically extract cotton and other materials from old T-shirts. It has also worked on printing software that enables designers both inside and outside the company to come up with new patterns and colours for printing on new T-shirts once they have been recreated.

The German tyre maker Continental, meanwhile, has championed the idea of recycling materials from used tyres and using them to create new ones. It has also been working on a 're-treading' process to enable worn tyres to be given new lives instead of being discarded. At the heart of this approach is what Continental calls its 'LifeCycle plant', in Hanover, which the company says is the only production facility worldwide that unites tyre recycling and re-treading under one roof. It then uses the ideas from Hanover in several other smaller scale recycling and re-treading plants in other countries.

While most businesses involved with circularity have developed their technologies solely for use in their own operations, others offer a 'platform' of intellectual property designed to be used by other companies and from which they can earn revenues through routes such as licensing.

A leader in this strategy is Niaga. It has developed a set of manufacturing principles that allow both for the redesign of products to make them straightforward to recycle, and for the use of special adhesives and other chemicals (which Niaga sells to its partner businesses) that facilitate the release of useful substances from old products.

In a similar way, UK-based Plastic Energy has devised a series of processes for using waste plastics to make new chemical materials that are then used in plants run by a series of partner businesses. The company has announced that its technologies are set to be used by big chemical and consumer groups including Sabic, Total and Nestlé.

Other approaches include specialist technologies that split apart certain high-value items, such as industrial magnets or electric car batteries, and re-use their components in a systematic way. The US's Urban Mining operates a plant in Texas that extracts key materials (mainly metals) from the rare-earth magnets used in a range of industrial equipment. From these materials, the same plant then used those materials to make new magnets.

Umicore, meanwhile, splits apart electronic equipment in its high-tech facility in Hoboken, Belgium, and then distributes the materials to business customers around the world to use in their own operations.

PARTNERSHIPS IN CIRCULARITY

Behind many of these companies' thinking is the second element of circularity strategies: partnerships.

Teemill, for instance, operates at the centre of its own business ecosystem. This comprises some 15,000 organisations – many of them large clothing brands – that use Teemill's software and logistics expertise to make their own operations more sustainable.

Kelly Hall at Niaga says her group of 15 partner businesses, which she calls "front runners", are key to testing and proving the circular approach by collaborating in areas such as new products. Hall's front runners include Belgium's Louis De Poortere and the US's Mohawk in carpets; the Netherlands' Auping and Revor in mattresses; and König & Neurath, a German furniture maker. She calls executives at these businesses "courageous leaders and positive deviants who will prove that circularity works without sacrificing performance or profitability".

SENDING A STRONG MESSAGE TO CONSUMERS

Precise figures showing the financial advantages companies gain from circularity are impossible to find, but businesses say they gain other unquantifiable benefits. One of these is the positive message it sends to consumers about a company's approach to the environment. This could help to increase consumer engagement and as a result add to revenues.

Through its Napapijri brand, VF is one of the most enthusiastic of Aquafil's ECONYL partners. It has organised take-back programmes for the jackets it sells as part of its 'Circular Series'. VF says the products have been central to its social media and have "allowed us to reach out to our consumers with a clear, strong message about our commitment to sustainability".

At Herman Miller, Scott Charon has no doubt about the advantages of its work in circularity. "We have built up a leadership position in circularity and sustainability that I believe has made us a stronger business," he says.

The corporate world has made some bold attempts to introduce circularity strategies into key aspects of global manufacturing and distribution systems. And the biggest advances in circularity seem to be happening in areas where businesses are dealing with other businesses – such as in the recovery operations organised by companies such as Urban Mining and Umicore – rather than consumers.

Will significant numbers of consumers embrace the concepts behind circularity, and overcome their inbuilt resistance to circularity demonstrated by the dominance of take-make-waste? Until circular-economy proponents offer tightly organised systems that give consumers a financial incentive to take part in recovery programmes, it seems unlikely. And so far, very few businesses have been able to do this on a large scale.

But global concerns about the environmental impact of production operations are not going away. And as those concerns become increasingly central to political and economic thought, circularity – and the technology and partnerships that enable it – will appear in more and more corporate strategies.

THE REVENUES OF RE-USE

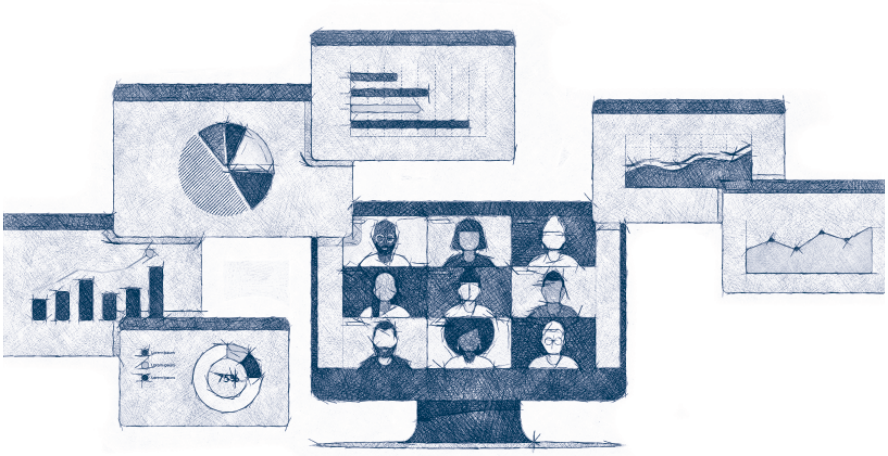
Aquafil is an Italy-based chemical business that is a key producer of reusable nylon 6, which is used in products such as carpets. Aquafil's most important regenerated product is ECONYL, which is made from old carpets, waste from industrial processes and products collected via consumer 'take back' programmes. In 2020, Aquafil made revenues of €161 million from ECONYL, which represented just over a third of its total sales.

A vital part of Aquafil's strategy is its partnerships with more than 470 brands (at the last count) – up from about 300 in 2019 – that use ECONYL in their products. These brands include well-known clothing brands such as Speedo, Napapijri and Gucci, along with the US rug-maker Delos and Italian home-furnishings company Medit.

However, only a small number of these 470 brands – Aquafil names just three – operate their own take-back programmes to encourage consumers to return used clothes made from ECONYL so they can be remanufactured. Aquafil says it is working to encourage more take-back programmes, but says that this is "not an easy exercise". "We are discussing [the idea] with many other brands, but it takes time."

Following a 30-year career at the *Financial Times*, latterly as Manufacturing Editor, Peter Marsh founded Made Here Now in 2014 to celebrate UK manufacturing and encourage young people to pursue a career in the sector. Walter Scott has supported Made Here Now since its launch, reflecting our shared belief in the benefits that flow from technological advances across manufacturing processes and outputs, and the sometimes-overlooked career opportunities. Peter is a past speaker at our Lecture Series and contributor to this *Journal*. His 2012 book, *The New Industrial Revolution*, explored 250 years of manufacturing progress.

[1] https://archive.ellenmacarthurfoundation.org/explore/the-circular-economy-in-detail

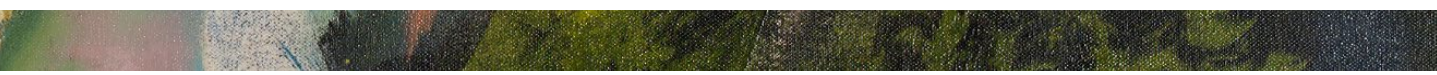


THE NUANCE OF NUMBERS

Visual and data journalism has come of age in the past two years. Alan Smith tells us how our relationship with data changed during the Covid-19 crisis.

"The only positive I can think of during this entire pandemic nightmare is that some of us may have learnt to read a graph." That was Gary Lineker tweeting in October 2020, as the UK's latest wave of Covid-19 brought 20,000 cases per day.[1] That a footballer-turned-broadcaster should find comfort in increased chart literacy shows the extent to which data and graphics have become staples of mass media in the past 18 months.

When the pandemic hit, the *Financial Times* had already spent several years crafting a data visualisation strategy that aimed to place charts at the centre of our reporting. One of the impacts of Covid-19 has been to accelerate that strategy's implementation. After all, data has been the only way to truly understand the scale and impact of the pandemic.



"Data has been the only way to truly understand the scale and impact of the pandemic."

At the heart of our strategy was the Visual Vocabulary, a taxonomy that focuses on designing *with* data, instead of decorating it.[2] The Chart Doctor, meanwhile, is a pre-pandemic series that explained our approach to readers using makeovers, interactive experiments and even music created from US economic data.[3]

Then came Covid-19. Very quickly, the FT's charts became important stories in their own right. Our Chief Data Reporter, John Burn-Murdoch, posted daily updates on Twitter that generated an enormous readership, and one person found his work by googling "FT death chart guy".[4] In the very early stages of the pandemic, Burn-Murdoch was also on hand to explain exponential growth.[5]

OFF THE BEATEN TRACK

Data sources were a particular challenge during the early stages of the crisis. With official figures often subject to frustrating delays, much of our data reporters' early focus was on identifying alternative data sources that could shed light on dramatic changes to daily life around the world. These included mobility indicators from Google, energy consumption data, flight traffic data and even restaurant reservations.

The grim task of establishing official Covid death tolls was also a challenge, because there are considerable variations in methodology from one country to another. Ultimately, the team compiled data on excess deaths, which is the difference between deaths from all causes during the pandemic and the historical average for the season.[6] The data suggested that official figures were likely to be significantly undercounting the pandemic's real impact.

In the early stages of the crisis, it became clear that we were not only going to have to produce one-off news stories based on this analysis, but data 'products' that readers could come back to day after day and week after week as the pandemic evolved across the world.

These products – daily updating trackers of key metrics and trends – required us to take a different approach from the one we would traditionally use in the newsroom. The relentless nature of the pandemic meant that the model we had to adopt was 'publish early and iterate'.

Simple, manually updated charts were soon replaced by dynamic interactive charts of global cases and deaths.[7] That was followed by an updating, animated lockdown tracker,[8] which used new data feeds compiled by the University of Oxford.[9] This provided a stark view of government interventions across the world and made the scale of the crisis even more apparent.

SIMPLIFIED SCIENCE

The FT's triptych of pandemic trackers was completed this year with the arrival of our vaccine tracker, which since the start of 2021 has recorded the staggering rollout of more than four billion jabs – and counting.

The ingenuity of the scientific effort to overcome the virus has been the positive side of the crisis, and it has

"The grim task of establishing official Covid death tolls was also a challenge, because there are considerable variations in methodology from one country to another."

also created opportunities for visual journalism. Throughout the pandemic, the FT's Technical Illustrator Ian Bott has been working with our Science Correspondent Clive Cookson to explain key scientific concepts such as how a virus mutates[10] and the mysteries of T-cells.[11]

The oddities of working remotely were neatly captured when Ian was creating a graphic showing how buildings can be ventilated to minimise Covid exposure: an FT colleague's 'industry contact' turned out to be Ian's wife, who was working in the room next door!

"There is a common misconception that data journalism is a threat to traditional 'shoe-leather' reporting."

TWO SIDES TO THE STORY

Our coronavirus trackers have broken page-viewing records, and our charts have engaged and informed readers – all of which has made data an integral part of the FT's output. But not to the exclusion of all else. There is a common misconception that data journalism is a threat to traditional 'shoe-leather reporting'. In fact, some of the FT's most powerful stories this year, such as a piece on India's second wave that combined charts and data with personal stories from the ground,[12] have fused traditional reporting with progressive new techniques.

Numbers alone can struggle to convey the deeply personal human impact of the crisis, but there are often questions about just how representative any individual experience can be. As a combination, however, numbers and personal testimony create journalism that is truly greater than the sum of its parts.

Alan Smith is Head of Visual and Data Journalism at the *Financial Times*.

[1] @GaryLineker, Twitter, 26 October 2020

[2] Ft-interactive/chart-doctor, GitHub

[3] The Chart Doctor, FT

[4] @SilverVVulpes, Twitter, 18 April 2020

[5] Coronavirus trajectory tracker explained, FT, 30 March 2020

[6] Financial-Times/coronavirus-excess-mortality-data, GitHub

[7] Coronavirus tracked: see how your country compares, FT

[8] Lockdowns compared: tracking governments' coronavirus responses, FT

[9] Covid-19 Government Response Tracker, Blavatnik School of Government, University of Oxford

[10] Mutations map holds the key to bringing coronavirus under control, FT, 21 April 2020

[11] T-cells: the missing link in coronavirus immunity?, FT, 17 July 2020

[12] India's devastating second wave: 'It is much worse this time', FT, 21 April 2021

WALTER SCOTT CONTRIBUTORS

Members of Walter Scott's Research Team that contributed to this edition of *The Journal*.

ON THE VIRTUAL ROAD

pages 6-9

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Ashley-Jane is an investment analyst at Walter Scott, who joined the firm in 2017. She holds a BA (Hons) in Accounting and Finance from Edinburgh Napier University and an MSc in Finance and Investment from the University of Edinburgh. Ashley-Jane is a CFA charterholder.

TOM MIEDEMA

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Tom is an investment manager at Walter Scott, who joined the firm in 2007. Prior to this, he lived and worked in Taiwan, having previously worked at Baillie Gifford. He holds an MA in Business and Economics from Heriot-Watt University, Edinburgh and an MFin in International Finance from the University of Glasgow. Tom is a CFA charterholder.

ALAN EDINGTON

Investment Manager – Responsible Investment

Alan is Investment Manager, Responsible Investment and a member of the Investment Management Committee at Walter Scott. Prior to joining the firm in 2012, he worked at ManoCap, a private equity firm based in Sierra Leone, and as a lawyer at Slaughter and May. Before university, Alan undertook an extended internship at Walter Scott. He holds a BA (Hons) in Law from the University of Oxford. Alan is a CFA charterholder.

ALISTAIR CEURVORST

Investment Manager

Alistair is an investment manager at Walter Scott. Prior to joining the firm in 2019, he was an investment analyst at BlackRock. Alistair holds an MEng in Mechanical Engineering from the University of Warwick and is a CFA charterholder.

HAVE LAPTOP, WILL TRAVEL

pages 10-12

FRASER FOX

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Fraser is an investment manager at Walter Scott, who joined the firm in 2003. He has experience across each of the three regional research teams. Fraser holds a first class LLB (Hons) in Law from the University of Edinburgh and is a CFA charterholder.

FLIGHT OF FANCY?

pages 13-18

JOSEPH FRIEDLAND

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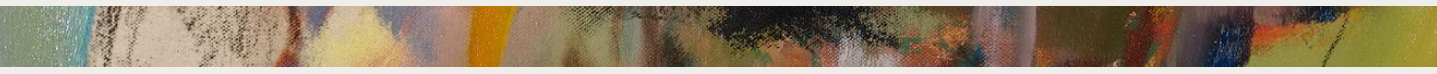
Joseph is an investment analyst who joined Walter Scott in 2019 having interned at the firm in 2018. He holds a PgD in Ecological



Economics from the University of Edinburgh and a BA in Environmental Science from Colorado College in the United States.

Fraser Fox also contributed to this article.

TRAVEL WITH CARE

pages 19-20

JAMIE ZEGLEMAN

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Jamie is an investment manager at Walter Scott, who joined the firm in 2008. He has experience across each of the three regional research teams. Jamie holds an MA (Hons) in Mathematics and Economics from the University of St Andrews and is a CFA charterholder.

THE RISK CALCULATORS

pages 30-35

CHARLIE MACQUAKER

Investment Director

Charlie is Executive Director, Investment at Walter Scott. Having joined the firm in 1991, he has held a range of investment, management, client service and governance responsibilities and has had extensive experience of analysing companies around the world, particularly in Europe and Japan. Charlie joined the Board in 2009 and is Co-Chair of the Investment Management Committee. He holds a BSc (Econ) (Hons) in European Studies from the University of Buckingham.

Alan Edington and Jamie Zegleman also contributed to this discussion.

HEALTHCARE'S NEW ORDER

pages 44-47

DES ARMSTRONG

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Des is an investment manager and a member of the Investment Management Committee at Walter Scott. Des joined in 2004 and has spent time across all three of the regional teams, including time living and working in Australia. He holds a BSc (hons) in Pharmacology from the University of Aberdeen.

TRUST IN FLEXIBILITY

page 49

RICHARD BARRY

Head of Executive Initiatives

Richard is Head of Executive Initiatives. Prior to joining Walter Scott, Richard worked at Baillie Gifford for over 20 years. He graduated with a BSc in Food Science from Queen Margaret University and also attained a PG Dip in Human Resource Management from Napier University. Richard is a Charter Member of the Chartered Institute of Personnel and Development.

AN EVER-PRESENT RISK

pages 61-62

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Alan is Investment Manager, Co-Head of Research and a member of the Investment Management Committee at Walter Scott. He joined the firm in 2006 and holds a BSc (Hons) in Mathematics from the University of Nottingham and an MSc in Financial Mathematics awarded jointly by the University of Edinburgh and Heriot-Watt University, Edinburgh. Alan is a CFA charterholder.

MATTHEW GERLACH

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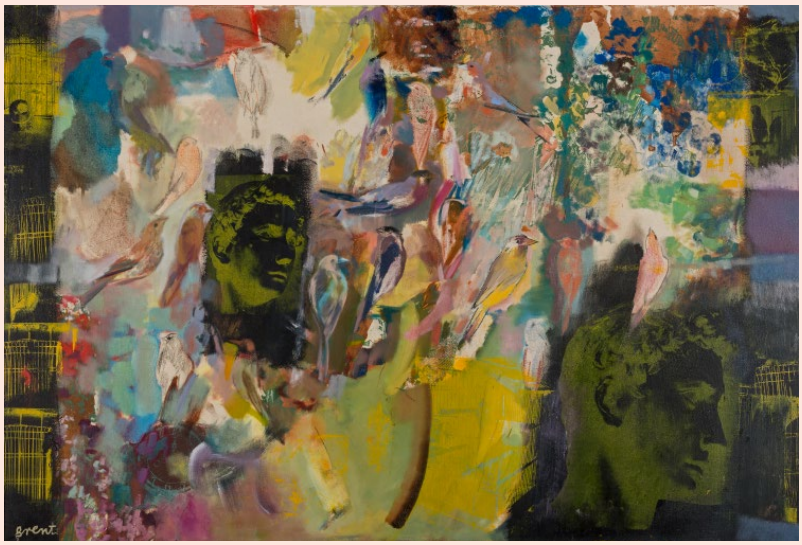
Matthew is an investment manager at Walter Scott. He joined the firm in 2016 having taken part in the investment intern programme in 2015. Prior to this, Matthew undertook internships at Stryker and the Trade & Investment Department of the British Consulate-General in São Paulo, Brazil. He holds a BSc (Hons) in Management from Warwick Business School.



Brent Millar
Keep Athens in Mind

Walter Scott has been supporting emerging Scottish talent since 1988. In the same way that we believe that different perspectives within the team generate the best investment ideas, so we believe that our art collection should incorporate a wide range of work from an eclectic group of contemporary artists.

Our commitment to the art community is also reflected in our established partnerships with – and sponsorship of prizes at – the Royal Scottish Academy, the Royal Glasgow Institute of the Fine Arts and the Royal Scottish Society of Painters in Watercolour.