

Thank you for inviting me to join you here today. It is a great honour.

I'm a technologist and spent all my career life looking at how technology might change the future of finance and financial services. When looking to the future, it is determined by four forces of change: political, economic, social and technology change.

For me, technology is the core driver change, but this does not belittle the others. All of them impact financial markets and businesses equally and I'm sure you would agree that these changes have become particularly frenetic in the last decade. This is part inspired by the global financial crisis, but equally enabled by the technology structures that we have today.

Cloud computing, artificial intelligence, the mobile phone network and open banking which incorporates application program interfaces (APIs), which provide plug-and-play code that can be taken and dropped from any provider to any other service that you want to use.

These technologies have transformed the landscape of the world in the last decade, and are now massively changing banking as finance and technology becomes integrated. Today, we call this FinTech and FinTech has grown from nothing to a market receiving over \$110 billion of investment in start-up firms last year.

The first time that I encountered FinTech was over a decade ago in a meeting in London, where someone had the idea of launching a business that they called 'an eBay for money'. Their idea was that you could have people who have money connected to people that need money through a platform and an algorithm. That company is called Zopa.

In the past fifteen years, Zopa has done pretty well in the UK, as have many other peer-to-peer lenders and FinTech start-ups. For example, 36% of all new personal loans were originated by FinTech companies in the United States in 2017, according to Bloomberg, compared to just 1% in 2010. That's the reason why you can see the integration of finance and technology is such a hot market space.

Last year \$111.8 billion was invested in FinTech companies globally according to KPMG, which is more than double the figure of the year before. That covers peer-to-peer payments and lending, but it also covers a lot more from everything to do with robo-advice through to artificial intelligence through to

cryptocurrencies through to blockchain distributed ledger technology. There are thousands of things happening in each of these areas and I claim that, faced with these changes, the business model of the banking industry is completely broken.

The business model of banking is designed for the physical distribution of paper in a localised network through buildings and humans. We then implemented technology to cement that structure in place. Now, we need to rip that structure apart because what we are dealing with today is the digital distribution of data through software and servers on a global network. The latter is a radically different model for business and particularly for financial services.

Financial services hasn't been impacted by this change much so far, when compared with the changes we have seen in entertainment, consumption, media, books and other markets. This is purely because it has taken a long time to get to where we are. I've been working on this for a long time. In fact, it's only in the last decade that it's really started to hit the road.

You can see it hit the road in the valuations and the vision and rapid expansion of these new start-up companies like PayPal, which is one of the oldest FinTech firms around. Like Ant Financial, which makes up a case study that is a third of the book *Digital Human*.

However, if I had to pick one standout start-up, it would be Stripe. Stripe is my favourite FinTech start-up and is also one of the biggest FinTech unicorns – firms with over \$1 billion valuation – out there.

If you don't know what Stripe does, they were launched in 2011 with seven lines of code that enables any merchant to set up checkout online fast and easy. It's plug-and-play code. An API. The merchant can just drop the code in there, and it's easy. That's why the Ubers, Airbnbs and Indiegogos of this world are all using Stripe, because it's incredibly easy to just drop that code in and then you can take and make payments.

Simple.

It's so simple that after five years, in October 2016 when these figures were released, they had a \$9.2 billion valuation, with just 400 staff.

Another reason they are one of my favourite FinTech start-ups, is that they were started by Patrick and John Collison, two brothers from Ireland. When

they launched the idea for this business back in 2010, they were just 21 and 19 years old. And here is a key point about how the world has changed with digitalisation, because FinTech has created an equal relationship between parents and children. The children know how to code, and have the vision to create a whole new way of thinking about money using that code.

A great example of this is Vitalik Buterin, who is the developer who founded Ethereum. Ethereum is a distributed ledger services that is also call smart contracts on blockchains. If I explain it, it gets into a whole complex discussion, so I won't to go there except to say that his idea has become the backbone of how corporations, governments and businesses are creating next generation infrastructures. In other words, Vitalik's code might become the backbone of our world tomorrow and be as fundamental as the creation of the internet itself.

Vitalik Buterin was 19 years old when he started that idea.

That's how fundamental this is. Kids who can code are dramatically changing our market ... but they don't understand our market. They don't understand why we are regulated the way we are regulated. They don't understand how we got to where we got to.

This is why I see FinTech as a parent-child relationship. The Fin needs to act as the parent that mentors and nurtures the child, which is the Tech, and that is exactly what is happening today. A lot of banks are starting to collaborate and work with the FinTech start-up community, including the Stripes of this world.

However, the most telling figures here are when you analyse the changes in the big banks. One of the biggest and most admired banks in the world is JP Morgan Chase, with a valuation of \$245 billion in 2016. That means each employee is generating just under a million dollars of value. Compare this with Stripe, which generates \$22 million of value per employee and you see a chasm of difference. A five-year-old child called Stripe is generating twenty-two times more value when compared with its 220-year-old parent.

I get fed up with people saying banks are dumb and stupid however. They think banks are not able to change and yet there are some banks that are changing well. I'm talking to banks that are doing digital transformation well, and there is a frustration that banks are not valued in the same way that technology companies are. There's a distortion here between the investor analysis of the long-term potential for an Amazon or Stripe when compared to

a traditional firm like a JP Morgan or Barclays Bank. In some ways they are undervalued but, even more telling, is analysing and studying how they are changing.

For example, in just two years, Stripe gets a new funding round and comes out with a new valuation of \$20 billion. It is now a seven-year-old company with a thousand staff. They are still doing pretty well. They've gone global. They are expanding heavily into Asia.

What interested me more here however was the numbers for JP Morgan Chase. This big global behemoth had reduced staff numbers by a third in two years whilst increasing value by a half. It's a bank where employee value has doubled in two years.

This is why we are living in such interesting times, because we are living in a world where FinTech is making banks do what they've always done cheaper and faster and better with technology. If banks understand that then they will collaborate and partner and invest and mentor these thousands of new companies. This is why these start-up firms are getting billions of dollars in investment from these banks, so that they can be part of their marketplace, part of their community and, for the banks, it enables them to bring those start-up firms capabilities to their customers.

This is a digital revolution of planet earth, and goes far further than just changing banking however. In fact, there are seven new ways in which finance delivered by technology is changing the game, and it is in this area where the United Nations Sustainable Development Goals will be most impacted and supported.

The first way we find finance delivered by technology different is that it is **real-time**. We are able to fund, save, spend, invest, transact, trade, borrow and more in time windows identified as relevant to us, not in annualised products offered by institutions. The only reason products were annual is because it was too difficult to service them more regularly in a physical distribution model with buildings and humans. In a digital distribution model, software, servers and algorithms can offer everything immediately and for as long as you want. Forget a yearly service, let's just borrow for the next few hours.

The second way we find finance delivered by technology different is that it is **all the time** and **everywhere**. The idea of any downtime anytime is unacceptable. If I want it, I want it now, so let me get it now. Whether I'm in

the mountains of the Himalayas or in Timbuktu, I want it and I want it now. Any barriers to access will be seen as a reason to switch to another provider.

The third way we find finance delivered by technology different is that it is **seamless**. I don't want to think about money and banking, but want it to be stitched into the fabric of my lifestyle, and supportive of the way I live. Banking should be invisible, frictionless and seamless. If I need to think about my money, it's purely because my devices are telling me there's something important to think about. Otherwise, I don't want to know.

The fourth way we find finance delivered by technology different is that it is **personalised**. If things are happening in my financial world I should know about, then tell me to my face or, rather, my device. So, I shouldn't need to be concerned about covering my next mortgage payment by moving funding from savings unless my savings account is empty. But if it's empty, don't tell me *your savings account is empty* but tell me *Chris, you have funds arriving next week but your mortgage payment goes out today ... don't worry about it, I've taken care of it by using a 12-hour loan facility at a cost of \$5. If you want to change this, swipe here*.

The fifth way we find finance delivered by technology different is that it is not only personalised but **predictive**. That's kind of illustrated by the point above, but it goes far further and deeper than this. With deep mining of my financial lifestyle data, the bank should be able to predict my financial lifestyle needs. My favourite example of this today is the bank that works out I catch the subway every day but always pay day-by-day, rather than taking out a season ticket. That's because I don't have funds for a season ticket, so the bank says *Hey Chris, you could save €1,000 a quarter with a season ticket for €2,500; swipe here if you want one*. OK, so the bank is wrapping up a personalised offer in a loan, but at least they've mined my data, worked out why I can't buy a season ticket and offered one based upon predictive and personalised contextual information. Thanks.

The sixth way we find finance delivered by technology different is that it is **for everyone**. Why should anyone be unable to move money between friends and family? Why should banking only be for the rich? Everyone should have a basic human right to send money freely, cheaply and easily to anyone else, and this is being delivered by technology services for the unbanked, underbanked and underserved. In fact, the biggest change in our world in the last decade is that

digital services can reach the unreachable. It's a major transformation to everything in life.

The seventh way in which we find finance delivered by technology different is that it **reaches the unreachable**. Building on the last point, the new world of finance can reach the long tail of customers previously overlooked and start doing new things for them. The long tail are kids who are uneducated in money who now get financial literacy through apps. The long tail is the elderly who are scammed and conned because they are financially vulnerable are now protected through connectivity to those who care about them. The long tail are the addicts, the depressed, the gamblers and the mentally ill who need help with their financial accounts, so they don't drain them of funds on activities that they are trying to get away from. All of these people are now reachable and capable of being supported rather than over-looked.

This is why we have seen a radical change to our world in the last decade and there are many developments of non-traditional finance that are creating inclusive societies and supporting the UN's SDGs. In fact, I would cite five areas of change.

First, there's **financial inclusion**. The fact that anyone who can get access to a mobile telephone can now get access to finance is why so many people are getting engaged in trading and transacting. According to the World Bank, 69% of adults – 3.8 billion people – now have an account at a bank or mobile money provider, a substantial rise from the mere 51% in 2011, all thanks to the mobile phone and the internet. That's financial inclusion for you. Get a phone, get a credit history, get a bank account.

It's more than that though. It's more to do with the fact that the internet and mobile telephone is a cheap way of supporting anyone with a bank account, whether that person has a few cents or a few millions. Digital is cheap.

Second, there's **financial literacy**. Considering finance is the major factor in our lives for comfort and wealth, it is also one of the areas most over-looked in our school years. There are now many firms focused upon providing financial literacy for children, using gamification technologies to make it fun and easy.

Third, there's **financial capability for the financially less abled**. This builds on financial literacy, but focused specifically on the most vulnerable financial users, such as financial management for the elderly. When your mum or dad gets dementia, Alzheimer's, Parkinson's or some other disease that means they

can no longer cope, these apps help their kids – if they have them – look after their finances or, at least, helps them to avoid being ripped off by scammers and criminals.

Fourth is **financial wellness** overall. Psychologists find those who have the worst mental health problems are usually those who have the worst financial health. Multiple studies report people with mental health problems are more likely to be in debt. And those with addictions are most likely to be at issue, so help people with those addictions.

A great example of action here is how UK challenger banks Monzo and Starling are helping customers to give up gambling by offering a block on having their financial accounts accessing anything gambling related. There are two million people at risk of mental health issues caused by gambling in the UK, that's good thing to do.

Finally, there's **sustainability and responsible banking**, an area the UN SDGs is leading with the publication of the Principles for Responsible Banking last year. Sustainable finance I think is best illustrated by Ant Forest. Ant Forest encourages users of Alipay in China, of which there are 800 million, to play a game of growing virtual trees.

To grow your tree the system encourages users to avoid doing things that increase carbon emissions. So, if you take a bus to work rather than a taxi, you get points towards planting your virtual tree which, when you get enough points, becomes a real tree in real life. You get more points the more environmentally friendly your lifestyle becomes so, if you walk or cycle to work, you save even more than if you took the bus.

In fact, there are 19 different things you can change in your lifestyle to be more eco-friendly from making online payments to going paperless in the office to using disposable cardboard cutlery instead of plastic to recycling and more. You can then claim carbon points for the actions you've performed every day and save them into your Alipay account. These points are used to water and grow your virtual tree in Ant Forest and, when the virtual tree grows tall enough through your constant watering of carbon points, Ant Financial plants a real tree for you.

By playing in a fun app whilst making payments, 500 million Chinese Alipay users have planted over 100 million real trees in nearly 1,000 square kilometres of arid drylands. This is estimated to reduce the carbon emissions of China by five percent by the end of next year.

This is where lessons are learned looking at new economies that had no or little historical infrastructure. We see this in India, China, across Asia, Africa and South America. These countries started their infrastructure projects in the internet age, and are turbo-charging their economies as a result.

I learned this when I visited with Ant Financial in Hangzhou, China, as they have a mission for mobile financial inclusion, and have exported their technologies to local partnerships in Indonesia, the Philippines, Thailand, Pakistan, India and more. This is bringing simple and easy financial services to markets that have historically been ignored by banks.

My favourite example is in India. This really brings home what's happening with technology and financial inclusion.

PayTM is a mobile wallet that's used across all of India. I was just in Bangladesh and went to see a temple. At the temple I could give donations either in cash or by using PayTM. It's as simple and ubiquitous as that.

PayTM has around 400 million users today whereas, just before demonetisation in November 2016, it had about 150 million. Because of this and other moves by the Indian government, the story of inclusion in India has risen dramatically and much of this is thanks to the mobile payments wallet network.

Vijay Shekhar Sharma is the founder of PayTM. He is also a fan of Jack Ma and Alibaba, and wanted to copy Alibaba and Alipay in India. He went to see Jack Ma and said *can you invest in me, can I bring Alibaba to India*, and he persuaded Jack Ma to invest. This is why Alibaba and Ant Financial own a substantial part of PayTM.

Core technologies behind PayTM are provided by Ant Financial through open banking, open payments, open financial services, using these technologies for PayTM to grown really quickly and scale very quickly using their cloud-based services. Ant Financial and Alipay are not just doing this in India, but also with partners in many other countries from Pakistan to the Philippines to Indonesia, Thailand and South Korea. They've gone global.

But a final piece of the puzzle, it is worth nothing that PayTM's founder, Vijay Shekhar Sharma, India's youngest multi-billionaire today, was homeless ten years ago. He had been bankrupted by his business partners and was sofa-surfing on friends couches to survive. That is what today's digital network enables: opportunity and inclusion for everyone.

In conclusion, we are living through a revolution of humanity through digitalisation with technology. It is a fundamental change to how we think, trade, transact, talk, build relationships, build structures. It demands a completely different business model from financial institutions and it's incredibly difficult for these institutions to make this change, especially if their leaders do not understand it.

For the UN's SDGs, financial technologies offer ways and means to achieve many of your objectives from the creation of inclusive societies – as demonstrated in China and India – to eradicating poverty by offering opportunity through online trade which creates jobs. I trust you agreed with me and look forward to discussing this further with you over the next three days.

Thank you.