NewStatesman

Spotlight

FINTECH: THE EMERGING ECONOMY

Matt Hancock / Eileen Burbidge / John Glen / Anne Boden

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Data can be an unstable currency

The move to social money was long considered inevitable. Facebook Payments Inc was formed as a subsidiary of Facebook in 2010, and from the summer of 2012 began applying for Money Transmitter Licenses in the US; by mid-2014, it had payment licenses in 48 states. Two months later, the new head of Facebook Messenger was announced as David Marcus, who had been poached from his position as CEO of Paypal, the internet's largest e-payment system. In December 2016, Facebook announced that it had received licenses for e-money and payment licenses in Europe.

The motives are understandable; information, unlike money, has inherent use-value. Knowledge is power, as the salesmen of Cambridge Analytica were so keen to remind their clients. But exercising that power has unpredictable results. The people on whom data is collected are often rightly suspicious of the data collection involved, and suspicion, too, has economic power.

This is the paradox of the data economy. Advertising companies such as Facebook and Google must make bold claims about the data they can collect on their users and the influence it can have over people's decisions. It is what persuades their clients to pay for their advertising services. But at the same time, nobody wants to think they have been bewitched. In his *Kreutzer Sonata*, Leo Tolstoy asks: "can it really be allowable for anyone who feels like it to hypnotize another person, or many other persons, and then do what he likes with them? Particularly if the hypnotist is the first unscrupulous individual who happens to come along?" This sentiment may be 129 years old, but in the last two weeks it has cost Facebook more than 80 billion dollars.

It remains to be seen if Facebook will ever regain enough of the public's trust to handle their money. But for the fintech companies hoping to tempt established banking consumers away from their old bank with data-driven apps and services, Facebook's mistakes must be a valuable lesson in what the public will tolerate.

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At the Treasury's recent International Fintech Conference, Oscar Williams spoke to Matt Hancock, Eileen Burbidge and John Glen about how the government is approaching the fastest-growing part of the UK's valuable financial services industry

Spreading the benefits of the fintech boom

Matt Hancock, Secretary of State for digital, culture, media and sport

Why is London's fintech sector growing so quickly?

Britain is the fintech capital of the world right now and we need to make sure we stay there. I think the reason for this is a combination of strong support for tech and the fact that we're the leading tech hub in Europe, with London's position as the biggest international financial market. The fact that Silicon Roundabout – the heart of the renaissance in the British tech scene – is only half a mile away from the City of London means there is a strong pool in both finance and tech, which is rare anywhere else in the world.

Will the benefits of the fintech sector be felt across the UK?

The capital's strength is a good thing for the country because it means the UK as a whole is stronger in fintech. We're working now to spread that benefit around the country. Taking the organisations that really made London the tech hub that it is today, such as Tech City, we are looking at turning that into Tech Nation; and are focusing on expanding it to other parts of the country now. That demonstrates our desire to spread the benefits of this tech boom.

What might regulation entail?

That is a Treasury and Bank of England lead. Making sure we have pro-innovation regulation is important, especially in finance. A good regulatory structure must work collaboratively with new start-ups rather than saying no to every idea. I think it's better to have cryptocurrencies based here in the UK in a good regulatory

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system that supports innovation but also gives them a firm framework, rather than having them offshore in a tax haven.

Will the Bank of England ever back a new "Britcoin"?

That is a very intriguing question. The currency in the UK is rightly backed by the government and the Bank of England. We only want one currency here in the UK. Nevertheless, having other currencies whether they're backed internationally or are essentially backed by technology and verified through a distributed ledger, it's better to have them here than offshore. Because we have such a strong institutional set up the demand for a UK cryptocurrency isn't as great. Ultimately, what does the blockchain provide? It allows you to verify that validity of a transaction. In the UK we have a tried and tested, centralised way of doing that.

"Tech City must turn into Tech Nation"

How can government mitigate the impact of Brexit on the sector?

I know people in the sector have concerns. But my sense from talking to people regularly over the last 18 months is that people are increasingly reassured. The good deals – both the first deal in December and the transition deal we did last month [March] – have reassured people a lot. Of course people still want to have access to the brightest and best talent and that's very important to us. Making sure the financial regulations mean the European market is open is very important too. But ultimately, there's an opportunity and the opportunity is to be trading with the whole world, which is what London has traditionally done in financial services.

Could distributed ledgers be useful in the public sector?

I use as my example the use of blockchain in development aid because then you can follow the money to the recipient and go and check that the recipient has received the money and what they're using it for. I can see anywhere where you need verification, the blockchain is a potential technology for doing that. So I can see the big advantages of doing that in international aid where delivery can be opaque and I'm interested in where else that can happen in the public sector too.

Eileen Burbidge, Treasury Special Envoy for Fintech

You often describe London as the fintech capital of the world. Why does it deserve that title?

First of all, there is its financial services heritage. There's no question: London and New York alternate in terms of being the financial services capital of the

world. The time zone in London means you can conduct a financial services transaction and settle within the same business day as in Asia and America. On top of that, we have this growing digital ecosystem, and we have progressive regulators that are very thoughtful, in contrast to the US and other markets. It's like Wall Street, plus Silicon Valley, plus Washington DC operating in one city. There's no other city that comes close.

How will Brexit affect the sector?

The most immediate impact of Brexit is that it's a distraction. Entrepreneurs just want to focus on building their businesses. Being concerned about Brexit is an opportunity cost. There is also potential risk attached to attracting talent. Obviously we're doing a lot to develop domestic talent but, like every other market in the world, we need to rely on international talent as well. I fear that Great Britain looks a little less welcoming now. That will be a palpable issue because really high growth fintech start-ups need that highly skilled talent. The third point is less material than those first two and that is the risk to regulated entities should we not have full passporting rights after the transition period.

The Treasury is going to work as hard as possible for some sort of equivalence, but there's also this worst case scenario in which we don't have full passporting rights and that will be a distraction. But for fintech it's probably less of an issue than the existing financial services institutions because less than half of them need to be regulated, but it affects the ecosystem and our foundational layer.

Do fintech start-ups represent a genuine threat to legacy institutions?

I think fintech start-ups add a little competitive pressure. Do they actually threaten their existence? No, I don't think so. TransferWise, for example, couldn't exist without the incumbent banks. The biggest existential threat to the banks is going to look like an Alibaba, like an Amazon or an Apple. It's not the start-ups or small companies.

I think they recognise that now and there's great opportunity for institutions to work together with small, agile teams to bring innovation into their organisation whether that's through acquisitions or collaborations. I don't know if the tech firms will go into banking with a regulated capital B, but they will go into financial services.

John Glen, Economic Secretary to the Treasury

What value do cryptocurrencies have for the UK economy?

The purpose of the taskforce to look into it, is that we want to understand the risks and opportunities of cryptoassets and currencies, and the applications of a distributed ledger. We want to get a thorough understanding of it, so that we can then take appropriate action. More regulation may be appropriate. The Bank of England has done some worthwhile work, but we really need a joined-up piece of work that will establish what the correct response is.

When I first came into this job on 9th January [2018], I said to the Chancellor that this [cryptoassets] was something we should be looking at for this conference today, because there is a lot of uncertainty. The security around it, the implications for the fintech sector – all that needs thorough examination.

What are the risks?

I'm not necessarily saying there are any. There is a view that you need to proactively regulate in order to establish the parameters to function better and encourage its growth. Others, such as the Bank of England, say that at the level it's operating, it has no systemic risk at all.

Do you see Bitcoin as having real value for the UK economy?

I'm obviously aware of the financial advantages that some people are accruing from it, but it wouldn't be appropriate to prejudge the outcomes of the taskforce. I haven't personally purchased any cryptoassets. I've heard that someone created a Theresa May Coin – perhaps I should start there!

Bitcoin's ledger was found to contain images of child abuse, and it's used to pay for illegal drugs. Should Bitcoin be incorporated into the UK economy?

These are exactly the sorts of risks that we need to examine carefully. We need to be sure that we're aware of the ethical implications of adopting or regulating something that is working in a way that, probably, other currencies don't.

Isn't Bitcoin designed to be self-regulating, and to make state regulation irrelevant?

A range of jurisdictions in the world have taken different views. Some have already regulated, and we've got to examine why they've done that – does it go against the intention of it, and is it necessary?

Does the government know how much tax has gone unpaid on the money made through Bitcoin?

This government has shown a determination to reduce the tax gap. In this particular issue, I would expect the taskforce to give us a very good steer on where tax opportunities are being forsaken. We want a fair and predictable tax system, and we want to set those taxes and make them enforceable within a global system. I think this work will feed into HMRC.

ADDITIONAL REPORTING BY WILL DUNN

Friends with benefits: the future of finance

Sara Rasmussen, head of sales at Auka, explains why more banks should be exploring fintech partnerships

Global finance is at a crossroads in 2018. Traditional banks are under pressure to digitise their services in order to satisfy a modern culture which increasingly craves convenience and efficiency, while fintech start-ups – even with digitisation at their heart – are still not established, neither in terms of customer base nor legalistically, enough to be considered the status quo. Rather, the idea that fintech companies might kill traditional banks is being replaced by an idea that they could save them.

A partnership between banks and fintech makes sense. Leading banks understand that previously laboured, paper-based processes and clunky user interfaces are no longer acceptable to the modern citizen on the go, and so can turn to fintech to benefit from cloud-based systems and agile mobile payments, in real time and on location.

Furthermore, with 2018 also signalling the start of data privacy directives PSD2 and GDPR, the need to become more digitally savvy has been underscored. Banks no longer have a monopoly on their customers' information and they don't have time to develop new technologies from scratch. As technology giants such as Google gain access to user data, banks are being challenged to make services more intuitive.

But banks are not purely bystanders in the revolution; they have their own assets, too. For fintech companies, banks come to the table with significant capital, massive existing customer bases, real-world infrastructure and big data.

Opening up application programming interfaces (APIs) to external software developers has been one of the main harbingers in the fintech boom. APIs represent reasonably basic technology for developers, even if they are new terminology for bankers. APIs offer a set of well-defined standards that allow different kinds of software to collaborate. Consider how Google Maps regularly shows up inside other apps on a smart phone. Google shares its API for the Maps app with outside parties, because it creates a win-win scenario for all those involved. The other apps gain the functionality of Google Maps without having to start from scratch and Google, in turn, gains more users and data.

As society becomes more cashless – note that physical currency is more or less untraceable – the opportunity arises to keep more records between banks, customers and merchants about how the money is used. In the future, there will be a greater emphasis on solving actual problems for consumers and merchants.

Auka, based in the mostly cashless Norway, is at the forefront of digitising consumer-merchant-bank relationships through fintech. At Auka, we have observed numerous benefits to launching mobile payments, including the recovering of lost transactional-based revenue, being able to leverage customer data and being able to offer low-risk product extras – such as small loans or a line of credit – at the right time and place.

Ultimately, a profitable partnership between banks and fintech works best when both parties equally share the risk – as well as the rewards through a mutually beneficial business case. Auka licenses its payment platform on a SaaS model to retail banks, giving them the capability to deliver mobile payment products to both corporate and private customers, via the web and native interfaces. Their technology provides banks quick access to mobile payments infrastructure that they can brand and use for real-time peer-to-peer payments, point-of-sale, merchant services and much more.

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Informing the value of around $20 trillion in assets, the "Aladdin" risk analysis system at BlackRock is arguably the most influential piece of technology in the world. Will Dunn speaks to Jody Kochansky, who has worked on Aladdin for 25 years

The most powerful computer on Earth

The winter of early 1993 was a cold one in New York; the beginning of February saw the mercury drop below -13°C. Each morning of that winter Jody Kochansky would arrive at 6.30am at the Manhattan offices of BlackRock, and begin going through the printouts.

"I'm not a big morning person," Kochansky admits. To compound the early start, the first job of the day was also the most arduous: "to take the risk reports, to flip the pages and literally to compare the portfolio as it looked today versus the portfolio as it looked the previous day, by hand." The first web browser would not be created until later that year; "the delivery mechanism was paper", but Kochansky and his team found a solution. "We said, let's take this data, and rather than print it out, let's sort it into a database, and have the computer compare the report today versus the report yesterday, across every position."

From a simple time-saving system designed while most of New York was still in bed, BlackRock's computer system has grown into the "operating system" for a company that has itself grown into the world's largest manager of financial assets. The system, now known as Aladdin, inhabits multiple datacentres – warehouses filled with servers – and is used by around 13,000 BlackRock employees and thousands more people at the company's clients, who pay for the analysis the system provides.

This is how much money Aladdin manages: if you took every last cent out of every bank in every country in the world, emptied the wallets and pockets and penny jars of all 7.6 billion people, if you rummaged down the back of every sofa and emptied every till and safe until you collected every scrap of currency in the world, you would have a pile of cash worth around five trillion dollars. The total value of assets under management by BlackRock is $6.3 trillion. But Aladdin also delivers risk analysis on the assets managed by its clients, which are valued at more than double that amount. Overall, Aladdin has an effect on the management of around ten per cent of the world's financial assets, or around $20 trillion. Over 25 years, it has grown into a system that is directly or indirectly responsible for more than four times the value of all the money in the world.

The first fintech

The fact that Aladdin demonstrates about financial technology is that it is not the technology itself that creates success, but how it is used. Kochansky says broker-dealers were using powerful mainframe computers to understand the risks that applied to different investments as far back as the 1980s. BlackRock's founders invested in new "workstations" – "cheaper computers, that cost tens of thousands rather than millions". Their innovation was to use the cheaper computing power not only to sell securities, as others did, but to know the true value of what they were buying.

How does a computer know how risky

SHUTTERSTOCK / ISABELLE OHARA

"We were one of the earliest fintechs"

something is? Kochansky says that the mathematics "can be fairly complex", but that Aladdin uses "Monte Carlo simulations", among other models, "to try to see what happens to the security under different kinds of environments". A Monte Carlo simulation is a type of algorithm that simulates the messy unpredictability of the real world within the deterministic order of mathematics. To do this, it uses random numbers to calculate not exactly what will happen, but what is likely to happen.

When BlackRock began applying this type of mathematics to building portfolios, they were run on a single Unix workstation that was "literally the desktop computer for the trader," Kochansky remembers. "But then at night we would use the compute resource to run our bond analytics, and the next morning the portfolio manager would get a fancy report that other buy-side organisations couldn't get." The "fancy report" would contain risk analytics on "everything they owned. Every single day, our portfolio managers could see the risk on their entire portfolio." Today, when analytics are applied to everything from training athletes to selling deodorant, this would be expected, but in the early 1990s BlackRock was the first and only company to use data in this way.

"Nowadays the hot topic is fintech," say Kochansky. "I like to think that we were one of the earliest fintechs."

But BlackRock soon realised that the system should not just calculate risk. The next step was to use the system for "position-keeping, record-keeping, and control". The reason for this was that at the time, with risk calculated separately from positions, analytics were always one step behind trading. "We realised that if you know how risky a security is, but you don't know how much you own, you don't really know your risk," he explains. "You ultimately have to marry the risk calculations at the security level with the portfolio holdings to truly get a view of risk. We needed to know how much we owned."

This insight was particularly important in the autumn of 1994, in the wake of a crisis in the bond market remembered by *Fortune* magazine as "the Great Bond Massacre". As bond prices fell, General Electric began looking for a buyer for a Wall Street broker-dealer that it owned. "They went to other broker-dealers," Kochansky remembers, "and said, hey, we've got this complex portfolio, can you provide a bid for it – in other words, how much would you pay me for it?" The bids GE received were low – "much lower than they had expected." Kochansky says this "makes sense, because they were trying to move a big block of securities" – companies rarely get top dollar for their stock during a closing-down sale. The answer was to have BlackRock manage the portfolio, gradually selling it over time.

Kochansky and his team "literally pulled three all-nighters in a row. We modelled the entire portfolio. It was very painful, lots of coffee. But when we were done – wow." Incorporating a broker-dealer system into Aladdin was, says

$20 trillion, he admits, "*sounds* like a lot of money..."

Kochansky, "the moment when we realised that the platform was capable of doing a lot of things that we hadn't even contemplated at that time."

By the mid-1990s, the system was able to "rebalance" portfolios "in more automated ways". Once a portfolio manager knew how risky their portfolio was and how much they owned of every security, they would look to invest in other securities, and Aladdin was designed to adjust the portfolio, to balance automatically the risk being introduced. It was in this way that Aladdin was given, says Kochansky, "the ability to interact with the marketplace. In those early days, in the mid to late 90s, the vast majority of trading in fixed-income was really based on the telephone. People would pick up the phone and offer two-year notes and that kind of thing. So as the electronification of the marketplace was happening, we were building out the market-facing technologies."

In 1999, BlackRock went public at $14 a share. Kochansky points to other moments in the firm's history when the company and its technological core had to be recalibrated. In 2006, BlackRock acquired Merrill-Lynch investment managers and "we suddenly became very international, and we became very equity". But it was the financial crisis of 2008 that really proved Aladdin as a significant influence on the global economy. As the government struggled to make sense of the febrile financial markets, asking an investment bank to help value the rest of Wall Street would have been, Kochansky puts it diplomatically, "a potential conflict". "And so I think as these governments – it wasn't just the US government – looked around and asked who had the capabilities to gain the insight into what's happening in these portfolios, that's a relatively short list." Unlike an investment bank, BlackRock does not trade its own capital. This fact, coupled with its analytical prowess, gave it an unparalleled ability to value the twelve-figure refinancing deals needed to keep the US economy afloat. In 2010, *Vanity Fair* reported that "BlackRock has effectively become the leading manager of Washington's bailout of Wall Street". BlackRock's share price at time of writing was $521.

The simulated economy

While the world has changed dramatically since Kochansky started at BlackRock in 1992, he says that "a lot of the mindset that was created then propagates today. The principles are the same. What we nowadays call Aladdin – at the time, it didn't really have a name – is the operating system for BlackRock."

In 1994, when Kochansky and his team worked for 72 hours to rewrite Aladdin for the first time, "the entire effort around Aladdin was maybe 40 or 50 people. Nowadays, within the Aladdin product group we have about 1,500 to 2,000 people that contribute to Aladdin in different forms."

Physically, Aladdin occupies three datacentres in the United States. Unusually, these are owned by the company itself rather than a third party. The company is looking at opening a pair of datacentres in Europe. Kochansky says "it's hard to characterise it exactly by number of computers, but one way to think about it is that we are running the risk analytics on tens of millions of securities." Every individual security is valued through "thousands and thousands of Monte Carlo simulations, and each simulation is a matter of creating an economic scenario that's based in statistical grounding. One security manifests as millions of scenarios. So, we are running billions and billions of scenarios every single night and throughout the day."

In a typical day, Kochansky adds, the cloud-based system will pass "tens of billions of messages" to distribute analytics to users and clients.

Every security that is analysed goes through "the economy process", which Kochansky describes as valuation in the context of every data point BlackRock can gather than might affect the economy – "a real-time snapshot of all sorts of market information. So,

The economy of the future is being created not in a stock exchange, but a server room

anything you could imagine that's going on in the marketplace – what are the Treasury rates, what's the shape of the yield curve, what's going on in equities, what's the state of volatility. In the case of mortgages, you want to know stuff about the rate of inflation, home price appreciation trends by zip code. We call that 'the economy'."

Every single one of the tens of millions of securities Aladdin analyses is valued against "hundreds of thousands of data points each day", in thousands of different ways.

Too big to fail?

In December 2013 Stanley Pignall, the *Economist*'s finance correspondent, said of BlackRock that "it's unprecedented to have a single firm that has such a grip on the way that not only itself, but its rivals, look at the world." While Pignall said BlackRock was not "too big to fail" in the sense that some banks had been – as an asset manager it is not exposed to the same risks – he said the sheer size and power of the Aladdin platform had some economists spooked.

"A kind of power never seen before"

The reason, said Pignall, was that so much value is now managed using Aladdin that if, for example, JP Morgan, Deutsche bank and some of the world's biggest sovereign wealth finds all use the same model, "the risk is that they start finding certain types of assets attractive, or unattractive, at the same time. You'd get a herding of investors," Pignall suggested, similar to that "in 2008, when too many people started listening to the credit rating agencies, and started buying products that were linked to subprime real estate in the US."

Kochansky answers that "it's important to recognise that Aladdin itself does not predict the future at all. Aladdin tells you what you have in your portfolio. It doesn't tell you what to buy." There are, for Aladdin, no good or bad bets – there is only risk, in varying degrees.

"The enterprise clients have a separate instance of Aladdin," he adds, "meaning that it's all their own data, running on separate computers, separate databases. They dial the models based on their views of the markets, their views of risk. Aladdin doesn't dictate to them how to run their business."

Nor is Aladdin the only system in play. "Keep in mind that the models in Aladdin are based on historical data. There are many providers in the marketplace that provide risk models based on historic data. Our models are world-class, but we're not the only model provider in the world," says Kochansky. Elsewhere, behemoths such as MSCI Barra and Bloomberg offer their models and systems that may influence still more value even than Aladdin. While Kochansky admits, memorably, that "$20 trillion *sounds* like a lot of money,"there may be, "in the grand scheme of the capital markets", models that have still greater influence.

The idea that computer systems and financial models of this sort quietly underpin the value of almost everything in the world (everything that can be invested in, anyway) could be either frightening or reassuring. The filmmaker Adam Curtis has described Aladdin as "a kind of power never seen before… more powerful in some respects than traditional politics."

On the other hand, if the principal aim of such a vastly influential system is the management of risk, it could be the steady hand that the markets of the future will need . A powerful stabilising technology such as Aladdin could yet be the source of "Great Moderation" that neoliberalism tried to deliver.

Either way, Aladdin is set to become more powerful still. BlackRock's $109bn research unit, the Systematic Active Equity division, has been investigating artificial intelligence for some time, and the company recently announced that it is building a new laboratory in California to develop this technology even further. As to what kind of future this creates for the world and its economy, Aladdin itself will probably be the first to know.

SHUTTERSTOCK / F.SCHMIDT

Starling Bank CEO Anne Boden tells Augusta Riddy that the era of big banks is coming to an end

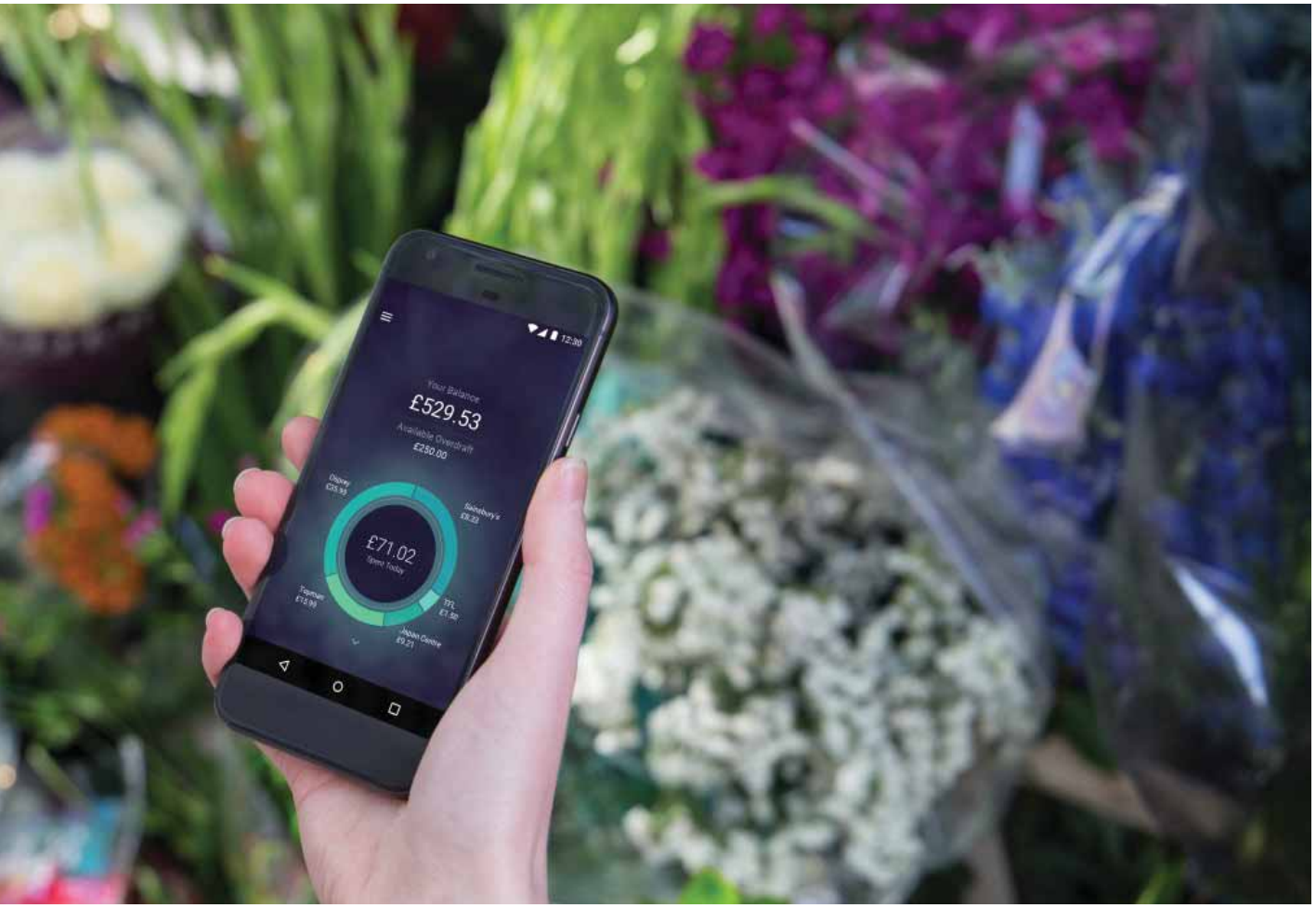
"I made a list of what was wrong with banks"

In October 2008, less than a month after the collapse of Lehman Brothers in the United States, then-Prime Minister Gordon Brown unveiled a plan he called "unprecedented but essential". Of the £37bn Brown committed to bailing out the big banks, the lion's share – £20bn of taxpayers' money – was aimed at saving the Royal Bank of Scotland.

For the United Kingdom to provide state aid of this scale to one of its banks, RBS had to agree with the European Commission to launch a £425m Capability and Innovation fund, aimed at fostering competition. This fund is now becoming available to SMEs, in the form of grants ranging from £5m to £120m, and Anne Boden wants in.

Boden says her company, the four-year-old digital bank Starling, would do more with £100m than the likes of Santander and TSB – who she expects will also apply. "If you give it to us, we'll shake up the market because we're very efficient, we spend our money carefully, and we have a track record of creating things. [Santander and TSB] have so much money," she says, that to the high street banks, "£100m is not going to make any difference!"

Boden's career began in traditional banking. Having studied computer science in her native Swansea she started at Lloyds in the early 1980s, entering an industry that was "very, very different". In the wake of the recession, the banks "tried to put everything back together the way it was before the crisis", but to Boden it was clear that business couldn't continue as usual. "It was no longer acceptable to fine customers when they



STARLING BANK

went into unauthorised overdrafts. It was no longer acceptable to charge customers for returning a direct debit." She "stepped away" and spent some time in fintech.

Re-entering banking as Allied Irish Bank's chief operating officer, Boden helped return AIB to profitability, but says she knew that "the only way of actually doing something really transformative was to start from scratch." She set about creating a brand new digital bank in January 2014. At the outset her wealth of experience in "the old world" was, in some ways, a setback. "I was a computer scientist, I was a woman, but I was also an ex-banker, and that was just as difficult."

Choosing to abandon the old world and join the new made her a black sheep amongst her peers. "They were trying to defend the industry," she recalls, but "there was new knowledge, new technology, and a new culture that I could embrace." Within four years, Starling Bank had won Best British Bank at the British Bank Awards, narrowly beating its competitor, Monzo.

Boden gets out her phone and opens the Starling app. "We're all about the day-to-day money," she explains. The app is slickly designed – "it's quite addictive" – and allows customers to track, categorise and map their spending in real time. Pre-approved overdrafts can be adjusted using a slider, and money can be added to "goals" – an item or experience worth saving for – instantly. One feature, which Boden says she finds particularly useful, locks and unlocks the debit card – "I'm always losing my card in my handbag." She demonstrates a bill-splitting feature which sends little prompts for payment – perfect for millennial dinner parties. Or when your mum lends you money and wants to get it back? Boden giggles. "Yes!"

While both Starling and Monzo offer tech-first, app-based banking aimed at millennials, Boden would be first to admit she isn't a millennial, nor is she typical of the fintech scene: "like it or not, the majority of people in fintech are men in their 30s and 40s with beards".

One of those bearded 30-somethings is Tom Blomfield, CEO of Monzo. Blomfield was Starling's chief technical officer until – following a reported falling-out between Blomfield and Boden – he left to start his own challenger, Monzo, in 2015. Boden says that Starling is the more serious option of the two. "We've only been a bank," she says, in

"Banks will copy everything we do"

reference to Monzo's beginnings as a provider of pre-paid debit cards. "We've never been a pre-paid card, and we have many more of the real banking features." The fact that they have Current Account Switching (CAS) and function as a B2B company – servicing "other fintechs" as well as the Department for Work and Pensions – shows that Starling is much more than a flashy app, Boden says. "As well as being able to offer these great services, we have more revenue."

When the subject of Open Banking is raised, Boden wheels out a whiteboard – it's time for a lesson in economics. The deadline for implementing EU directive PSD2 was 13 January 2018, a deadline that several big banks missed. "PSD2 introduced the idea of open APIs, and open APIs mean that a customer can permission somebody else to see your data." Starling has been PSD2-compliant since its inception.

Via platforms called "aggregators", customers will be able to share their financial data through APIs, allowing other financial providers to view it and offer them tailored products. It's thought that this will allow consumer to switch providers much more easily, encouraging competition and ending the banking monopoly.

The response from the big banks, Boden explains, has been to try to buy control of this. HSBC recently bought its own aggregator – she draws aggressive circles on the board – because "it thinks it can consolidate Barclays and Starling into its app". If one bank can buy the digital space in which customers can pick and choose between banks, that freedom of choice becomes an illusion.

Boden predicts banks like HSBC "will copy everything we do", but two years later, citing a recent Lloyds announcement: an exciting new feature that enables people to lock and unlock their cards. But the "big battle", she says, will be on cost. "The big banks are increasing their cost base all the time, and they won't be able to compete because our cost of delivery here is very low."

Cheap as it may be to run, Starling is still a bank, with all the regulatory baggage that comes with that label. Boden takes issue with some regulation, such as the Minimum Requirement for Own Funds and Eligible Liabilities (MREL). MREL, a the-government-never-wants-to-bail-you-out-again fund, was established after the financial crash and stipulates that banks must have "bailing debt" to insure the capital they hold in the event of a collapse. A bank is eligible if it holds over a certain amount of customers: "everybody assumed that this would only be for big banks and nobody expected this to apply to banks like ourselves, but because we have so many customers, it does". Relative to the big banks, Boden says, Starling carries a very small amount of risk, but such a requirement could put the brakes on growth for ambitious fintech companies.

As a CEO, she is both down to earth – personally responding to customer queries on Twitter – and economically philosophical. She has spoken publicly about "the war on cash", which she hopes to win. "Cash is very costly. Banks charge businesses a huge amount of money for using cash."

While she is reluctant to be drawn into a political debate about the implications of a cash-free society, Boden says "we have an obligation to make sure everybody can get banking services" before this becomes a reality. Historically, people on low incomes have been more likely to avoid banking and stick to cash, but Boden argues that Starling is changing this relationship, both through pricing and control: "we have customers that are managing every penny."

Boden is now focused on building Starling's case for receiving the £100m grant from the Capability and Innovation fund. If her team is successful, awarding the spoils of post-recession banking punishment to a digital start-up has a certain cyclical poetry to it. Boden has said in the past that she "doesn't really relax"; despite her friendly exterior, the world of traditional banking may come to regret letting this hard-working Welshwoman out of its sights.

What are the top fintech trends of 2018?

Kamran Hedjri, CEO of Kalixa Payments Group, takes a closer look at some of the key issues shaping the fintech landscape

This year has already been staggering in terms of the new trends, technologies and developments out in the market, driven almost entirely by the fintech ecosystem. Here are just some of the main themes that are continuing to play out in 2018:

Payments

Payments don't always strike one as the hub of rapid innovation. Often viewed as a binary, mundane aspect of people's financial day-to-day activity, it's in fact at the forefront of transformation in financial technology, changing faster than ever. Given the constant flow of money and data between customers and merchants, the payments sector is well-positioned to be a testing ground for new technologies and it's where some exciting new ideas come to fruition.

Financial inclusion

Technology can be an enabler and reach millions of new customers with products that can have a truly life-changing effect. The World Bank estimates that 2bn people don't use formal financial services and more than 50 per cent of adults in the poorest households are unbanked. Financial inclusion is a key in boosting prosperity – and technology is making this possible.

Distributed ledgers and blockchain

The blockchain technology applies to a wide range of different sectors and industries. This is one area that will continue to grow around the world, and governments in particular are taking it seriously. For example, Estonia is looking to introduce its own cryptocurrency to fund its e-residency programme; the UK is testing blockchain technology for welfare distribution; and despite some hesitation, many states, be it Gibraltar, Malta, the United States or across Asia (where some governments are sceptical of cryptocurrencies, but see value in the underlying technology) are making noises about regulation.

Open platforms

Technology has allowed us to share information much more securely and conveniently, and when it comes to financial services and banking this means that products, services and other more nuanced offerings like financial advice can be much more easily adapted for the customer. This is all possible through the opening up of application programming interface (APIs), helping accelerate innovation. And there's been significant shift in this recently as banks move away from treating each other and start-ups with suspicion, to embracing new developments collaboratively.

Artificial intelligence (AI)

Another buzzword right now, artificial intelligence is expected to explode exponentially – McKinsey & Company calculated that tech giants Baidu and Google spent as much as $20bn and $30bn on AI in 2016. It can reduce processing times, cut resourcing costs, improve security and reduce human error. Like pretty much in every industry out there, automation is inevitable. It can increase competition and drive deeper insights to businesses.

Bank-fintech partnerships

In recent years e-commerce platforms, tech start-ups and investors have been working out where they could disrupt and disintermediate the traditional banking model. However, while this is still the case, partnerships seems to be the trend that's most in vogue. Moving forward, we expect to see more banks and Fintech companies collaborate to achieve a better functioning financial services ecosystem.

Security will make the fintech boom sustainable

Ian Butler, head of EU security products at Elavon, says the new breed of financial services companies will need to guard their customers' data very carefully

Butler's view is that over the next few years we will see many new financial apps and services as a result of the second Payment Services Directive, or PSD2. "The combinations of ideas are bound to be interesting. But this will also inevitably lead to data breaches from unproven technologies."

As PSD2 gives companies more access to data, Butler says this also creates more "attack surface". "More customer data will be shared, away from the source, because that's the essence of the directive – the banks have to give up the data if the customer has authorised it."

Butler explains that there are strong incentives to keep data secure. "The GDPR cyber security regulation includes fines of up to €20m or four per cent of global turnover for failure to protect consumer data. A €20m fine would wipe out most new fintechs. But there's a lot of pressure to be first to market with a great new idea. While there's probably a lot more consideration of security in fintech than in your average web or app start-up, they share the same sense that they need to build fast and get the product out.

"All these new businesses will take payments from customers somewhere along the line. That's when they turn to companies like Elavon, to take payments by card or with new alternative payment methods. We offer them the services to integrate these payment tools, and we're mature enough to offer them the security backing, so the products themselves are secure by design. Our new Poynt smart POS terminal, for example, encrypts card numbers at source, and our e-commerce platform has built-in fraud management tools. If you accept credit cards, you also have to follow a set of rules called PCI DSS. Our bigger customers have to do an annual audit, and our smaller customers have a questionnaire – but that can be far from straightforward. So we offer a service where we call them and we walk through all the questions in plain English, and we submit the assessment on their behalf. If they do have a breach and lose cardholder data, being compliant can reduce the penalties. Again, PCI fines can be very large, so we offer a fee waiver scheme. If a company is compliant, we can waive some of the charges if there is a breach."

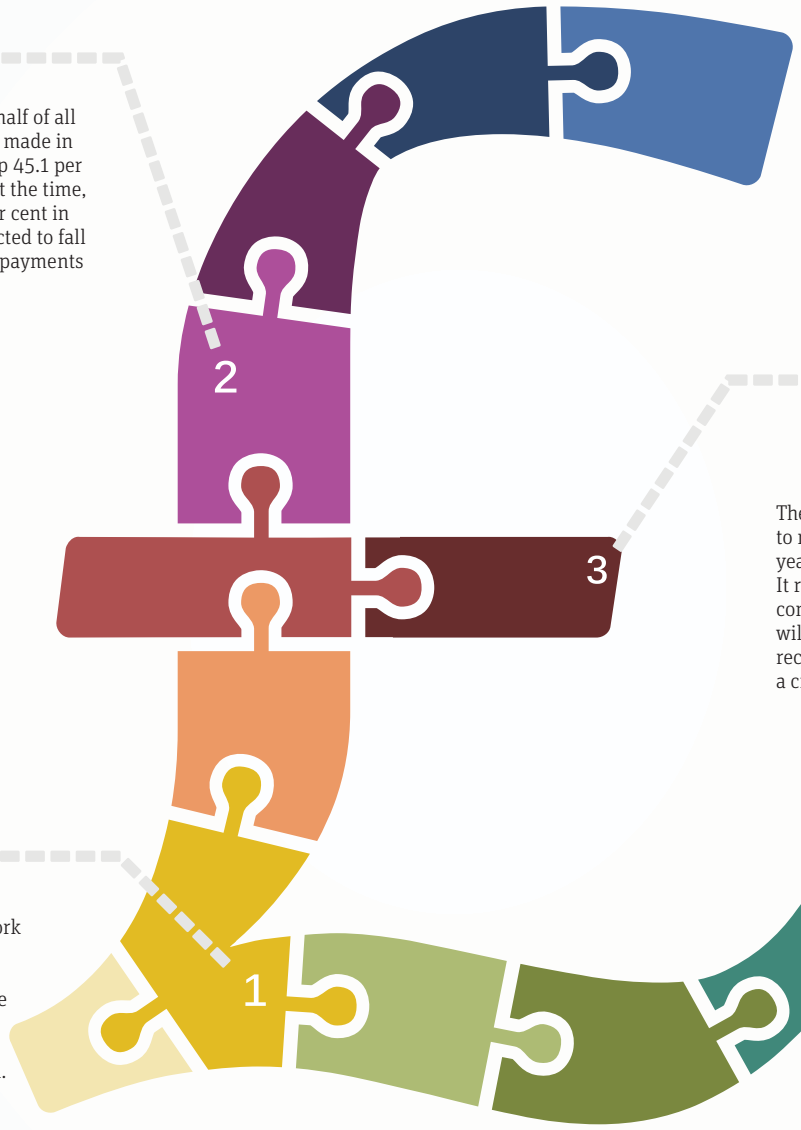
Looking forward, Butler believes fintechs will come and go in the near future, and in some cases their demise will be a result of data breaches. "One new type of attack will be the PSD2 equivalent of phishing. A 'bad actor' would set up as a third party that's going to offer a fintech service, and customers would give them access to their banking details. A growing worry we have in this industry is that criminals are getting very sophisticated. In modern cybercrime, middlemen collect data from multiple sources, combine them with other data and use them to create complete consumer profiles – playing a similar role to big data analysts in legitimate businesses. Identity theft, rather than plain old financial theft, is becoming more interesting to criminals. They can do more with it."

According to Butler, some groups of consumers, especially millennials, may be at greater risk. "These people in particular need practical advice, because many new fintech products will be marketed at them. A kitemark equivalent might be a really good step. Because only trusted businesses will succeed in the end.

"Payment security is evolving rapidly, but businesses need to manage risk. The old phrase 'buyer beware' has a companion. If you are a vendor, it's a case of 'seller beware'. Make sure you protect your customers and your business by making the right technology choice."

MARKET TRENDS

Is cash being phased out?



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In 2015, less than half of all UK payments were made in cash. Cash made up 45.1 per cent of payments at the time, compared to 64 per cent in 2005. This is expected to fall to just a quarter of payments by 2025.

Philip Hammond's Spring Statement says that the UK Treasury contains a commitment to look at a maximum level of cash transactions. In Belgium and Spain, it's illegal to buy or sell anything for more than €13,000 in cash.

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The Spring Statement also includes plans to recoup as much as £3.5bn every year in tax from the "black economy". It recommends that receipts are made compulsory across the country, which will force people to record any payment received, even for baby-sitting, as part of a crackdown on cash-in-hand work.

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1

Cash machine network Link has confirmed that it will go ahead with proposals to axe the fees operators receive from banks when ATMs are used. Because this makes ATMs less profitable to operate, the ATM Industry Association, says "at least 10,000" of the network's 70,000 free-to-use cash machines could be at risk of closure.

Evolving an education

It is important that academia and training keep pace with the booming fintech sector, writes **Leila Davies**, university marketing lead at GetSmarter

SHUTTERSTOCK/ELENA N. KOKODEY

Fintech has long-since evolved from a trendy buzzword to a mainstay in modern banking's vocabulary. Financial institutions are increasingly embracing disruptive technologies to satisfy changing consumer demands – relating to speed and convenience – and as part of a concerted effort to slash overhead costs. Our research indicates that 77 per cent of financial institutions will increase their own internal efforts to pursue innovation, and 82 per cent will foster partnerships with fintech firms in the next three to five years.

The staggering evolution of fintech has been onset from the early 1990s, and with the commercialisation of the internet, e-commerce models became more commonplace. This, in turn, paved the way for the introduction of brokerage websites targeting retail investors and driving out a wave of mobile-based products.

A major leap in the type of innovation fintech companies could offer came in the form of blockchain: a digital distributed ledger in which transactions made in bitcoin or another cryptocurrency are recorded chronologically and publicly.

To be able to provide secure and trusted transactions without the use of a third-party, was one of the most significant advancements in the fintech revolution. Through the use of this "trust" network, cryptocurrencies are traded around the world on various exchanges. As of January 2018, the total market cap of cryptocurrencies was $707bn.

A key player in the wider Fourth Industrial Revolution (4IR), fintech has also onset another avenue for artificial intelligence (AI). The use of AI in the form of robot advisers has already had a significant impact on how we invest and receive investment advice. With its market size growing exponentially year on year, it is expected that AI in fintech will reach a market value of $35.8bn by 2025. This will have implications for every industry and having skilled professionals with knowledge of how to navigate new technologies will be essential to managing the marketplace and workforce of the future.

Quantum computing is another technology set to have an impact on any areas where computing plays

Saïd Business School, University of Oxford has launched a ten-week online fintech programme

an important role, for example as in financial portfolio optimisation.

The industry is becoming increasingly specialised, with retail banks expected to evolve into a marketplace ecosystem with a variety of service providers, where the major players establish a base platform and infrastructure for a variety of services.

Consumers will be able to switch from bank to bank, depending on which one has the better fees structure to suit your unique profile. Fintech's overarching contribution to the banking scene will be to make it increasingly efficient and cost-effective, by leveraging the power of advanced data analytics and AI.

Fintech is opening up new markets for AI

Fintech's evolution signals hugely profitable opportunities at the highest levels. There is increasing competition in the fintech marketplace, not only from start-ups but even more so recently from the financial incumbents themselves, who are exploring partnership programmes to stay abreast of modern demands.

Yet for all fintech's success in improving efficiency and eradicating the clunky paper-based processes of yesteryear, it is worth noting that with new technology and trends, there is a risk to be borne in terms of training and education. The modern banker must be equipped with the ability to identify opportunities for disruption in the financial services sector.

Industry experts estimate that two and six million jobs could be lost over the next decade due to disruptive financial technologies like AI and blockchain. Illustrating the potential, digital challenger banks such as Starling and Monzo can operate with 90 per cent less headcount than traditional banks. Recognising this serious challenge facing the financial sector, then, Saïd Business School, University of Oxford has launched a new digital open enrolment programme on financial technology and innovation, called Oxford Fintech Programme.

The Oxford Fintech Programme is designed for business leaders, managers and financial executives alike. The programme comprises a comprehensive understanding of the multiple aspects of financial technology, including: regulatory technology (regtech), technology relating to the real estate industry (proptech) and other frontiers of financial innovation. Learning online, participants of the programme interact and collaborate with an international cohort of business leaders – expanding their global business network, and their perspective.

The £2,500 programme, which lasts ten weeks and is led by industrial and academic experts including David Shrier and Professor Nir Vulkan , enables its students to walk away with the expertise to draft, strategise and develop disruptive fintech innovations of their own, using various app tools and solutions. They will have the ability to hypothesise about the effect new regulations will have on future commerce products – an extremely pertinent awareness to have against the backdrop of the fintech sector's evolving regulatory landscape. Data privacy directives PSD2 and GDP, for example, are being implemented this year.

Peter Tufano, the dean of Saïd Business School, said of the programme: "While we touch on current topics such as bitcoin or AI, we also delve into the structure of financial systems themselves to put the current wave of technology-driven disruption in a broader context. You can't really understand the future directions that robo-advising or quantum computing will take the global financial system without appreciating the current state, the array of regulatory, business and technology architectures in place."

For more information, please visit: www.getsmarter.com/courses/uk/said-business-school-oxford-university-fintech-online-short-course

The multi-billion-pound safety net

Charlotte Crosswell, CEO of Innovate Finance, talks to Rohan Banerjee about the need to co-ordinate the UK's flourishing fintech scene

According to a report by the United Kingdom's fintech industry body, Innovate Finance, the sector attracted more than double the amount of venture capital investment last year than in 2016. UK fintech companies raised a total of $1.8bn in 2017, an upturn of more than 150 per cent from £530m. Innovate Finance's CEO Charlotte Crosswell says this happened "despite Brexit" – and in contrast with an 18 per cent dip in fintech investment worldwide. It means the UK has now overtaken China to occupy second place in the league of total fintech investment, with only the United States attracting more capital.

Having previously worked as head of international business development for the London Stock Exchange and president of NASDAQ Europe, Crosswell has watched for some time as the UK's "resilience" and "fantastic regulatory ecosystem" allowed it to "rub shoulders" with global superpowers. While she doesn't deny that Brexit "presents multiple challenges for the UK", the foundations for a thriving fintech scene "were already in place before [the vote happened]". Still, she urges the UK government to "guard against complacency" and strive for the best Brexit deal possible – "one that addresses the issues of sustained inward investment and maintains access to a high-quality skills pipeline".

The appetite for fintech generally, Crosswell explains, was "catalysed by the global financial crisis of 2008". Changing consumer demands, alongside the needs of banks and businesses to cut costs made technological solutions more attractive. "The financial crisis gave banks an incentive to find ways of cutting their costs. As revenue dropped, they faced a challenge to become efficient. But there was also a more general theme, at the consumer level, of people wanting financial services that were quicker and

Fintech was "catalysed" by the 2008 crisis

SHUTTERSTOCK/JR STONE

more convenient. Internet and open banking took off because people wanted to be more flexible with their payments."

Crosswell says the UK recognised the potential of fintech earlier than most. "This was something being talked about as far back as the 1990s. And so that's been reflected in how we regulate fintech over here, looking to encourage innovation rather than stifle it." In 2016, the UK's Financial Conduct Authority (FCA) found itself singled out for praise by Microsoft as it urged the US Treasury's Office to emulate the UK regulator. In particular, Crosswell notes, it is the FCA's sandbox that has captured people's imaginations. "The sandbox is a way for companies to test products in the real world, which makes it easier for younger companies to go to market with more clarity." The sandbox is part of the FCA's Project Innovate, which advises companies about the regulations they need to bear in mind when developing new products.

London already has the advantages of "massive financial and tech sectors" but its regulatory environment, Crosswell says, also has an "active mandate for competition". Following the "lessons of the financial crisis" and episodes such as the LIBOR rigging scandal, the FCA's oversight has, she says, paved the way for a sub-market for "regtech" – compliance products used by financial services companies or regulators. Far from impeding growth, she argues, the new rules actually stimulate it.

"The UK's progressive regulatory environment has been a driver of the capital inflows," she says. "Last year was important, with the industry preparing for numerous new regulations including PSD2 and Open Banking, MiFID II and GDPR. This has created an environment that encourages competition and innovation across incumbents and start-ups."

It is "not enough," however, "to just assume that this [trend] will continue". Innovate Finance was set up to "co-ordinate fintech companies, policymakers and influencers alike, and add some colour to the UK's evolving fintech landscape". Entrepreneurship, she claims, can be a "lonely journey". An industry body dedicated to supporting start-ups with "policy reports, expert advice, roundtable discussions and showcase events" can help "change the culture around fintech", and speed up its mass adoption. "Fintech is clearly an area of strategic importance to the UK. Innovate Finance brought together 50 members when it started, and that number is now 250. We're trying to collate multiple voices as one so we can lobby government and the bigger organisations to adapt to fintech."

Brexit is, she says, the most obvious concern for the sector, "particularly within the contexts of skills and foreign direct investment. A lot of the investment in the UK's fintech sector has come from outside of the UK." The UK's "access to an international workforce" has been a big part of the country's success in fintech. "The UK has been a magnet for skilled

"Fintech is certainly our best chance post-Brexit"

Crosswell addresses Innovate Finance's 2018 Global Summit

immigration. We have relied for a long time on overseas skills to help our science, technology, engineering and mathematics [STEM] sectors. We've seen a natural progression of international students taking up further qualifications here, such as an MBA or a PhD, and those students stay on over here. They've been a key part of the fintech innovation boom. As technology causes financial services to change and develop, we are going to need to retain our access to talented graduates from around the world."

All the same, "it's possible to turn a challenge into an opportunity." Most fintech companies, Crosswell suspects, have "international ambitions". Complying with international standards – particularly the EU-mandated privacy directives PSD2 or GDPR – should, Crosswell says, represent a priority for all UK firms post-Brexit. "They have to, in order to stay competitive."

How should the UK's fintech scene look five years from now? Croswell says fintech will progress from the "low-hanging fruit" of consumer level and that growth will be found in larger business-to-business projects. "A lot of the existing banks or big companies are going to be looking at how technology can enhance their services and databases. I think what you'll find is that 2018 is the start of even more collaboration between banks and fintech." Where previously rivalry has existed between banks and disruptive start-ups, Crosswell suggests there could soon be a chance to partner effectively. "Banks might draw on fintech's technology, while smaller fintech start-ups can draw on banks' superior resources to deal with a 100-page legal or compliance document."

Innovate Finance's role in all this, Crosswell explains, will be "to serve as the facilitator for a better fintech ecosystem in the UK", which she hopes will not be "too rooted in London" and will enable industry to help steer government policy on regulation and education. "I'd want to see a knowledge exchange between UK fintech companies. There are around 1,500 fintech companies here and we've got 250 across our membership. Of course we'd like to grow that and show how in convening around the table together, we can lobby government and learn from each other."

"The internet has made geographical location less of an issue," she points out, and hopes that the benefits of the fintech industry will soon be felt "outside of the capital and the South East". While fintech "is certainly not a silver bullet" for the UK's economic sustainability post-Brexit, Crosswell thinks "it is definitely our best chance, so we have to make sure we have the ecosystem in place to support it."

Fintech in risk management leaves nothing to chance

Pranav Pasricha, CEO of Intellect SEEC, explains how artificial intelligence and big data are transforming the insurance sector

Intellect SEEC, a global fintech company just concluded analysis on the incoming quote submissions to seven major United States commercial carriers between January 2017 and January 2018. The results are stunning. While it's common knowledge in the insurance industry that clients or brokers, on occasion, portray risks in a better light to obtain better rates or to get sub-par risks through underwriting, the extent of this misinformation and its impact on pricing and loss ratio has been statistically proven for the first time through the use of Intellect's big data and AI toolkit. Intellect found that up to 30 per cent of submissions had material errors on key rating and underwriting fields, such as employee count, revenue, details of business operations, and key disclosures about operational practices, past trading, and safety history.

A way to plug underwriting leakage

Historically, it has been near impossible for insurers to check submission accuracy through structured data and traditional means. They relied on denying claims if a client misled the company – which isn't effective for many reasons. Most policies do not result in claims, and for those that do these errors mostly remain undiscovered. Consequently, insurers face revenue leakage through lower premiums and higher claims incidence rates. The potential loss ratio impact of such errors is estimated between three and five per cent and Intellect's work with US Insurers in 2017 to remediate such data discrepancies has validated this.

Building a risk's digital footprint

There has been a lot of hype about the use of social network data. However, this is not a practical source for insurance as most clients do not have underwriting-pertinent information on their social profiles. Furthermore, to use such data, its veracity and authenticity must be proven and it should be appropriate from a regulatory perspective. Risk-pertinent information is usually found hidden in many different sources, such as legal and government sources, press and review sites, trade and occupational sources, geo-spatial imagery, and other proprietary sources which are often not openly accessible. Even with access to these sources, manually assessing a client's digital profile is simply not possible.

For computers to accurately extract underwriting information with certainty from an unstructured source is a complex art. The consequences of having false positives or wrong data, particularly when used in automated risk assessment models are very severe – financial, reputational and regulatory.

Confluence of AI and big data technology

Intellect has been building a network of data sources, which over the last four years has grown to 1800 plus, to cover different risk types. To analyse this varied data set requires the deployment of multiple AI branches such ML-based NLP and image recognition. Furthermore, different sources can have different versions of information about the same fact, specific algorithms are required to triangulate and validate data. Given the complexities of insurance, creating algorithms to deal with such issues at scale, speed and certainty has been a challenge which requires highly specialised development across multiple technologies and is why progress was slow despite the hype.

As newer technologies like IoT and blockchain mature, and the connected device world grows, the universe of data will expand and the applicability of these techniques will become ubiquitous to all aspects of insurance.

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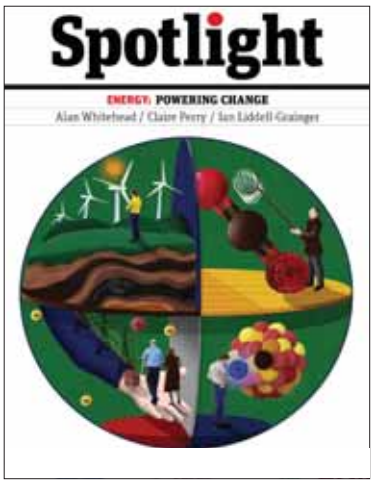
Spotlight



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