



**CONSUMERS
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COMING TOGETHER
FOR CHANGE



BANKING ON THE FUTURE:

**AN EXPLORATION OF FINTECH AND
THE CONSUMER INTEREST**

JULY 2017

Bright young things based in San Francisco, New York, London and Stockholm are raising billions of dollars in venture capital to “disrupt” financial services. With much brashness, these t-shirt-wearing whizz-kids are confident they will do to banks what digital photography did to Kodak.

The Economist, June 17th 2015

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INTRODUCTION

The financial services sector has a history of early adoption when it comes to new technologies – from the telegram, to high frequency trading. It is easy to forget that services which now form part of the banking fabric – such as ATMs and credit cards – once represented radical innovations. Until now, technological adoption and innovation within financial services has, for the most part, been sector-led: implemented by banks or insurance companies to update and enhance existing functions and services, without challenging underlying business models. One might reasonably describe these iterations over time as an evolution.

FinTech shifts the gear to revolution. Change is no longer an internal process, but is driven from the outside, as the technologists of Silicon Valley focus their capacity to disrupt and disintermediate on the bankers of Wall Street. FinTech's impact is already reverberating across all sectors that comprise the financial services market, from wealth management to microfinance.

The impact is also being felt by consumers, as FinTech starts to transform their experience of and engagement with financial services – from seeking a bespoke car insurance policy that remotely tracks and reflects their low mileage, to being able to borrow from their peers.

This paper seeks to explore how and why FinTech is transforming financial services markets for consumers, and to understand what the implications – both positive and negative – are, as FinTech services and products start to become widely used. It also offers some thoughts on how those working in the consumer interest might address some of the emerging consumer protection issues.

SECTION 1

Section 1 asks what is FinTech? It then explores the ways in which FinTech transforms the consumer experience of financial services. For example, through increased access to core banking products in low income countries; or by changing how consumers interface with financial services, their options for making payments, or the nature of money itself as cryptocurrencies edge towards the mainstream. It also summarises the drivers underpinning the growth of FinTech.

SECTION 2

Section 2 provides an overview of the impact that FinTech-powered innovation is having across a range of key financial services sectors. It provides short case studies of some of the leading FinTech firms and how they are taking on the status quo, including how their propositions represent a departure from conventional providers' approaches.

SECTION 3

Section 3 offers an overview of the extent to which consumers are utilising FinTech products and services. It shows that 50% of consumers globally are already using a FinTech service, with that number growing to 59% in Asia Pacific. The featured research indicates that consumers who are younger, tech-savvy and affluent are more likely to utilise FinTech.

SECTION 4

Section 4 Outlines the benefits that FinTech can bring for consumers, examining these under the two broad headings of (i) an expansion of competition and choice, and (ii) FinTech as a driver of access to financial services.

SECTION 5

Section 5 provides an overview of the risks, detriments and consumer protection challenges that FinTech is giving rise to. Key amongst these are: issues around data and privacy; cybercrime; questions on liability; and systemic risk associated with rapid growth.

SECTION 6

Section 6 considers what, if any, consumer protection steps need to be taken in order to maximise the benefits of FinTech for consumers and minimise the risks. The paper refers to the G20's High-level Principles on Financial Consumer Protection and High-Level Principles for Digital Financial Inclusion, and considers elements of these alongside other relevant instruments, initiatives and regulatory practices. The analysis suggests these can and should serve as the basis of a response to a number of the risks and detriments identified in section 5.



SECTION 1: WHAT IS FINTECH?

THE 3 AGES OF FINTECH

FinTech is the point at which financial services and technology collide. It is not a new phenomenon – banking and financial services institutions have a long history as early adopters of new technologies. Barberis et al.¹ describe 3 ages of FinTech:

- FinTech 1.0 (1866-1967): from the laying of the first transatlantic cable to invention of the ATM, finance and technology combined to produce the first period of financial globalisation. Technologies such as the telegraph underpinned financial interlinkages across borders, allowing rapid transmission of financial information, transactions and payments.²
- FinTech 2.0 (1967-2008): when FinTech remained internal to the sector and: was dominated primarily by the traditional regulated financial services industry that used technology to provide financial products and services.³ This era witnessed the introduction of electronic payments and clearing systems, ATM machines and online banking. In the mid-1990s, the financial services industry became the single largest purchaser of IT – a position it retains to this day.
- FinTech 3.0 (2008-present): since the global financial crisis, disruptive new start-ups and established technology companies have begun to deliver financial products and services directly to businesses and the general public.⁴ And where new entrants tend to: focus on a single-purpose solution, designed to offer an improved experience in just one product or service.⁵

A key takeaway in relation to FinTech 3.0 is that the competition banks and other financial institutions are facing is not so much from their incumbent rivals. Instead, it is largely from FinTech challengers, who are reimagining how financial services can be delivered, and using cutting edge technologies to do it. It is in this sense that FinTech mirrors the disruption evident across the wider economy where online platforms, such as Amazon or Uber, have upended the established order. In economies without established financial infrastructure, instead of reimagining banking, many FinTech services have created essential infrastructure.

Some of tech's biggest players are getting involved, for example Apple Pay is a virtual wallet allowing users to store card details on an iPhone or Apple Watch and pay using the device at offline points of sale. Some commentators speculate this could be the first step in offering a more comprehensive banking interface on its devices. This could, for example, allow consumers to manage and optimise their relationships with financial service providers; and receive targeted rewards.⁶

Furthermore, it is in the 3.0 era that FinTech has become a burgeoning industry in its own right. The global consulting firm, McKinsey, tracks more than 2,000 start-ups offering traditional and new financial services, and estimates there may be as many as 12,000 FinTech firms in existence.⁷ That figure is in addition to incumbents' own FinTech initiatives.

It's estimated there may be as many as 12,000 FinTech firms in existence

THE 3 SPHERES OF FINTECH

Within the FinTech 3.0 era, the term has application to at least 3 distinct, if interdependent, spheres:

- In the systems sphere: where banks and other financial institutions utilise technology to upgrade and update corporate systems and processes, either internally, or as participants in a consortium. The development of the Paym – a mobile payment system – by UK banks and building societies under the Payments Council umbrella is one example of the latter.⁸
- In the B2B⁹ sphere: where a bank is the client, backer, or partner of a FinTech enterprise – purchasing, investing in, or co-developing FinTech products in order to modernise its existing customer-facing services, or to offer new ones. For example, Backbase provides digital banking platforms to leading financial institutions.¹⁰
- In the B2C sphere: where FinTech enterprises compete against incumbent banks and other financial services institutions for market share. They do so either by reimagining conventional products and services – such as payment services and loans – in ways that offer superior value and user experience; or by using technology to build a market around responding to

1 D. W. Arner, J. N. Barberis, R. P. Buckley. 'The Evolution of FinTech: A New Post-Crisis Paradigm?'. University of Hong Kong Faculty of Law Research Paper No. 2015/047; UNSW Law Research Paper No. 2016-62. October, 2015.

2 Ibid.

3 Ibid.

4 Ibid.

5 World Economic Forum, *The Future of FinTech - A Paradigm Shift in Small Business Finance*, October 2015

6 'Could Apple Be Your Next Bank?', The Financial Brand, April 2016

7 'Cutting through the noise around financial technology', McKinsey&Company, February 2016

8 Wikipedia contributors, 'Paym', URL: <https://en.wikipedia.org/wiki/Paym>

9 B2B here is used in the sense of banks being the clients of FinTech service providers. A fourth sphere not covered in this paper is in the B2B realm of FinTech companies providing services direct to businesses, such as loans and payment service solutions.

10 Backbase, 'Solutions designed especially for retail banking'. See: www.backbase.com/solutions/retail-banking

needs that conventional financial services providers had left unmet. The result is a transformation of how consumers interface with financial services, who provides those services to them, and how they transact in the wider economy.

As is highlighted in section 2, some FinTech firms assume the role of a platform – creating and mediating a marketplace in peer-to-peer (P2P) lending and insurance.

To give some sense of the balance of activity between the 2nd and 3rd spheres, KPMG's most recent assessment of the top 100 FinTech companies noted that a striking feature was the balance towards disruptors – those who challenge the existing market, over enablers – those who help incumbents do better work. With 92% of the top 50 in the disruptor category.¹¹

TRANSFORMING THE CONSUMER EXPERIENCE OF FINANCIAL SERVICES

It is the B2C sphere of FinTech that is the focus of this paper. Here, FinTech is already transforming how consumers interact with and access financial services. Key amongst these transformations are FinTech's impact on:

- Enabling access to financial services (financial inclusion): Within six years of its 2007 launch, more than two-thirds of the Kenyan adult population, were using the mobile money service, M-Pesa, to pay for taxi rides, electricity bills, or daily supermarket purchases.¹²
- Where and how consumers interface with financial services (channel shift): Banking becomes a non-physical consumer experience – interactions with providers shift to online channels, transactions shift to e-money.¹³ The near-ubiquity of mobile phones – both smartphones and feature phones – underpin this shift, not least in countries where access to banking had not been widespread.
- The providers and institutions consumers develop financial services relationships with (beyond banks): new start-ups and established technology companies have begun to deliver financial products and services directly to businesses and the general public.¹⁴
- The means by which consumers make (or receive) payments when engaging in transactions: while cash still accounts for around 85% of global consumer transactions,¹⁵ between 2009 and 2014 the total value of cash-free transactions worldwide increased by almost half, from £269 billion to £389.7 billion.¹⁶ The recent demonetisation of high denomination banknotes in India sparked unprecedented growth in the use of mobile wallets.¹⁷
- Whether consumers can make payment using an alternative cryptocurrency in place of orthodox legal tender: large mainstream retail brands, such as Dell, Expedia and Subway are already accepting payments in Bitcoin, the virtual currency.¹⁸
- Consumers' own awareness of their financial behaviours and wellbeing: as personal financial management apps track and analyse incomings, outgoings and expenditure. These services typically consolidate data from across all of a user's account providers in one place, visualising it in a dashboard. The apps function like a personal financial adviser and utilise user data to provide insights, plans and prompts to help the user budget better, ensure bills are paid and achieve financial goals.



This transformation of consumers' engagement with financial services will be mirrored on the supply side. Providers will base engagement with consumers on insights gleaned from big data and machine learning. This raises issues around the potential for discrimination and for 'fintusion,' which are explained in greater detail in section 5.

11 KPMG and H2 Ventures, *2016 FinTech 100*, 2016
12 World Bank, *World Development Report 2016 - digital dividends*, 2016
13 Investopedia website, <http://www.investopedia.com/uk/>
14 D. W. Arner, J. N. Barberis, R. P. Buckley. *The Evolution of FinTech: A New Post-Crisis Paradigm?*. University of Hong Kong Faculty of Law Research Paper No. 2015/047; UNSW Law Research Paper No. 2016-62. October, 2015.
15 *The decline of cash?*, Raconteur.net, July 2016
16 Capgemini, *World FinTech Report 2017*, 2017
17 Express News Service *'Boom in use of mobile wallets'*, The Indian Express, November 2016

18 *'5 Places You May Have Not Known You Can Use Bitcoin'*, Due.com, May 2016



Photo credit: Settawat Udom/ Shutterstock

WHY NOW? DRIVERS OF FINTECH GROWTH

The literature on FinTech indicates that a number of, often interrelated, drivers are catalysing its growth. The following provides an overview of each driver.

TECHNOLOGY

Moore's Law¹⁹ explains how computer processing power doubles every two years, with this growth matched by an inversely proportional fall in costs to consumers. So, the typical smartphone has processing power equivalent to the elite supercomputers of the 1980s, but at a tiny fraction of the cost. As a result, data intensive analytical services that were once the preserve of enterprise-grade systems, can now be made available to the individual at minimal cost.

Mobile phone usage is central to the adoption and growth of FinTech services, particularly in countries where access to orthodox banking is limited. GSMA data shows that for unique mobile subscriptions, global mobile penetration stands at 65% today and is forecast to reach 73% by 2020. At the same time smartphone adoption will grow from 51% to 65%²⁰

The availability of lower cost, higher powered computing, along with other advances in ICT, benefits FinTech challengers too, as the consulting firm PwC notes:

Startups – With easy access to open source frameworks, scaled cloud computing and development on-Demand, technology barriers to entry have been lowered. New players that have the ability to innovate quickly are taking advantage of the opportunity to fill the gaps that incumbents have not.²¹

RISING CONSUMER EXPECTATIONS THAT HAVE BEEN LEFT UNMET BY INCUMBENTS

A 'consumer-centric' approach, built around understanding user needs and then building a continuously improving user experience in response to them, are characteristics of successful digital economy companies. The convenience and usability that result become the new normal in terms of consumer expectations. PwC observes that:

As clients are becoming accustomed to the digital experience offered by companies such as Google, Amazon, Facebook and Apple, they expect the same level of customer experience from their financial services providers. FinTech is riding the waves of disruption with solutions that can better address customer needs by offering enhanced accessibility, convenience and tailored products. In this context, the pursuit of customer centricity has become a main priority.²²

A 'consumer-centric' approach are characteristics of successful digital economy companies

In the context of this report, exclusion from core financial services represents the most significant unmet consumer need. As the examples profiled in sections 3 & 4 highlight, FinTech is driving welcome advances by opening up access to lower cost payments, insurance and remittance services.

19 Moores Law Website, 'Moore's Law or how overall processing power for computers will double every two years' Moores Law Website, URL: <http://www.mooreslaw.org/>

20 GSMA, *The Mobile Economy 2017*, 2017

21 PwC, *InsurTech: A golden opportunity for insurers to innovate*, March 2016

22 PwC, *Blurred lines: How FinTech is shaping Financial Services - Global FinTech Report*, March 2016

DEMOGRAPHICS

By number, Millennials²³ are the largest generation in US history and the first to grow up digital. They are three times more likely than baby boomers to bank using mobile devices.²⁴ Analysts reason that, as Millennials rise to economic prominence, FinTech will grow in response to the behaviours, preferences and needs of this cohort.

By number, Millennials are the largest generation in US history and the first to grow up digital

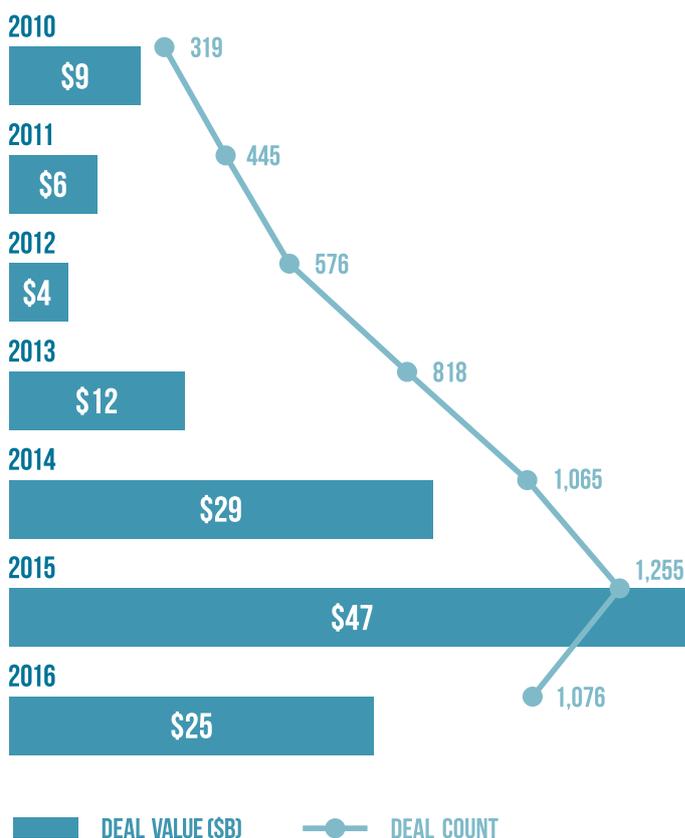
International research on FinTech adoption,²⁵ indicates that usage is higher than average amongst younger cohorts; with around a quarter of those aged between 25-34 having used at least two FinTech products during the last six months.

Research on the expectations of Millennials' in the USA in relation to banking²⁶ found that a third believe they won't need a bank in five years time and that half are 'counting on' tech start-ups to overhaul banks. Less than half have a credit card²⁷, and one third of US Millennials had no savings account.²⁸ In a 2014 Google Consumer Survey, Canadian Millennials were one and a half times more likely to switch banks than the general population with almost half of those motivated to do so in order to gain a better mobile experience.^{29 30}

INVESTMENT

FinTech has witnessed some of the most exuberant investment in tech-based start-ups since the dot-com bubble of the 1990s. As figure 1 highlights, levels of investment in FinTech accelerated significantly in the years 2012-15.³¹

Figure 1: Total global investment in FinTech companies 2010 – 2016 (source: KPMG)



AFTERMATH OF THE 2008 GLOBAL FINANCIAL CRISIS (GFC)

The Global Financial Crisis prompted a collapse of consumer trust in the banking system. It also prompted regulatory responses that increased capital requirements and steps to reshape the structure of banks, with a view to minimising the risk of a repeat crisis in years to come. Barberis et al. argue that the collapse of trust and regulatory reform have had: the unintended consequence of spurring the rise of new technological players and limiting the capacity of banks to compete³² – a refrain that is echoed by a number of FinTech analysts.

23 People born between 1980 and 2000

24 'The Best New Personal Finance Apps and Sites', Forbes, citing: FIS FIS Consumer Banking PACE Index September 2016

25 EY, *FinTech is gaining traction and young, high-income users are the early adopters*, 2015

26 H. Terry, D. Schwartz and T. Sun. *Future of Finance*, Goldman Sachs Global Investment Research, March 2015

27 H. Terry, D. Schwartz and T. Sun. *Future of Finance*, March 2015

28 FinTech Ranking, "Money of the Future", 2016

29 'Banks, watch your backs: Millennial clients have almost no loyalty', Canadian Business, September 2014

30 Compare with FIS research cited in section 4, which finds of the Millennials who are using personal financial management apps, 90% have opted for a PFM app provided by their primary financial institution.

31 By way of comparison total spending by banks worldwide on information technology (IT) was estimated to equal \$215 billion for 2014. See: *The Future of FinTech*, World Economic Forum, 2015

32 D. W. Arner, J. N. Barberis, R. P. Buckley. 'The Evolution of FinTech: A New Post-Crisis Paradigm?'. University of Hong Kong Faculty of Law Research Paper No. 2015/047; UNSW Law Research Paper No. 2016-62. October, 2015.

With regards to consumer trust in bank brands relative to tech firms, 2015 research by Instantly Brand Monitor found that the financial services offered by PayPal, Google and Apple enjoy higher levels of trust than the largest banks.³³

The 2017 Edelman Trust Barometer reports that trust in financial services has actually grown by 11% in the period 2012-17, representing a rebound following the GFC.³⁴ Trust in the sector now stands at 54% globally (marginally higher than 52% for trust in the institution of business) and is growing across all the major financial markets, although in Germany (+3% to 35%) and the UK (+4% to 45%) trust remains a minority sentiment.³⁵ However, despite being more trusted than the media (43%), financial services trails all other sectors covered. Notably, technology is the most trusted sector, which – with some qualifications relating to specific innovations and to how data is used – continues to enjoy the advantage of a high level of trust....the sector is trusted in all but one of the countries we surveyed and by 76% of the general population.³⁶

GROWTH OF E-COMMERCE

In countries where high proportions of the population are either unbanked or don't use credit cards, the interrelated growth in mobile-led Internet access and e-commerce has ignited the growth of FinTech – not least in the payments and e-wallets sectors. China, now the world's largest e-commerce market, offers the most vivid example of this phenomenon.

The interrelated growth in mobile-led Internet access and e-commerce has ignited the growth of FinTech

In 2016, digital purchases in China are expected to reach a world-leading 18.4% of the country's total retail sales value, compared with 8% in the US and 12% in South Korea. EY analysis predicts that mobile transactions will rise from 55.5% of all e-commerce sales in China today, to 68% by 2020.³⁷

Despite this growth, the country's banks have failed to capitalise on digital payments due to low credit card penetration rates. Chinese consumers bypass cards and migrate straight from cash to digital wallets, using mobile platforms such as Alipay, or WeChat. 98.3% of respondents to EY's survey had used mobile payment platforms during the previous three months.³⁸

SECTION 2: MAPPING THE BRAVE NEW WORLD

FinTech has arrived. Its influence and its impact are reverberating across all categories within the financial services sector. The following section provides examples of how FinTech is reshaping categories and disrupting incumbents across a number of financial services sector categories. While it treats the various sectors profiled in isolation, it should be noted that many FinTech products offer services that fall into two or more of these categories (as per the first example given, Yu'e Bao – a savings product that forms part of Alipay's payments platform).

SAVINGS

The FinTech savings sector has seen explosive growth. For instance, China's Yu'e Bao has attracted 185 million customers within 18 months, giving it 600bn yuan of assets under management.³⁹ Yu'e Bao enables users to earn bank-beating interest rates on cash that would otherwise sit idle in their accounts. The service is offered as a feature within Alipay, the escrow payment platform developed by Alibaba for use in its online marketplaces. Yu'e Bao has quickly grown to become one of the world's largest money-market funds. Its ease of use is likely to have led to its rapid uptake, particularly by young, educated Chinese people.

PERSONAL FINANCIAL MANAGER SERVICES

Personal financial manager services consolidate in one place a user's account balances, card transaction histories, credit scores and other key financial data from across providers. They add value through analytics and data visualisation to provide the user with a picture of their current financial health, forecasts on how this will change in the future and suggestions on how to improve, for instance by switching to a better credit card deal. For example, Money Dashboard in the UK enables users to monitor all their online bank and credit card accounts and track their spending by automatically tagging items in online statements, such as 'grocery' or 'travel,' to give an aggregated view with the aim of helping with budgeting.⁴⁰

33 D. W. Arner, J. N. Barberis, R. P. Buckley. 'The Evolution of FinTech: A New Post-Crisis Paradigm?'. University of Hong Kong Faculty of Law Research Paper No. 2015/047; UNSW Law Research Paper No. 2016-62. October, 2015.

34 *Accelerating Trust in Financial Services*, Edelman, March 2017

35 *Accelerating Trust in Financial Services*, Edelman, March 2017

36 *Trust in Tech: No Room for Complacency*, Edelman, March 2017

37 EY and DBS, *The Rise of FinTech in China - Redefining Financial Services*, November 2016

38 EY and DBS, *The Rise of FinTech in China - Redefining Financial Services*, November 2016

39 'In fintech, China shows the way' *The Economist*, February 2017.

40 *15 Useful Personal Finance Management Services*, FinTech Ranking, March 2016

INVESTMENT AND WEALTH MANAGEMENT

'Automated investment' or 'robo-advisor' services are designed to provide automated, algorithm-based portfolio management advice. Robo-advisors use the same software as human advisors but cost less.⁴¹ Silicon Valley based Wealthfront⁴² is one example of a robo-advisor service that has attracted more than \$3 billion in assets.⁴³ It offers free management of accounts below \$10,000.

It's worth noting that automated advice may do nothing to address long standing concerns about the impact of commissions on the independence and quality of financial advice.

LENDING & UNSECURED CREDIT

Lending is a major FinTech sub-sector. World Economic Forum analysis indicates that, of total investment in FinTech enterprises:

27% has gone into consumer lending and 16% into business lending. Consumer lending companies include Zopa, Lending Club and SoFi, while companies such as OnDeck or MarketInvoice lend primarily to small businesses.⁴⁴

A third of KPMG's FinTech 100 for 2016 is comprised of lending-focused companies, rising to almost a half of its top 50.⁴⁵ Its Pulse of FinTech report states that, although lending platforms may have reached the point of saturation in some markets, they:

...continue to garner a lot of attention in other jurisdictions, particularly those with a significant degree of unbanked individuals. Countries like India and Brazil, for example, continue to see payments and lending models as key avenues for FinTech growth.⁴⁶

Two factors have ignited the rise of FinTech lending:

- The GFC of 2008 and subsequent regulatory interventions – where the increased capital requirements and stricter lending criteria that banks faced made it more difficult for SMEs and individuals to secure credit, thus creating an unmet need.
- The comparative advantages that FinTechs have been able to exploit. Most notable amongst these are lower overheads and smarter, more efficient systems and processes, including innovative new approaches to data-led credit scoring and risk profiling. A further advantage in some instances has been a business model built around matching lenders and borrowers, where either financial



institutions or individuals (peers) provide the capital for loans made, rather than the FinTech firm itself raising money for and assuming the default risks inherent in consumer lending.⁴⁷

BOX: Three examples of lenders models: .

- Affirm offers point-of-purchase payment by instalments and an alternative to credit cards. Based in the US, Affirm uses a Facebook application to verify customer identity. It uses other information like ZIP code and mobile device ID to make its decision to vouch for customers or not. This allows it to provide finance for a 'broader set of consumers.'
- Kueski is a microlender in Mexico, country where formal credit is unavailable to 85% of the population.⁴⁸ It claims to be the fastest micro-lending service in Latin America.⁴⁹ Kueski underwrites its own loans, using a complex risk algorithm that draws on multiple sources of data including a customer's social media profile, to assess creditworthiness.
- US peer to peer lending platform Prosper provides loans that are focused on life/home events and projects, at rates that are marketed as being typically lower

41 Investopedia, 'Robo-Advisor (Robo-Advisor)' Investopedia

42 Wealthfront website, www.wealthfront.com

43 KPMG and H2 Ventures, 2016 FinTech 100, 2016

44 World Economic Forum, *The Future of FinTech - A Paradigm Shift in Small Business Finance*, 2015

45 KPMG and H2 Ventures, 2016 FinTech 100, 2016

46 KPMG, *The Pulse of FinTech - Q4 2016*, KPMG, 2016

47 'The FinTech revolution', The Economist, May 2015

48 'Guadalajara startup Kueski scores largest FinTech investment in Mexico history with \$35 million', Geektime, April 2016

49 H2 Ventures & KPMG, *FinTech 100 Leading Global FinTech Innovators*, 2016

than credit cards.⁵⁰ Borrowers choose a loan amount (between \$2,000 and \$35,000) and post a loan listing, stating the loan's purpose. Investors review loan listings and invest in listings that meet their criteria. Borrowers make fixed monthly payments and investors receive a portion of those payments into their Prosper account.

MORTGAGES

FinTech activity in the mortgage category is much more subdued than in the non-secured lending sector. That's perhaps unsurprising given the increased capital, timelines, regulation and costs of default involved. However, FinTech firms are starting to make an impact in the sector, primarily through online marketplaces. Here, FinTech 'brokers' use algorithms to identify the market's best deal for the consumer, based on the consumer's individual circumstances. They then offer a simpler mortgage pre-approval process that can be completed online.

An example of this type of service is Trussle in the UK. Trussle compares more than 11,000 deals from 90 lenders, before providing a personalised mortgage recommendation based on information provided by the consumer. It also manages the application and onboarding process with the chosen provider, after which it continues to watch the market for a better deal.

PAYMENTS

FinTech has already caused significant disruption in the area of payments. For consumers, FinTech's advances in the payments space are most apparent in the evolution of 'digital wallets'. Emerging initially as a response to consumer concerns around the security of online payments, the first wave of digital wallets (e.g. PayPal) provided a virtual alternative to consumers' physical wallets, enabling them to complete online transactions without divulging card details.

The growing penetration of smartphones has given consumers the option to use digital wallets in offline environments. Consumers can 'emulate' the cards from their physical wallets on their smartphones and then use the device to make payments in 'bricks and mortar' retail outlets. They can also deploy apps to send payments to each other via their phones.

In some high and middle income countries, the uptake of digital wallets has tracked growth in consumer access to the Internet, online purchasing habits and, latterly, smartphone penetration. Where digital wallets have become feature rich, offering functionality that goes beyond online payments, they have been used in lieu of conventional financial services (such as credit cards and savings) and become challengers to banks on several fronts (see Alipay below).

In developing countries and in parts of Africa especially, a different set of drivers (limited access to formal banking, limited internet access, a reliance on pre-smart feature phones and a need to pay people and businesses offline, rather than online) has seen the growth of a different form of digital wallet, but the impact has been no less profound.



**MOBILE MONEY
TRANSFER SERVICES
HAVE HAD A MAJOR
IMPACT ON THE
DEVELOPING WORLD**

DIGITAL WALLETS FOR E-COMMERCE

Prior to 'digital wallet' services such as PayPal and Alipay, paying for an online purchase presented challenges, both for consumers and vendors. Consumers were concerned as to whether providing card details to unfamiliar vendors would be secure. Vendors had to choose between high fees for card payments, or the expense of creating their own check-out infrastructure.⁵¹ PayPal and later Alipay addressed these issues by providing an encrypted digital wallet that stored bank, debit or credit card details enabling users to make online payments on websites via their PayPal accounts. Users only had to register with their email account and input their payment details once to make purchases globally. For sellers, it provided a ready-made checkout system, allowing small and medium sized businesses to accept online payments via PayPal.⁵² PayPal now has 197 million active user accounts and processed 4.9 billion payments in 2015.⁵³

In China – a country where just 16% of consumers have credit cards⁵⁴ – Alipay was created by parent company, Alibaba, as a purpose built digital wallet for use within the company's e-commerce marketplaces (and beyond). It currently has 400 million users globally⁵⁵ and processes 175 million transactions per day, of which more than 60% were made through a mobile device.⁵⁶

50 H2 Ventures & KPMG, *FinTech 100 Leading Global FinTech Innovators*, 2016

51 'Why Alipay is more than just the Chinese equivalent of PayPal', Tech in Asia, August 2015

52 Ibid.

53 *65 Amazing PayPal Statistics*, DMR, March 2017

54 *Credit in China - Just spend*, The Economist, November 2016

55 See: <https://intl.alipay.com/> See also: *32 Amazing Alipay Statistics & Facts*

56 'Alipay speeds up expansion in Europe, targeting Chinese tourists', The China Post, August 2016

Although it shares some similar core characteristics to PayPal, Alipay uses escrow to boost trust between buyer and seller, effectively withholding payment to the seller until the buyer declares the goods have arrived and are satisfactory. It has since developed additional functionality (such as the Yu'e Bao service referred to above) that further sets it apart from PayPal. According to the MIT Technology Review:

Alipay debuted as a simple e-payment system, but it's now a destination app (and website) in its own right. In addition to easing consumers into online shopping, Alipay, with its huge built-in user base, has recently made a range of financial services available to people who previously lacked easy access to tools for making payments, money market accounts, and small business loans.⁵⁷

The range of services offered includes: splitting bills using QR codes, paying utility bills, buying mobile phone credits, buying train tickets and checking the balance of linked bank accounts. Alipay has also partnered with many small businesses to allow its users to make payments on many Chinese websites and at an increasing number of offline shops using mobile payment functionality (see below).⁵⁸



MOBILE PAYMENTS: DIGITAL WALLETS IN THE OFFLINE WORLD

Services such as Apple Pay, Android Pay and Alipay's own mobile payment service represent a logical evolution of the digital wallet. These services:

Tokenize digital payments, thereby allowing users to bypass their physical wallets in favor of their smartphones. But customers continue to use the same credit cards, albeit digital versions, and transactions are still verified, processed and settled in a process nearly identical to purchases made with a physical card.⁵⁹

TechCrunch forecasts that by 2020 90% of smartphone users will have made a mobile payment and that 2017 will see \$60 billion worth of sales by mobile payment.⁶⁰ Such growth will be underpinned by the increasing ubiquity of near field communication (NFC) capable terminals at physical points of sale, or QR code generating/reading alternatives.

The attraction and utility to consumers can go beyond using a smartphone to make in-store payments. Depending on the digital wallet being used, the wider services and functions offered can also bring together the following in one place:

- Peer-to-peer payments.
- Coupons and loyalty rewards: like store vouchers, gift cards, or store loyalty programs.
- Tickets and transport: think boarding passes or concert tickets.
- Access and keys: including keys for cars, hotel rooms, or your front door.
- Identity: such as a passport, driving license, or employee ID.⁶¹

DIGITAL WALLETS: YOUR BANK ON YOUR PHONE

Mobile money transfer services have had a major impact in some low income countries. The growth of this service has enabled people to bypass bank accounts, instead transferring money to each other and to merchants via mobile phones. The most celebrated example of this innovation is Kenya's M-Pesa. The service allows users to deposit money into an account stored on their mobile phones, to send balances using PIN-secured SMS text messages to other users, including sellers of goods and services, and to redeem deposits for regular money. Users are charged a small fee for sending and withdrawing money using the service. M-Pesa customers can deposit and withdraw money from a network of agents that includes airtime resellers and retail outlets acting as banking agents.

57 'Alipay Leads a Digital Finance Revolution in China', MIT Technology Review, January 2015

58 'Why Alipay is more than just the Chinese equivalent of PayPal', Tech in Asia, August 2015

59 'An Introduction to FinTech: key sectors and trends', S&P Global, October 2016

60 'The evolution of the mobile payment', TechCrunch, June 2016

61 '5 Key Things You Need To Know About Digital Wallets', Nasdaq, November 2016

M-Pesa was launched in Kenya in 2007 not by a bank, but by mobile network partners Vodafone and Safaricom (initially in collaboration with the UK's Department for International Development). According to the Observer Research Foundation, prior to M-Pesa only 25% of Kenyans had access to banking products. By 2014, this figure had jumped to 68%.⁶² M-Pesa now has more than 20 million active users across Africa, the Middle East, Asia, and (Eastern) Europe.⁶³ M-Pesa has made financial services available to 2.5 billion people that have limited access to financial services.⁶⁴

M-Pesa services have expanded beyond money transfer and now include:

- M-Shwari – a paperless loan service by M-PESA that has 3.6 million active customers, with KES1.2 billion worth of loans issued per month and nonperforming loans at only 2.7%.
- Lipa Na M-PESA (cash payments for goods and services).
- Lipa Kodi (rental payment to landlords).
- International remittance payments.⁶⁵

FinTech analysts have attributed M-Pesa's success to the following factors:

- Safety: eliminates the risks associated with handling cash for both customers and merchants.
- Reduced losses: eliminates losses associated with receiving fake currency.
- Enhanced record keeping: transaction records are readily accessible.
- Short and flexible settlement cycles: allows timely collection.
- Acceptance of low value transactions: as little as KES10 [c. \$0.10.]
- Lower costs: avoids high point of sales (POS) and remittance fees.⁶⁶

INSURANCE

'InsurTech' is the distinct branch of FinTech dedicated to innovation in the insurance sector. As with FinTech lending – where data is being harvested from non-traditional sources and mined to identify credit risk in innovative new ways – the wealth of data that our increasingly connected devices (in homes, cars and worn about our person) generate, provides the 'big data' with

which insurance innovators calculate risk in dynamic new ways. As The Economist notes:

Tech-savvy insurers are..... exploiting entirely new sources of data. Some are using sensors to track everything from boiler temperatures to health data to driving styles, and then offering policies with pricing and coverage calibrated accordingly.⁶⁷

As the above indicates, consumers can now opt to utilise insurer-provided sensors and trackers (or choose insurers who oblige this as a condition of coverage) that share the resultant data with the insurer. In return, the insurer can then offer bespoke policies, along with interventions that reward low-risk behaviours, or support risk mitigation. This in turn starts to shift the insurance business model from its classic protection-led approach, towards one that is prevention-led:

Data from sensors also open the door to offering new kinds of risk-prevention services. As part of Aviva's partnership with HomeServe, a British home-services company, the insurer pays to have a sensor ("LeakBot") installed on its customers' incoming water pipes that can detect even minuscule leaks. HomeServe can then repair these before a pipe floods a home, causing serious damage.^{68,69}



62 'Kenya's mobile money story and the runaway success of M-Pesa', ORF, September 2016

63 Some observers posit that the dominant position of M-Pesa's parent company, the mobile network Safaricom, was a key factor in the rapid growth of M-Pesa in Kenya and is one of the reasons its success has been difficult to replicate in markets where a greater plurality of network providers operate. In these situations interoperability is crucial to facilitating payments across networks (see section 6). For more on this see: 'Cashless Africa: Kenya's smash success with mobile money', CNBC, November 2013.

64 'The Evolution of Digital and Mobile White Paper', AITE, August 2016

65 EY, *Who will disrupt the disrupters?* 2015

66 EY, *Who will disrupt the disrupters?* 2015

67 'Counsel of protection - The coming revolution in insurance', The Economist, March 2017

68 Ibid.

69 For a further exposition on some of these possibilities see: *What is InsurTech?* A blog from So-Sure, an InsurTech company

A number of insurance markets are poised to see both incumbents and startups harness technology and data in this way, with home, health and vehicle insurance being the most obvious starting points.

In relation to vehicle insurance, several large incumbents have begun to: use tracking devices or voluntary apps on cars to monitor how safely their customers drive. How fast they go and how hard they brake are just a couple of the factors that can be used to sort the cautious from the reckless.⁷⁰

Metromile (US) is a start-up in this market. With policies underwritten by a conventional insurer, it offers drivers an innovative pay-per-mile model for vehicle insurance. It claims that 65% of drivers overpay to subsidise high mileage drivers and that it can save customers an average of \$500 annually. To qualify for coverage users are required to install: a small free wireless device that...once in place...securely counts your miles to determine your total monthly bill. Pay-per-mile insurance doesn't consider other driving factors such as how fast you drive or how hard you brake, just how many miles you drive.⁷¹



PEER TO PEER INSURANCE MODELS

As with lending, a peer-to-peer model is also emerging for insurance. In a digital reimagining of the mutual insurance model, a digital platform acts as the middleman, inviting: users to form small groups of policyholders who pay premiums into a pool to pay claims, but where members get any leftover funds⁷² at the end of the policy period.⁷³ Lemonade (US) and Guevara (UK) are two examples of InsurTech firms offering this model.

Instead of underwriters, Lemonade uses: algorithms; and instead of expensive brokers and salespeople it uses chatbots. It even uses AI and machine-learning to handle claims, a job typically seen as needing a human touch.⁷⁴

The company claims that:

By injecting technology and transparency into an industry that often lacks both, we're creating an insurance experience that is fast, affordable and hassle free. Unlike any other insurance company, we gain nothing by delaying or denying claims (we take a flat fee!), so we handle and pay most claims instantly.⁷⁵

In reporting on the experience of one of Lemonade's customers, The Economist noted that:

Brandon claimed for a stolen coat. He answered a few questions on the app and recorded a report on his iPhone. Three seconds later his claim was paid – a world record, says Lemonade. In those three seconds "A.I. Jim", the firm's claims bot, reviewed the claim, cross-checked it with the policy, ran 18 anti-fraud algorithms, approved it, sent payment instructions to the bank and informed Brandon.⁷⁶

While complex claims still receive human attention, Lemonade's ambition is that its 'claims bots' will learn through experience (feeding on the data that claims provide) and eventually come to handle 90% of claims.⁷⁷

72 Lemonade takes an atypical approach for a FinTech firm. It is incorporated as a 'profit for a purpose' B-Corp, with its income derived from charging a fixed fee of 20% on the policyholders' premiums. After covering reinsurance costs and paying out any claims made, unclaimed remainders are distributed to causes our policyholders care about under its 'Giveback' policy.

73 *Peer-to-Peer Personal Lines Insurer Lemonade Opens for Business in New York*, Insurance Journal, September 2016

74 *A New York startup shakes up the insurance business*, The Economist, March 2017

75 Lemonade website, www.lemonade.com/faq#service

76 *A New York startup shakes up the insurance business*, The Economist, March 2017

77 Ibid.

70 *FinTech and insurance – Against the odds*, The Economist, January 2016

71 Metromile website, www.metromile.com/insurance

MICRO-INSURANCE

In an approach that has parallels with the M-Pesa model for mobile payments, Ghana's Tigo mobile network offers hospital and life insurance policies to low-income earners and people in the informal sector. This, it is claimed, helps them to manage risk and use their assets more productively.⁷⁸ 99% of Tigo's insurance customers in Africa live on less than \$10 per day.⁷⁹ It currently has over 1.5 million registered customers in Ghana (2.7 million across Africa) and pays over 300 claims every month, with valid claims being paid within 72 hours of completed documents being submitted.⁸⁰

Tigo Insurance is managed by BIMA⁸¹, a micro-insurance agent protecting low-income families in 14 countries across the world, and the policies are underwritten by Prudential Life.⁸²

REMITTANCES

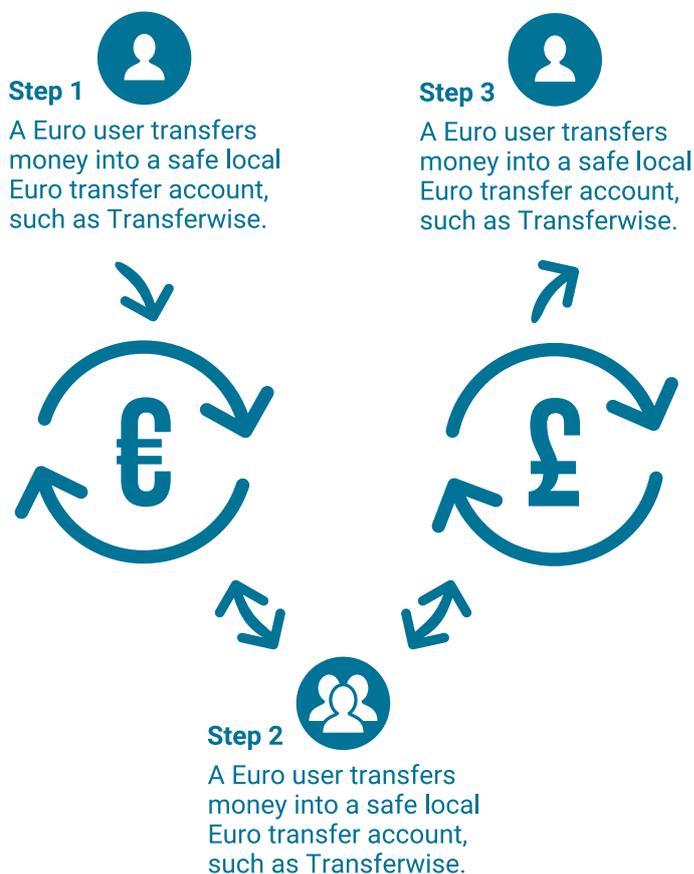
Migrant remittances to developing countries are worth around \$440 billion every year, according to the World Bank. Of that figure, at least \$32 billion is lost to the high transaction fees that sending and receiving money across borders has traditionally attracted.⁸³ The Bill and Melinda Gates Foundation estimated that a cut from 10% to 5% on remittance transaction costs could open up an extra \$15 billion for low income countries.⁸⁴ Western Union, a major incumbent, controls around 15% of the market and charges transfer fees of around 9%.⁸⁵ This high volume, high margin scenario created a situation that was ripe for disintermediation and disruption, with a number of FinTech firms such as: WorldRemit, Kantox and CurrencyFair offering international money transfer and foreign exchange services that engage advances in technology, leading to faster and cheaper solutions.⁸⁶

One example of a FinTech firm that is successfully challenging both remittance companies and major banks in sending money across borders is Transferwise, which now offers payment arrangements to (if not always from) more than 40 countries plus the Euro area. Its major selling points are its claims that fees are 8 times cheaper than sending money by conventional means; and that it: transparently displays its fee upfront and deducts it before conversion.⁸⁷ In addition, it also offers the mid-market currency exchange rate without adding any mark-up.

Transferwise operates using a quasi P2P model, which pairs two transfers going in opposite foreign directions. It then reroutes the two within their respective countries.⁸⁸ See figure 2 below.

Figure 2: How Transferwise Works

(Source: Transferwise)



M-Pesa (see above) also supports remittances on its mobile phone-based system. Since this service was introduced, remittance costs have drastically reduced. In 2008 shortly after M-Pesa entered the Kenyan market, the cost of sending US\$100 domestically was US\$12 by MoneyGram, US\$20 by bank wire, US\$6 by postal money order, and US\$3 by bus, compared to US\$2.50 by M-Pesa.⁸⁹

78 'FinTech in Africa', Sankalp Forum, 2015

79 'Tigo Insurance Reaches A New Milestone In Africa With 2.7 Million Active Users', BIMA

80 'Tigo Insurance Pays Ghs 4.5 Million In Claims To Customers', BIMA

81 BIMA website, www.bimamobile.com

82 Tigo website, www.tigo.com.gh

83 '5 trends affecting the remittance industry', Devex, December 2016

84 'This FinTech Start-up is Poised to Disrupt the Remittance Space with its £1 Money Transfer Service', Let's Talk Payments, December 2014

85 Ibid.

86 World Economic Forum, *The Future of FinTech - A Paradigm Shift in Small Business Finance*, 2015

87 Transferwise website, transferwise.com

88 'FinTech — how TransferWise Disrupts International Payments', Startup,

89 World Bank, *World Development Report 2016 - digital dividends*, 2016

CRYPTOCURRENCIES AND BLOCKCHAINS

One area of FinTech that has received growing attention and, in some instances, controversy and confusion in recent years, is the cryptocurrency field. Sometimes referred to as virtual money, or alt-coins, Bitcoin is the best known example. Yet while it is the most used and (currently) most valuable cryptocurrency, Bitcoin is far from being the only one. Cryptocurrencies are enabled by and function on top of a technology called Blockchain. Within FinTech communities, Blockchain technology is receiving significant interest and investment in its own right, not least because its qualities support a wide range of applications other than cryptocurrency.

A number of FinTech firms are already utilising cryptocurrencies and blockchain technology in the services they are offering to consumers; and a range of major financial institutions are experimenting with Blockchain.

Blockchain is expected to have a disruptive impact on the business models of banks, credit card businesses, monetary transfers and the trading of assets

WHAT IS BITCOIN?

Launched in 2009, Bitcoin is a privately developed, internet-based currency and payment system.⁹⁰ It was the first to launch and remains the largest. In simple terms, Bitcoin is a virtual currency that a user holds in a Bitcoin-specific virtual wallet. When the holder makes a Bitcoin payment they use their virtual wallet to send bitcoins to the payee – whether that be a person, or retailer – who then receives the bitcoin to their own virtual wallet. The transaction is verified and recorded in a distributed public ledger (see Blockchain below). Qualities that set Bitcoin (and other cryptocurrencies) apart include that they are:

- A direct payment method: Bitcoin payments travel direct from payer to payee. Processing via a central

intermediary, such as a bank, is not required.

- Global: compared to conventional currencies issued by government treasuries, Bitcoin is borderless, meaning there are fewer fees and third parties involved in transactions.⁹¹
- Finite: bitcoins are being gradually introduced in line with a predetermined formula. The supply will end once the total number of bitcoins in circulation reaches 21 million. Supply is not controlled by any central bank, or analogous authority – it will not be possible to 'print' additional bitcoins.
- Pseudonymous: although it is common to claim Bitcoin is anonymous, sending and receiving bitcoins is actually akin to writing under a pseudonym – in Bitcoin, your pseudonym is the address to which you receive Bitcoin. Every transaction involving that address is stored forever in the blockchain. If your address is ever linked to your identity, every transaction will be linked to you.⁹²
- Cryptographic: Bitcoin is inherently dependent on techniques from the field of cryptography to ensure the secure validation of transactions⁹³ (as are other cryptocurrencies).

The Bank of England attributes the growing popularity of digital currencies to three key factors:⁹⁴

- Ideology: in that Bitcoin and its equivalents are designed to avoid centralised control (of either the money supply or the payment system). Some adherents view Bitcoin as offering the prospect of an economic existence lived almost entirely outside of the prevailing monetary system. The claimed anonymity will likely have an ideological appeal to some users.
- Financial return: which views Bitcoin and equivalents as an instrument for financial investment, driven by an interaction between the schemes' planned fixed supplies and their increasing publicity.
- Lower transaction fees: as noted above, Bitcoin and equivalents offer a much more efficient means for payments and international transfers than conventional electronic means.

However, the qualities and appeal that set Bitcoin and its equivalents apart, have also contributed to some of the issues and notoriety that have come to be associated with cryptocurrencies. For example, the claimed anonymity has great advantages for illegal activities such as money laundering, avoiding financial regulations, terrorist financing and evading taxes.⁹⁵

90 *Innovations in payment technologies and the emergence of digital currencies*, Bank of England, 2014

91 *Digital Currency: What the Heck Is It?*, RBC Royal Bank, February 2017

92 Bitcoin simplified website, www.bitcoinsimplified.org/learn-more/anonymity

93 *Innovations in payment technologies and the emergence of digital currencies*, Bank of England, 2014

94 Ibid.

95 A. Blundell-Wignall, 'The Bitcoin Question: Currency versus Trust-less Transfer Technology', OECD Working Papers on Finance, Insurance and Private Pensions, No. 37, 2014

As adoption of Bitcoin has grown, the finite supply has contributed to remarkable increases in value, such as the 5,000% increase seen during 2012-14.⁹⁶ This in turn has attracted speculative investment and pushed the value higher. However, instances of Bitcoin hacking, market illiquidity and the prospect of regulatory and/or law enforcement intervention have contributed to sudden spikes and drops, leading to significant price volatility.

The digital nature of Bitcoin and its ecosystem, along with the irreversible nature of transactions, have also made it a target for hackers and cybercrime, with victims losing hundreds of thousands of dollars worth of Bitcoin in some instances (see below).⁹⁷

BLOCKCHAIN TECHNOLOGY

Blockchain is the technology that is used to settle and clear Bitcoin and other cryptocurrency transactions. It is made possible by the Internet and rests on concepts from cryptography, game theory and peer-to-peer networking.⁹⁸ Blockchain takes the form of: a distributed ledger and can settle transactions with a high degree of certainty. The network is decentralised, just like the internet, which means it's very durable.⁹⁹ The distributed, decentralised nature of the technology means there is no central governing body.

The ledger publicly records the details of each transaction and confirms them anonymously. Once the details are entered, they cannot be changed. Everything ever written in a blockchain is locked, stored forever, and cannot be tampered with or altered at a later date.¹⁰⁰ This means that: any series of transactions can be tracked with 100% accuracy (what's called an immutable audit trail), and that built-in encryption means it's inherently secure.¹⁰¹

The essence of Blockchain technology, according to The Economist, is its ability to let: people who have no particular confidence in each other collaborate without having to go through a neutral central authority. Simply put, it is a machine for creating trust.¹⁰²

While it is readily apparent why such a quality is essential for a functioning cryptocurrency, the utility of Blockchain looks set to have much wider application. Some analysts view Blockchain as an infrastructure technology, capable of supporting a range of applications. The OECD has described it in these terms:

The technology of 'trust-less transfer' is very interesting and it is quite possible (or even likely) that it will become a disruptive technology for many financial intermediaries in the future. The idea of eliminating the need for a

trusted third party in finance is revolutionary – the world of finance has never faced such a technological innovation that questions the need for intermediaries and the huge share of earnings in the economy that they appropriate for this role. Given that the trust-less transfer of financial quantities is already a proven technology, it is only a matter of time before it encroaches on business models of banks, credit card businesses, monetary transfers and the trading of assets.¹⁰³

Standard & Poor envisage blockchain infrastructure as having diverse potential applications that could: reshape how business is conducted across payments, loans and trading, stating that it could prove to be a disruptive technology in financial services: due to that potential and to the enhancement of three important characteristics: authentication, efficiency and transparency.¹⁰⁴



96 *Innovations in payment technologies and the emergence of digital currencies*, Bank of England, 2014

97 *Hackers Have Stolen Millions Of Dollars In Bitcoin – Using Only Phone Numbers*, Forbes, December 2016

98 *Innovations in payment technologies and the emergence of digital currencies*, Bank of England, 2014

99 *'Bringing Money into the Digital Age'*, OECD Guest Blog, June 2016

100 *Digital Currency: What the Heck Is It?*, RBC Royal Bank, February 2017

101 Ibid.

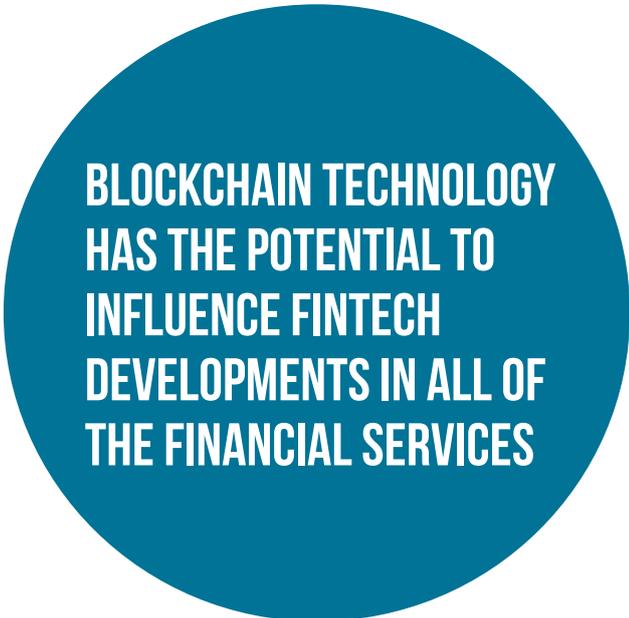
102 *The promise of the blockchain – The trust machine*, The Economist, October 2015

103 A. Blundell-Wignall, *'The Bitcoin Question: Currency versus Trust-less Transfer Technology'*, OECD Working Papers on Finance, Insurance and Private Pensions, No. 37, 2014

104 *An introduction to FinTech: Key sectors and trends*, S&P Global, October 2016

Analysis from PWC indicates that potential use cases usually focus on increasing efficiency by removing the need for reconciliation between parties, speeding up the settlement of trades or completely revamping existing processes. Examples it cites include:

- Enhancing efficiency in loan origination and servicing.
- Improving clearing house functions used by banks.
- The application of smart contracts in relation to the Internet of Things (IoT): Imagine a car insurance that is embedded in the car itself and changes the premium paid based on the driving habits of the owner. The car contract could also contact the nearest garages that have a contract with the insurance company in the event of an accident or a request for towing. All of this could happen with very limited human interaction.¹⁰⁵



**BLOCKCHAIN TECHNOLOGY
HAS THE POTENTIAL TO
INFLUENCE FINTECH
DEVELOPMENTS IN ALL OF
THE FINANCIAL SERVICES**

With these analyses in mind, it starts to become clear that Blockchain technology has the potential to influence FinTech developments in all of the financial services categories listed above. That said, KPMG have sounded a note of caution:

While many believe blockchain technologies can be a game changer... The early buzz generated by blockchain is fading as investors put pressure on companies to show that blockchain technologies are ready to evolve from test case scenarios into solutions that can be commercialized, scaled and made profitable.¹⁰⁶

In low income countries, cryptocurrencies and Blockchain infrastructure are already showing signs of being disruptive as they play a role in reducing transaction costs and driving up transparency. Examples cited by

Devex include BitPesa, a remittance service operating in Nigeria, Kenya, Uganda, Tanzania, Senegal, Democratic Republic of the Congo:

Blockchain is used by BitPesa as an open source digital ledger, which keeps a constantly updated record of all transactions, making the platform transparent and secure..[it is]....able to lower the cost of sending remittances by removing correspondent banks from the transaction chain.... For example, in a BitPesa transaction, BitPesa is able to receive local currency directly which it then sends in bitcoin to a digital broker who then deposits it as local currency in the receiving country. Regular money transfers would involve at least one deposit within a correspondent bank.¹⁰⁷

DEPOSIT TAKING

In countries where access to banking is widespread, deposit taking may prove to be the category most resistant to FinTech disruption. It should also be noted that deposit taking can serve as an essential part of the FinTech ecosystem: in that consumers need a bank account to be able to use many FinTech services. Deposit taking is also a highly regulated activity, with few FinTech firms appearing willing or able to take on the regulatory responsibility of becoming account providers in the conventional sense. The Economist observes that:

....banking incumbents do some things remarkably well – notably the current account, which allows people to store money in a way that keeps it safe and permanently accessible. Few in Silicon Valley or Silicon Roundabout want to take on that heavily regulated bit of finance. Many admit they depend on it: after all, you need a bank account to use most FinTech services.¹⁰⁸

A workaround deployed by a number of FinTech firms (including M-Pesa) is to work with conventional banks on a white label basis, with the FinTech firm then offering the deposit facility to their customers under their own branding.

In line with other FinTech analysts and observers, The Economist suggests that, unless incumbents are successful in surfing the wave of innovation that FinTech has brought to their sector, banks could end up as mere deposit taking utilities:

If FinTech doesn't kill banks, it might instead sap the sector's profitability. A future as a sort of financial utility – ubiquitous but heavily regulated, unglamorous and marginally profitable.¹⁰⁹

105 PwC, 'Blurred lines: How FinTech is shaping Financial Services', March 2016

106 KPMG, *The Pulse of FinTech - Q4 2016*, 2016

107 '5 trends affecting the remittance industry', Devex, December 2016

108 'Why FinTech won't kill banks', The Economist, June 2015

109 Ibid.

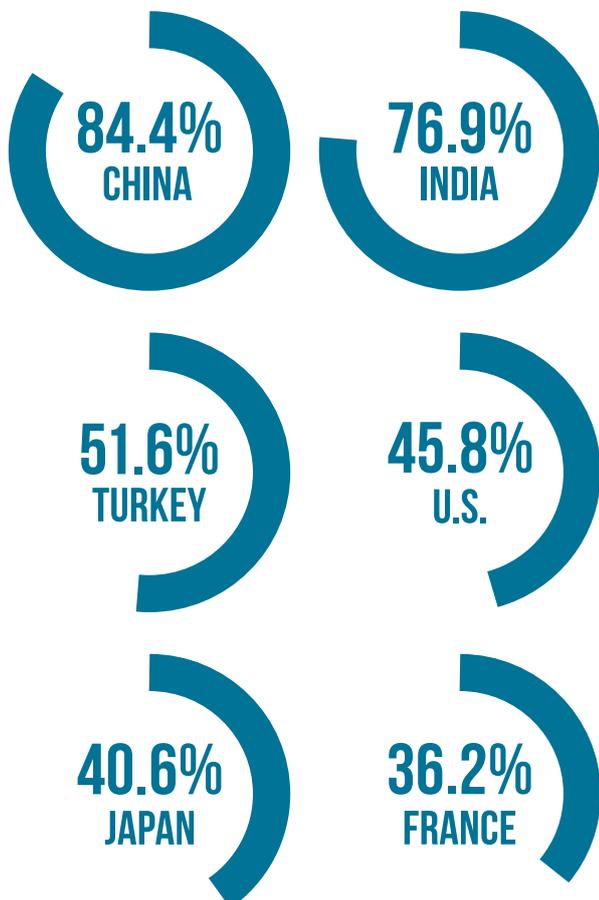
SECTION 3: THE CONSUMER RESPONSE TO FINTECH – ADOPTION & ATTITUDES

ADOPTION

Global research by Capgemini, based on a survey of financial services customers across 15 countries, found that consumers are embracing new FinTech providers – with 50.2% globally saying they do business with at least one non-traditional firm for banking, insurance, payments or investment management, with the percentage reaching the highest in Asia-Pacific (58.5%).¹¹⁰

As shown at figure 3 below, adoption was highest in China and India, with figures that were both above 75% and lowest in Belgium and the Netherlands, where, in both instances, only around 30% of financial services customers were using non-traditional firms.

Figure 3: Customers using at least one non-traditional firm for financial services, by country (%) 2016
(Source: Capgemini¹¹¹)

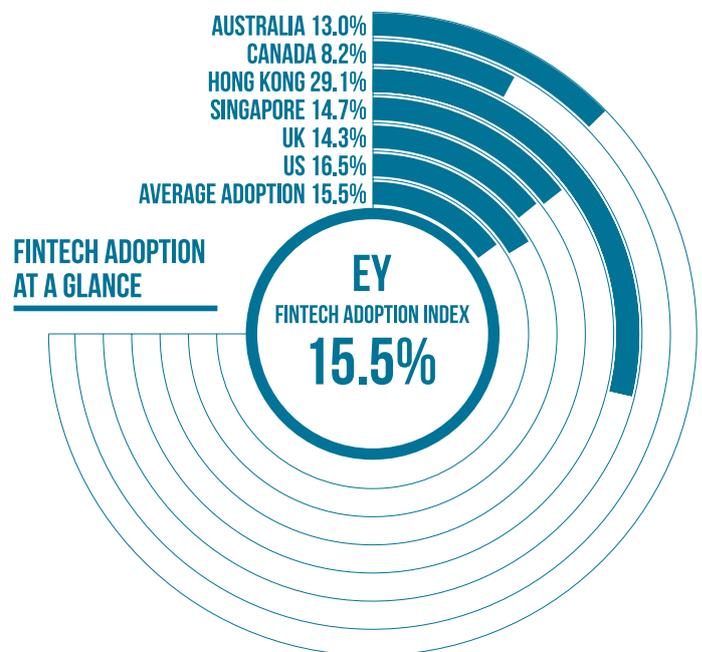


Capgemini also found that, in general, consumers who are younger, tech-savvy and affluent are more likely to supplement their basic financial services with FinTech offerings.¹¹²

EY's FinTech Adoption Index is based on a survey of 10,000 digitally active people in Australia, Canada, Hong Kong, Singapore, the United Kingdom and the United States.¹¹³ It found that: 15.5% of digitally active consumers have used at least two FinTech products within the last six months. EY speculate that: as awareness of the available products and services increases, adoption rates could double within the year.¹¹⁴

As shown at figure 4 below, EY found that: Hong Kong has the highest rate of FinTech use of all markets it surveyed (29.1%). The United States has the second-highest adoption rate (16.5%), followed by Singapore (14.7%), the United Kingdom (14.3%), Australia (13%) and Canada (8.2%).¹¹⁵

Figure 4: FinTech users by market
(Source: EY FinTech Adoption Index 2015)



Base: EY FinTech Adoption Index 2015

In terms of category of FinTech service used, EY found that money transfer and payments services, (including remittances) were the most popular, closely followed by savings and investment, with both being used by around a sixth of respondents (see figure 5 below). The lower use of insurance services (7.7%) may be a reflection of

¹¹² Capgemini, *World FinTech Report 2017*, 2017

¹¹³ EY *FinTech Adoption Index*, 2015

¹¹⁴ Ibid.

¹¹⁵ Discrepancies between the Capgemini and EY figures for the countries featured in both surveys, may result - at least in part - from (a) Capgemini asking about the adoption of one or more FinTech services, while EY defined users as digitally active consumers who use two or more FinTech products or services; and (b) Capgemini's fieldwork taking place one year after EY's.

¹¹⁰ Capgemini, *World FinTech Report 2017*, 2017

¹¹¹ Ibid.

there still being relatively few InsurTech offerings in the market. That said, the low usage of borrowing services (5.6%) seems at odds with the high proportion of FinTech firms who offer this service. EY's interpretation of these results posits:

That money transfers and payments have high adoption rates should not come as a surprise. In effect, these are entry-level FinTech products, allowing consumers to test the waters with simple transactions that don't involve much risk or commitment. Payment services provided by FinTechs are also an integral part of the customer journey of many popular e-commerce sites.¹¹⁶

In common with the Capgemini research (conducted a year later), EY also found that FinTech use skews toward younger, higher-income groups. Around a quarter of respondents aged 25 to 34 had used at least two FinTech products in the last six months. Use is also higher than average among 35 to 44 year olds (21.3%). For each cohort above age 44, the proportion of FinTech users declines and is below the average of all users.¹¹⁷



Figure 5: Analysis of FinTech use by product type

Source: EY FinTech Adoption Index 2015



17.6%

MONEY TRANSFER/PAYMENTS

Such as

- Use of non-banks to transfer money
- Online foreign exchange
- Overseas remittances



16.7%

SAVINGS/INVESTMENT

Such as

- Online stockbroking/spreadbetting
- Online budgeting/planning
- Online investments
- Equity and rewards crowdfunding
- P2P



7.7%

INSURANCE

Such as

- Car insurance using telematics
- Healthcare premium aggregators



5.6%

BORROWING

Such as

- Borrowing via P2P websites

Percentage of digitally active customers who have used each product

Base: 2,592 respondents who indicated using at least one FinTech service, EY FinTech Adoption Index 2015

EY also asked its respondents about their reasons for using FinTech services. Its findings indicated that the relative ease in setting up an account (43.4%) was overwhelmingly cited by respondents as the top reason for using FinTech. More attractive rates (15.4%), access to different products and services (12.4%) and a better online experience (11.2%) were also given as reasons.¹¹⁸

116 I. Gulamhuseinwala, Bull, T. et al. 'FinTech is gaining traction and young, high-income users are the early adopters', The Journal of Financial Perspectives: FinTech, 2015

117 Ibid.

118 EY, EY FinTech Adoption Index, 2015

SECTION 4: BENEFITS FINTECH CAN BRING FOR CONSUMERS

Consumers stand to benefit in the age of FinTech. Chief amongst the benefits they are set to experience, will be (i) increased competition and the gains in choice, service and value that follow; and (ii) increased access, as FinTech opens up financial services to groups of consumers for whom such services had previously been beyond reach, or sub-optimal.

AN EXPANSION OF COMPETITION AND CHOICE

FinTech firms have advantages that work in their favour. The World Economic Forum contrasts the inert culture, legacy processes and systems of large incumbents, with the nimble start-ups who can start with a clean slate and drive more radical innovation.¹¹⁹ Having this 'clean slate' as their starting point enables FinTech firms to reimagine financial services sector by sector – designing more consumer focussed models, and replacing or reconfiguring older and more expensive processes using sophisticated data analysis, machine learning and algorithms.

Depending on the service being offered and the scale at which they operate, FinTech firms also have fewer regulations to comply with. New regulations initiated in response to the GFC, such as the Dodd-Frank Wall Street Reform and Consumer Protection Act in the US, and enhanced capital requirements under international Basel III obligations, increased compliance costs for banks right at the time FinTech services were starting to appear.

The above qualities and advantages, combined with the much-reduced operating costs that functioning as a purely online entity enable, means that FinTech firms can achieve considerable cost savings relative to banks, a proportion of which can be passed through as savings to customers. For example, in relation to credit:

Many FinTech lenders have up to a 400-basis-point cost advantage over banks because they have no physical-distribution costs. While this puts a premium on the importance of the first marker, it also enables

*FinTech businesses to pass on significant benefits to customers with regard to cost and time to process loan applications.*¹²⁰

The Economist Intelligence Unit forecasts that: individuals and businesses worldwide will enjoy a wider range of ways to save, borrow and transfer money. Many of these will be dramatically simpler and cost less than ever before.¹²¹

FinTech firms also have fewer regulations to comply with

Regulatory authorities are also taking steps to nurture FinTech innovation to drive competition and deliver benefits to consumers. For example, In Europe, the adoption of a new directive on payment services (PSD2) looks set to accelerate the advance of FinTech. The Directive contains provisions that are designed to support a shift to 'open banking' and create the environment within which FinTech firms can compete more effectively with incumbent banks. The provisions will oblige banks to provide third parties with controlled, consumer-authorised access to account data, which brings disintermediation risk and lowers the barriers to entry for new value-added service providers.¹²² Clearly, FinTech challengers, such as personal money manager services, stand to be amongst the primary beneficiaries of these provisions. Analysis by Payments UK indicates that:

*PSD2 is expected to lead to a major change in terms of the accessibility of customer data to authorised third parties when the customer has given their explicit consent. Customers will be able to use payment initiation services and account information services..... helping customers to manage their accounts and make better comparisons of deals.....these changes will result in the development of products and services that allow customers to optimise the use of their account and transaction data.*¹²³

The PSD2's provisions in support of open banking will be accompanied by provisions to strengthen security requirements, including the use of strong customer authentication for electronic payments.¹²⁴

Research from PWC finds that incumbent financial services companies are feeling threatened and fear losing up to 23% of their business as FinTech develops. It identifies the fund transfer and payments sectors as

119 World Economic Forum, *The Future of FinTech - A Paradigm Shift in Small Business Finance*, 2015

120 'Cutting through the noise around financial technology', McKinsey, February 2016

121 Economist Intelligence Unit, *Financial services in 2017 - A special report from The Economist Intelligence Unit*, 2016

122 'PSD2: A Blessing or a Curse for European Bankers?', Capgemini, 2017

123 'The Second Payment Services Directive (PSD2)' Payments UK, July 2016

124 Ibid.

feeling most threatened – fearing a 28% loss of market share, while bankers think 24% of their business is at risk. In asset and wealth management, this falls marginally to 22% – and to 21% in insurance. It also finds that FinTech firms’ ambitions exceed incumbents’ feared losses, with FinTech firms expecting to capture as much as 33% of the incumbents’ business.¹²⁵

BANKS ARE FIGHTING BACK

Despite the undoubted impact that FinTech is having and will have, the financial services sector does not look set to be disrupted to the extent that, say, analogue photography or the music industry has been. Incumbent banks enjoy advantages not easily available to FinTech start-ups. For example, they have scale, an existing customer base in a low-churn market, strong institutional trust and built-in regulatory compliance. They also have the capital to invest in FinTech catch-up and/or acquisition.

**THE MOST IMPORTANT
IMPACT FINTECH
WILL HAVE ON THEIR
BUSINESSES IS AN
INCREASED FOCUS
ON THE CUSTOMER**

Banks are not only recognising the challenge posed by FinTech firms and the new realities they herald, but are also striking back. Their responses are built around strategies of internal innovation, self-disruption and capitalising on their advantages. This may prove to be the key to incumbents’ resilience. The Economist notes:

...[although] they are growing fast the startups are still tiny. Lending Club, the biggest FinTech lender, has arranged \$9 billion of loans since launching in 2007 – compared to \$885 billion of credit-card debt in America alone. Many FinTech groups do business in the billions, but banks often deal in trillions. Banks have ingrained advantages, not least the ability to create credit more or less at whim.¹²⁶

In its analysis of the impact of FinTech in China, The Economist also notes that FinTech has provoked a competitive response, pointing to the markedly improved customer experience at China’s biggest banks and their changing business models.¹²⁷ The biggest lesson of all, it claims, and one that may well have application in other territories, is that: it is not upstarts versus incumbents but rather a question of how banks absorb the FinTech innovations blossoming around them.

Given the above, in countries where there is widespread access to banking the showdown between FinTech challengers and incumbents is unlikely to see the former prevail over the latter. Indeed, rather than a winner-takes-all scenario playing out, a situation of co-existence is more likely, where, in the words of Capgemini, FinTechs are gaining traction, if not market share. Its analysis signals that:

...some FinTechs are finding their niche, with viable future business models. However, we also see far more who look like they will struggle to do so on their own. Simultaneously, we see signs of leading traditional firms moving quickly and successfully to build their own capabilities, both on their own and through collaboration with FinTechs.

Global consumer research undertaken for FIS, a financial technology provider, finds that of banked consumers who are using personal financial management apps, the vast majority are doing so with an app provided by their existing provider:



125 'Now is the time to embrace the opportunity: how FinTech is shaping financial services' PwC, March 2016

126 'Why FinTech won't kill banks', The Economist, June 2015

127 'The age of the appacus - In FinTech, China shows the way', The Economist, February 2017

Globally, 47% of banked consumers overall and 65% of millennials with smartphones and/or tablets report using a mobile personal financial management (PFM) app. 90% of PFM users have opted for a PFM app provided by their primary financial institution.¹²⁸

Consumer research across eight countries by CGI, a consulting firm, finds that trust is a major factor for consumers in determining whether they opt for their current provider over a FinTech firm when considering FinTech-type services:

For all the [FinTech] concepts tested, consumers overwhelmingly prefer their current financial institution to provide them with the new value-added digital services they want. When asked why they prefer their current primary financial provider, the most commonly cited reason consumers give is trust.¹²⁹

While competition between FinTech challengers and incumbents is set to deliver tangible benefits for consumers – not least in the form of improved customer/quality of service and better value – it could well be that incumbents are more likely to bring those benefits to the majority of consumers than FinTech firms are.



In relation to customer service, research from PwC finds 75% of FinTech firms and incumbents surveyed confirming that: the most important impact FinTech will have on their businesses is an increased focus on the customer.¹³⁰ Similarly, The Economist predicts that: the bigger effect from the FinTech revolution will be to force flabby incumbents to cut costs and improve the quality of their service. That will change finance as profoundly as any regulator has.¹³¹

There are also instances where incumbents seek to utilise FinTech firms strategically, or to partner with them. For example, the New York Times reports that: marketplace lenders are also forming partnerships with the same banks they are seeking to disrupt.

Smaller banks are buying up marketplace loans as investments, while others are offering co-branded loans with the online lenders.

One big bank, Citigroup, is teaming up with Lending Club to provide up to \$150 million in loans to low – and moderate-income borrowers.

The deal may allow Citigroup to satisfy regulatory requirements for making loans in poor communities.¹³²

FINTECH AS A DRIVER OF ACCESS TO FINANCIAL SERVICES

Africa's FinTech entrepreneurs are not disrupting the financial industry; they are building it from scratch. They are attracting investments and bringing about financial inclusion in the continent.¹³³

In countries where access to core financial service is widespread, consumers stand to benefit from the resultant competition between old and new, as incumbents seek to fend off the FinTech challenge. But across much of the world there is no 'old': the FinTech benefit will be derived from connecting consumers to financial services for the first time.



128 FIS, *FIS Consumer Banking Pace Index 2016*, 2016 (research conducted in 10 countries: Australia, Brazil, Canada, Germany, India, the Philippines, Poland, Switzerland, UK, USA. Approximately 1,000 surveys were completed in each country)

129 CGI, *FinTech Disruption in Financial Services - A Consumer Perspective*, 2015. (CGI's survey sample was small - just 1,670 consumers across the U.S., Canada, the UK, France, Germany, Sweden, Singapore and Australia.)

130 PwC, *Blurred lines: How FinTech is shaping Financial Services - Global FinTech Report*, March 2016

131 *The FinTech Revolution*, The Economist, May 2015

132 *'Pitfalls for the Unwary Borrower Out on the Frontiers of Banking'*, The New York Times, September 2015

133 *'FinTech in Africa'*, Sankalp Forum, 2015

The scale of the challenge/opportunity is vast: 38% of the world's population lacks even a basic financial account¹³⁴ and an even greater proportion lack the simplest of insurance and investment products.¹³⁵ As figure 6 highlights, the scale of financial exclusion is significantly higher than the global average in some regions. As the G20 acknowledges, FinTech, particularly in the form of mobile money, is an essential part of the solution:

While tremendous gains in financial inclusion have already been achieved, digital financial services, together with effective supervision (which may be digitally enabled), are essential to close the remaining gaps in financial inclusion. Digital technologies offer affordable ways for the financially excluded – the majority of whom are women – to save for school, make a payment, get a small business loan, send a remittance, or buy insurance.¹³⁶

As the profiles of M-Pesa and Tigo insurance in section 2 highlight, mobile-led FinTech has already benefited significant numbers of consumers in parts of Africa. World Bank data for Sub-Saharan Africa indicates that:

Mobile money accounts drove the growth in overall account penetration from 24% in 2011 to 34% in 2014. In East Africa, where mobile money accounts are most common, these accounts increased overall account penetration by 9 percentage points to 35%, while the share of adults with an account at a financial institution remained steady at 26%.¹³⁷

CHALLENGES IN REALISING THE POTENTIAL FOR IMPROVED ACCESS

However, it should be noted that access to the benefits of mobile FinTech is dependent on access to a mobile handset and network subscription. At the end of 2015 just 46% of the African population had a mobile subscription, compared to 63% globally. That number is forecast to climb to 54% by 2020, compared to 72% globally.¹³⁹

In addition, some analysts caution that, even where people do have mobile phone access: targeted end-users often offer little in the way of obvious profitable opportunities and so market forces alone are not enough to ensure the supply of services and products that match end-users' means, needs or wants. As a result, digital financial services in emerging markets may suffer from limited uptake and usage, with little effect on financial inclusion.¹⁴⁰

In relation to access it is also important to note that – in countries that enjoy widespread access to banking – the FinTech fuelled competition described in the preceding section could serve to erode access to financial services for some vulnerable and/or underserved groups. For example, as incumbents seek to cut operating costs and shift services to digital channels to compete with FinTech challengers, this will inevitably lead to the closure of large parts of branch networks. For consumers who cannot or choose not to bank online, this could represent a detrimental step.

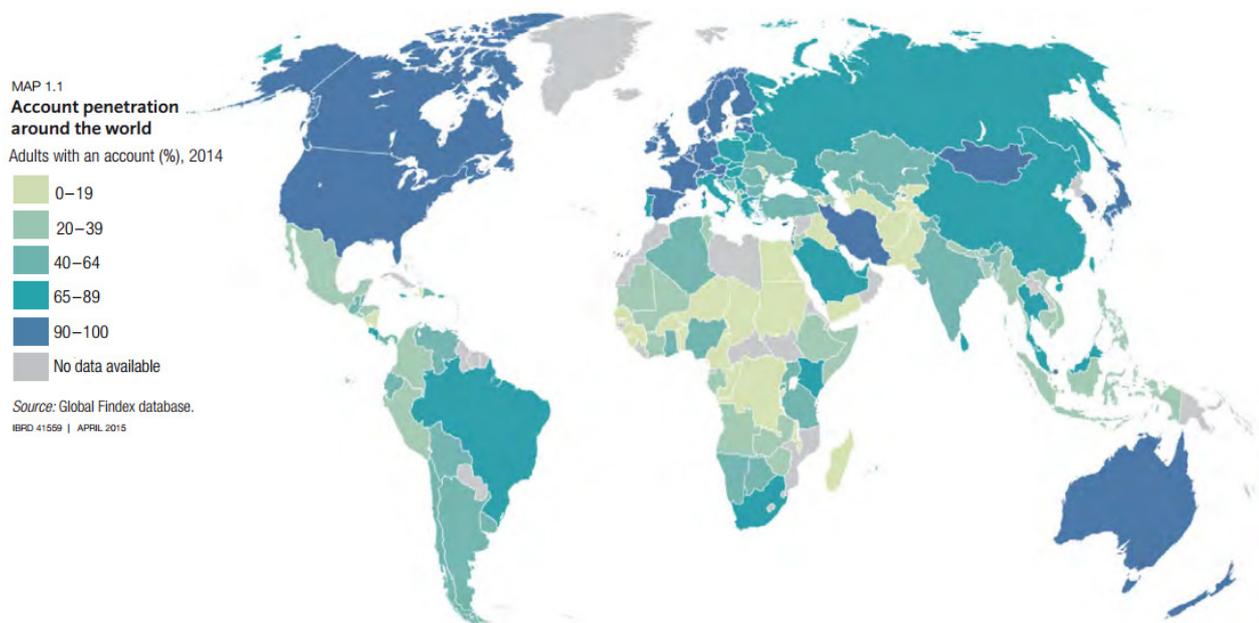


Figure 6: account penetration around the world

(Source: Global Findex Database/World Bank¹³⁸)

134 World Bank *Global Findex Database*, 2015

135 Economist Intelligence Unit, *Financial services in 2017 - A special report from The Economist Intelligence Unit*, 2016

136 GPF, *High-Level Principles for Digital Financial Inclusion*, 2016

137 World Bank, *Global Findex Database*, 2015

138 Ibid.

139 GSMA, *The Mobile Economy Africa 2016*, 2016

140 R. Buckley, and L. Malady, 'The new regulatory frontier: building consumer demand for digital financial services', *The Journal of Financial Perspectives*, 2015

SECTION 5: THE CHALLENGES THAT FINTECH PRESENTS FOR CONSUMERS AND REGULATORS

The following explores a number of issues where FinTech firms and the impact of FinTech more widely can give cause for concern in relation to consumer protection. It touches on some of the risks and detriments that FinTech has already exposed consumers to. In some cases, such as with irresponsible and predatory lending, FinTech magnifies existing risks, in other it creates new ones.

This section also provides a short overview of the emerging field of RegTech and how this might be used to keep the risks that FinTech firms present in check, and – given the real-time nature of the data it would generate – enable the ‘learning as we go’ that such fast-moving innovation requires.

FINTRUSION? DATA, PRIVACY AND FINTECH

FinTech has led financial services to become the most intensive users of data.¹⁴¹ As outlined in preceding sections, innovation and experimentation in data mining and analytics, including in relation to personal data, are both defining characteristics of FinTech and the backbone of FinTech services.

As a data intensive ecosystem, FinTech gives rise to security concerns around hacking and data breaches (see below on cybercrime and vulnerable technologies); and in a banking context, identity theft and the theft of assets can be simultaneous, leading to potentially catastrophic detriment for consumers (see liability, below). FinTech’s appetite for evermore data concerning the context, circumstances and behaviours of the consumer also fuels data and privacy concerns.

Citing an expert on the issue, The Economist reports an intensifying data arms-race, and points to a situation

141 ‘Big data, financial services and privacy’, The Economist, February 2017

where banks and insurers move from a reliance on credit agencies and volunteered information, and towards mining social-media profiles, web-browsing, loyalty cards and phone-location trackers.¹⁴² It also reports that in a trial: FICO, America’s main credit-scorer, found that the words someone uses in his Facebook status could help predict his creditworthiness. Even facial expressions and tone of voice are being studied for risk.¹⁴³ Facebook itself abandoned experiments around gauging its users’ creditworthiness in 2016, in light of regulatory concerns.¹⁴⁴



While advocates for mining personal data in this way argue that consumers stand to benefit from personalised products and keener pricing, the scope for consumer detriment is significant. Critics have voiced concerns that such practices could actually increase financial exclusion as consumers seen as risky and those lacking a digital footprint could be priced out (see cherry picking below).¹⁴⁵ There is also the possibility – especially in relation to insurance – that, in time, providers will make consent to tracking a condition of coverage. The use of closed, proprietary algorithms could also lead to a situation¹⁴⁶ where consumers are denied access to a service (e.g credit or insurance) based on an inaccurate correlation, but are unable to determine why or to correct underlying assumptions.

As The Economist points out: algorithms can be wrong. A bilingual speaker’s search-engine entries could look erratic; a social-worker’s location-tracker could imply a risky lifestyle.¹⁴⁷

In a similar vein, the US Federal Trade Commission has stated: while big data may be highly effective in showing correlations, it is axiomatic that correlation is not causation;¹⁴⁸ and an Obama era White House whitepaper on FinTech noted that while algorithms can be smart they can also be biased:

Despite the potential for increased objectivity, algorithmic systems still rely on inputs and processes

142 ‘Big data, financial services and privacy’, The Economist, February 2017
143 Ibid.

144 ‘Credit in China - Just spend’, The Economist, November 2016

145 ‘Big data, financial services and privacy’, The Economist, February 2017

146 Ibid., citing Frederike Kaltheuner of Privacy International.

147 Ibid., citing Frederike Kaltheuner of Privacy International.

148 Federal Trade Commission, *Big Data - A Tool for Inclusion or Exclusion?* January 2016

*informed by the people who design them. Moreover, the information they create still may be subject to human interpretations....Therefore, the underlying algorithms and the decisions they prompt could contain systemic, historical, and cultural biases that potentially may impact consumers unfairly and inequitably.*¹⁴⁹

In order to tackle this 'technological bias' the report urged that innovators needed to be: proactive in assessing the quality of their data and the potential for bias or negative externalities in their development and use of technology.

Beyond consumer privacy and financial inclusion concerns, analysts have noted that, despite such approaches becoming commonplace, the innovative use of data is still in its early days. Although a wide range of experimentation is taking place, the extent to which new approaches are robust remains unknown. McKinsey cautions that:

*Many of these experiments will fail, stress-tested by credit and economic cycles (it is not hard to lend based on different underwriting criteria when times are good; the hard part is getting the money back when times are tough).*¹⁵⁰



CHERRY PICKING AND THE RISK OF PRICE DISCRIMINATION

As noted above in relation to data, FinTech affords financial services firms enhanced insights into the circumstances and behaviours of consumers and prospective consumers. This gives rise to the possibility that some providers may seek to offer services only to the most profitable, or least risky segments and shut others out of the market. In the UK, the Financial Conduct Authority has already expressed concerns that big data could price consumers seen as risky out of insurance.¹⁵¹

The data practices outlined above can also give rise to price discrimination, where a provider offers incentives to its preferred segments and charges premier rates to the rest. This is a practice that would make comparison difficult and risk negating the benefits from choice and competition outlined above.

The FTC has pointed to instances of discrimination where, rather than data mining leading to a bespoke offer for a consumer based on their individual behaviours, individuals have been denied opportunities based on the actions of others:

*...one credit card company settled FTC allegations that it failed to disclose its practice of rating consumers as having a greater credit risk because they used their cards to pay for marriage counseling, therapy, or tire-repair services, based on its experiences with other consumers and their repayment histories. Using this type of a statistical model might reduce the cost of credit for some individuals, but may also result in some creditworthy consumers being denied or charged more for credit than they might otherwise have been charged.*¹⁵²

CYBERCRIME & VULNERABLE TECHNOLOGIES

As a digital industry that's dependent on the Internet to function, FinTech is particularly vulnerable to cybercrime and espionage, with the latter increasingly important in geopolitics. This digitization and consequent vulnerability... will remain a major concern for governments, policy-makers, regulators and industry participants, as well as customers.¹⁵³

According to Juniper Research, fraudulent online transactions will reach a value of \$25.6 billion by 2020, up from \$10.7 billion last year. That means for every \$1,000 spent, \$4 will be fraudulent. More than a quarter (27% – \$6.9 billion) of that figure will relate to banking fraud.¹⁵⁴

149 National Economic Council, *A Framework for FinTech*, January 2017

150 'Cutting through the noise around financial technology', McKinsey & Company, February 2016

151 'Big data, financial services and privacy', *The Economist*, February 2017

152 Federal Trade Commission, *Big Data - A Tool for Inclusion or Exclusion?* January 2016

153 D. W. Arner, J. N. Barberis, R. P. Buckley. 'The Evolution of FinTech: A New Post-Crisis Paradigm?'. University of Hong Kong Faculty of Law Research Paper No. 2015/047; UNSW Law Research Paper No. 2016-62. October, 2015.

154 'Online Transaction Fraud To More Than Double To \$25BN By 2020', Juniper Research (UK), May 2016

One of the most high-profile acts of cybercrime relating to FinTech involved the theft of Bitcoin. Mt.Gox, which was the world's largest Bitcoin exchange, collapsed in 2014 after a hacker's heist on its virtual vaults siphoned away \$473 million worth of Bitcoin. 90% of the stolen Bitcoin belonged to 24,000 customers.¹⁵⁵ The CEO of Mt.Gox – who faced investigation for embezzlement following the collapse – attributed the heist to weaknesses in the company's systems.¹⁵⁶ In addition to the losses suffered by its customers, Mt. Gox's collapse triggered a collapse in the price of Bitcoin, which affected its holders everywhere. In its reporting at the time the technology magazine, Wired, opined that:

*Bitcoin promises to give a bank account to anyone with a mobile phone, no ID required. It's clearly an amazing and potentially world-changing technology – the first viable, decentralised, reliable form of digital cash. But it's also a technology that was pushed forward by a community of people who were unprepared or unwilling to deal with even the basics of everyday business.... over its first several years, bitcoin has been driven largely by computer geeks with little experience in the financial world.*¹⁵⁷

Bitcoin promises to give a bank account to anyone with a mobile phone, no ID required

The Mt. Gox incident is far from the only incident of cryptocurrency heists (and was the second time that exchange had been hit).¹⁵⁸

Analysis from S&P Global cautions that, regardless of payment medium, the central risk is theft:

*Thieves have exploited security vulnerabilities in the credit card processing system for years. According to a 2015 survey of over 900 cyber security professionals conducted by IT governance association ISACA, just 23% of experts believe mobile payments keep personal information safe.*¹⁵⁹

And while security has been improved by the implementation of techniques such as tokenization, host-card emulation and biometrics authentication, weak points remain: personal data is at risk if devices are lost and vulnerable during credit card enrolment into mobile wallets like Apple Pay.¹⁶⁰

This is driving the growth of two-factor authentication, which requires a wallet user to have at least two types of security credentials to access their account. Additional security types can include a PIN or password, possession of a physical item, such as a smartphone, and biometric information, such as a fingerprint or retina recognition.¹⁶¹

Unless such vulnerabilities can be addressed satisfactorily and in demonstrable ways, the adoption of FinTech may stall. 2015 research by the US Federal Reserve found that amongst non-users of mobile payments, 67% were concerned about the security of mobile payments; and 47% didn't trust the technology.¹⁶² The European Banking Authority has warned that: the integrity of the financial sector could be at stake if insecure data use eroded trust.¹⁶³

As noted in the overview of Blockchain ledger technology, the ability to pseudonymise transactions may, in the future, offer part of the solution in this respect.

ISSUES WITH PEER TO PEER LENDING

LendingClub, the first billion-dollar U online lending marketplace¹⁶⁴, saw the departure of its founder and CEO in 2016 following what the company itself described as a violation of the company's business practices along with a lack of full disclosure during the review.¹⁶⁵ Although, the violation primarily involved irregularities in the sale of loans to an institutional investor, it raised questions about the firm's integrity and its pitch of appealing returns for peer-lenders (i.e. consumers):

*If the company is willing to sell mislabeled goods to one of its largest and most sophisticated clients, why should Joe Investor assume he'll be treated any better? "It brings up issues of trust," says Michael Tarkan, a stock analyst that follows the company. "Small investors need to be sure they are receiving the loans they signed up for."*¹⁶⁶

2016 also saw ratings agencies voice concerns about P2P/marketplace lending in the US. Time reported that:

*Moody's said investments backed by loans issued by Lending Club's rival Prosper weren't performing as well as expected and might have to be downgraded.... Fitch said "pockets of recent credit underperformance" were prompting marketplace lenders (a larger group that includes peer-to-peer companies as well as other lenders) to tweak the computer models they used to evaluate loans – suggesting that the companies may not be as good at vetting borrowers as they had suggested.*¹⁶⁷

155 'Hedge funds gamble on Mt Gox bitcoin payout', Financial Times, February 2017

156 'The Inside Story of Mt. Gox, Bitcoin's \$460 Million Disaster', Wired, March 2014

157 Ibid.

158 'A history of bitcoin hacks' The Guardian, 2014

159 'An introduction to FinTech: Key sectors and trends', S&P Global, October 2016

160 Ibid.

161 'An introduction to FinTech: Key sectors and trends', S&P Global, October 2016

162 'Data breaches could cripple the growth of mobile wallets', Business Insider, August 2016

163 Ibid.

164 'Lending Club founder's abrupt departure tarnishes emerging industry', CNBC, May 2016

165 Ibid.

166 'Lending Club's CEO Has Left and Its Stock Has Plunged. Should Lenders Bail Out?', Time, June 2016

167 Ibid.

In addition, to the ratings agencies' concerns, the US Financial Stability Oversight Council has pointed to untested underwriting models, highlighted that issues embedded in new products and practices could be difficult to foresee and: indicated that regulators should be vigilant in monitoring digital lenders, even if their offerings may not constitute a current risk to financial stability.¹⁶⁸

The explosive growth of P2P lending in China – from 214 lending platforms in 2011, to more than 3,000 by 2015¹⁶⁹ – took place initially beyond the purview of regulators. Perhaps unsurprisingly, it: morphed into China's financial Wild West, brimming with frauds and dangerous funding models. More than a third of all P2P firms have already shut down.¹⁷⁰

WHEN IMPROVED ACCESS TO CREDIT CAN BE PROBLEMATIC

As highlighted at section 2, in societies where bank access is widespread, FinTech firms are servicing a demand for credit that incumbents were slow or unwilling to meet. In a number of instances, FinTech firms have created platforms that both streamline the application processes and crunch data in ways that enable a rapid decision on whether a loan is made. This can mean qualifying consumers are able to access loans in minutes. And in countries where access to banking is limited, FinTech is opening up credit to many for the first time.



However, while these can be positive developments, there are instances where easily available credit can result in irresponsible lending. In an article on FinTech lenders entitled pitfalls for the unwary borrower, The New York Times (NYT) reported on instances of easily

available credit turning sour. The article highlights the experiences of some consumers:

At first, a marketplace loan also seemed like a great idea to Vella Parker, 59, a lab technician who is out of work on disability. She could roll up thousands of dollars of debt from her five credit cards into one Lending Club loan and pay a lower interest rate.

But instead of paying off her credit cards, she spent much of her \$8,375 loan to keep up with everyday expenses, including health insurance co-payments and taxis to her doctor's visits.

"I fell into the same trap as before," said Ms. Parker, who lives in the Bronx and had a previous bankruptcy.

Her \$288 monthly loan payment was far more than she had to pay each month as a minimum payment on her credit cards. She stopped making her payments.¹⁷¹

The article also highlighted problems consumers had experienced with the lending platforms, once they had become over-indebted. It stated that some of the new lenders are unwilling to modify their loan terms and pointed to instances where lending platforms had continued to electronically deduct loan payments – even following bankruptcy, in the case of one small business.¹⁷² In a comment for the article, the Vice President of the Center for Responsible Lending told the NYT:

*I do believe there is promise here, but the industry needs monitoring.....The question is whether these companies will continue to use technology to provide fair loans or use it to gouge people like traditional small-dollar lenders.*¹⁷³

The technology that has improved lending conditions for consumers in general, has also brought ease and convenience to the world of payday and predatory lending – meaning that consumers denied credit elsewhere and/or quite possibly in desperate circumstances can now access high cost, potentially toxic credit within minutes. In the UK, the online payday lender, Wonga, voluntarily agreed to write off thirty three thousand loan agreements worth £220 million and cancel the interest on thousands more after the Financial Conduct Authority (the regulator) signalled its dissatisfaction with the company's relending rates and inadequate steps to assess borrowers' ability to make repayments.¹⁷⁴ Within two months, the regulator had also capped Wonga's annualised interest rate, bringing it down from 5,853% to 1,509%.¹⁷⁵

168 'An introduction to FinTech: Key sectors and trends', S&P Global, October 2016

169 'The age of the appacus - In FinTech, China shows the way', The Economist, February 2017

170 Ibid.

171 'Pitfalls for the Unwary Borrower Out on the Frontiers of Banking', The New York Times, September 2015

172 Ibid.

173 Ibid.

174 'Wonga to make major changes to affordability criteria following discussions with the FCA', FCA press release, October 2014

175 'Wonga cuts cost of borrowing, but interest rate still 1,509%', The Guardian, December 2016

LIABILITY: WHERE DOES THE BUCK STOP IF THINGS GO WRONG?

The issue of liability and, more accurately, which party it rests with, has been a prominent FinTech theme, especially in relation to personal financial manager/ account aggregator services. Absent the protocols by which a consumer can authorise these types of service to receive account data direct from their bank, the consumer has had to provide their login credentials to the FinTech third party, which can then access the account and 'scrape' the requisite data. This gives rise to:

- Consumer protection concerns – particularly where the consumer's contract with their bank contains provisions clearing the bank of any liability for losses from fraud or other illegal activities arising from a consumer granting access to their account to a third party. For example, Capital One tells users: If you choose to share account access information with a third-party, Capital One is not liable for any resulting damages or losses.¹⁷⁶
- Related to (a) are competition concerns, in instances where banks cite concerns around consumer protection as cover to forbid, or at least strongly discourage third party access to account data, thus denying FinTech third parties the opportunity to offer consumers a service from which they might benefit.

In some jurisdictions, including the US and Canada, this



has led to a stand-off between banks and FinTech firms such as Mint.com, and a grey area for consumers.¹⁷⁷ As highlighted in section 4 on competition and choice, the 'open banking' elements of the EU's Payment Services Directive 2, will see the creation of API based systems and protocols, by which consumers can require banks to share account data directly with an authorised third party. Consumer liability for unauthorised transactions is limited to €50, other than in instances where gross negligence or fraud can be proven by the bank.¹⁷⁸

Liability is also a live issue in relation to cryptocurrencies, where the decentralised nature of the system sees the user assume all liability for theft (where they hold the currency in a digital wallet). In a climate where technological vulnerability, high value 'coins' and, in some instances, user naivety can conspire to incentivise bad actors, liability resting with the individual can have devastating consequences.

As with any decentralised system, there is a lot more accountability on the singular user as there is no centralised authority

A case of ether theft (ether is the most popular cryptocurrency after bitcoin) involving the loss of \$100k worth of the 'coin', provides a stark illustration. FT Alphaville reports the user, a cybersecurity expert, felt the loss was due to a vulnerability in the open-source Mist wallet offered by Ethereum (the foundation that created ether and run the blockchain on which it trades). Ethereum, whose usage license states it is not liable for damages – including any general, special, incidental or consequential damages arising out of the use or inability to use the programme – refused to recompense the user. In commenting on the case to FT Alphaville, its spokesman stated that:

As with any decentralised system, there is a lot more accountability on the singular user as there is no centralised authority which is going to come in and roll back any erroneous activity, or reset an account because of a mishap – it's simply not possible due to the way it is designed. This is, really, the whole point of decentralised systems; to remove the potential for any central authority to take control.¹⁷⁹

176 'Why banks want you to drop Mint, other 'aggregators'', Reuters, November 2015

177 For an overview of the state of play on this issue in the US, see: *Banks, consumer groups agree: Screen scraping needs better regs*, Information Management, March 2017

178 European Commission website, *Payment Services Directive: frequently asked questions*, October 2015

179 'DAO hacking and dispute resolution', Financial Times Alphaville, June 2016

REAL RISKS FROM VIRTUAL CURRENCIES

As awareness of bitcoin and other cryptocurrencies grows and as people become attracted by the impressive gains in value that some cryptocurrencies have seen (and discount collapses in value that have sometimes followed), the risk of consumer detriment arising from virtual currencies starts to become a reality. And while the numbers of people affected might be low in the medium term, the losses that could be incurred, either through theft or a lack of sophisticated investing skills, could be significant (and catastrophic to those involved). In its consideration of consumer protection issues related to market volatility and fairness, the OECD presents this hypothetical scenario:

The potential for market volatility and contract litigation issues seems large. For example, a real estate sales company starts taking Bitcoins to pay for houses from persons unknown and of dubious origins. They fail to convert the Bitcoins into legal tender for the client just prior to a major dip in price, or an event that takes their value to zero. The coins are not backed by anything and the network has no capital or obligations. The client has signed a contract accepting the risks and takes a massive wealth loss, while the money launderer now owns a building. Who does the house seller litigate against? Presumably the real estate agent, as the buyer is unknown. The real estate entity fails, and it has other links with banks and the financial system, creating losses and instability elsewhere in the financial system.¹⁸⁰

SYSTEMIC RISKS

Minimal cost distribution and accelerated network effects can result in online services reaching and being used by millions in a much shorter space of time than was possible with analogue services. In relation to FinTech, this could mean that an innovative new service is widely adopted before any inherent flaws or risks are properly understood, or before regulators can make a proper assessment of whether the service at scale poses a systemic risk, and the safeguards required if it does.

To date, there have been a handful of instances where FinTech has led to such a scenario. One instance was the rapid growth of the P2P lending sector in China which, in the space of eight years, became an integral part of the economic fabric – rising from too-small-to-care to too-big-to-fail.¹⁸¹ When P2P lending platforms began to close in quick succession in 2015 and many more looked vulnerable, regulators were forced to mitigate the systemic risk posed by the sector. Arner & Barberis observe that:

The speed at which this sector emerged has prevented

regulators from drafting adequate legislation to ensure consumer and prudential safeguards, while at the same time, underpinning development of the market. However, in March 2015, the Chinese Banking Regulatory Commission (CBRC) announced the enactment of new capital requirements for P2P platforms. The sector went from light-touch regulation with low barriers to entry to one where actors may need to set aside more than RMB30 million in regulatory capital.....This change of approach by regulators reflects that the P2P sector in China has reached systemic size.¹⁸²

M-Pesa offers an additional example of where a FinTech innovation has rapidly scaled to the point of presenting systemic risk. Within five years of launching, payments made through the platform surpassed 43% of Kenya's GDP,¹⁸³ which resulted in it coming under Central Bank supervision due to its systemic significance.

With regards to systemic risk, the White House's FinTech whitepaper urged collaboration between policymakers, regulators, and industry: to identify and mitigate potential systemic risks as the industry grows. Part of that collaboration might include using new innovations to assist in risk management and regulatory functions.¹⁸⁴



180 A. Blundell-Wignall, 'The Bitcoin Question: Currency versus Trust-less Transfer Technology', OECD Working Papers on Finance, Insurance and Private Pensions, No. 37, 2014

181 D.Arner, and J. Barberis, 'FinTech in China: from the shadows?' The Journal of Financial Perspectives, EY, Winter 2015

182 D.Arner, and J. Barberis, 'FinTech in China: from the shadows?' The Journal of Financial Perspectives, EY, Winter 2015

183 Ibid.

184 National Economic Council, A Framework for FinTech, January 2017

CHALLENGES AND OPPORTUNITIES FOR REGULATORS OF FINANCIAL SERVICES

As with the disruption of other sectors, financial services regulators seeking to grapple with the implications of FinTech will face significant challenges from both the velocity and magnitude of change. They will also be required to manage the tensions arising from seeking to support innovation that complements their competition objectives, while at the same time recognising that some of those innovations will inevitably either create new risks (i.e. cryptocurrency manipulation), or shift existing risks into the digital realm (i.e. financial criminal activity becomes financial cybercrime).

In facing up to these challenges, financial services regulators will have an advantage that isn't readily available to counterparts in other markets who are looking to contend with, say, the implications of Uber arriving in their patch. That advantage is derived from being able to repurpose the technological advances that give rise to FinTech in support of data-led, automated approaches to the supervision of the financial system and the monitoring of FinTech firms' performance and compliance. The age of FinTech looks set to also be the age of RegTech. Professor Philip Treleaven, Director of UCL's Financial Computing Centre argues that:

Effective financial regulation is clearly crucial to innovation and the future success of the financial services industry and in specific FinTech. There are also unprecedented opportunities for reforming regulation and also creating new businesses in the process. Examples include: using "big data" regulatory online reporting and analytics to streamline reporting; and stimulating a new generation of "RegTech" companies to provide the regulatory/compliance software.¹⁸⁵

RegTech also provides an opportunity for regulators to access data more easily and to customise the compliance requirements

In a similar vein, Arner & Barberis argue that: the increased use of technology within the financial services industry gives regulatory bodies an opportunity to access a level of granularity in risk assessments that did not previously exist.¹⁸⁶ In 2014 The Bank of England's Chief Economist, Andy Haldane, outlined a sci-fi influenced vision for the future of financial services regulation:

I have a dream. It is futuristic, but realistic. It involves a Star Trek chair and a bank of monitors. It would involve tracking the global flow of funds in close to real time (from a Star Trek chair using a bank of monitors), in much the same way as happens with global weather systems and global internet traffic. Its centrepiece would be a global map of financial flows, charting spill-overs and correlations.¹⁸⁷

The European Commission has highlighted how RegTech can be a win-win situation for regulators and regulated entities alike. Through the efficiencies it achieves, RegTech could also enable, where appropriate, early stage FinTech firms to be brought under a regulator's compliance and reporting gaze, without imposing a disproportionate regulatory responsibility:

RegTech also provides an opportunity for regulators to access data more easily and to customise the compliance requirements, whilst enabling the regulated entities to reduce their compliance costs and to lower operational risks without compromising on regulatory objectives.¹⁸⁸



185 P. Treleaven, 'Financial regulation of FinTech', *The Journal of Financial Perspectives*, EY, Winter 2015; For additional analysis of regulatory evolution prompted by FinTech see: Arner, Douglas W. and Barberis, Janos Nathan and Buckley, Ross P., *The Evolution of FinTech: A New Post-Crisis Paradigm?* (October 1, 2015). University of Hong Kong Faculty of Law Research Paper No. 2015/047; UNSW Law Research Paper No. 2016-62.

186 D.Arner, and J. Barberis, 'FinTech in China: from the shadows?' *The Journal of Financial Perspectives*, EY, Winter 2015

187 'Managing global finance as a system', Bank of England, October 2014

188 European Commission Directorate General Financial Stability, Financial Services and Capital Markets Union, *FinTech: A More Competitive And Innovative European Financial Sector*, 2017

SECTION 6: MAKING FINTECH WORK FOR CONSUMERS

The European consumer organisation, BEUC has argued that an additional benefit of the use of big data will be: its usage by supervisory authorities. Algorithms could be e.g. designed to test other algorithms for bias, discrimination, or other principles. ESMA [European Securities and Markets Authority] could use big data analytics to better track the net returns and performance of long-term investment products.¹⁸⁹

Beyond the potential that RegTech offers, it is also worth noting the value of regulatory 'open door' initiatives, such as the Financial Conduct Authority's Project Innovate¹⁹⁰ in the UK. These present the opportunity for nascent FinTech firms and the regulator to engage and build mutually beneficial relationships at an early stage – enabling the firm to better understand the regulatory requirements they will face; and enabling the regulator to assess firms' character and stay abreast of FinTech innovation. Regulatory 'sandboxes', where early stage FinTech firms can safely test new products, services and delivery with customers – absent some or all of the regulations an established provider would face – are another important forward step that some regulators have taken.¹⁹¹

An additional benefit of the use of big data will be: its usage by supervisory authorities

Finally, Arner & Barberis point to China as the world's FinTech laboratory, arguing that other regions will have much to learn from its regulatory lead:

*.....the Internet Finance Guidelines, released in July 2015, indicate that the country is creating both a financial market infrastructure and a regulatory framework that is built with FinTech in mind. China would effectively transform its last-mover advantage in the field of financial reform into a first-mover advantage, by setting global standards for financial market and regulatory developments that can be looked upon by developing markets in South-East Asia and Africa.*¹⁹²

FinTech is still in its early days. Yet, as the preceding sections have shown, it is already reshaping large financial services markets in ways that deliver benefits for consumers, but that can also magnify existing risks and detriments, as well as introduce new ones. Some of these risks and detriments are already becoming apparent. Others will emerge as FinTech adoption increases, or as new innovations further transform what the market offers. While it is inevitable that in time, new or revised legislation and regulation (and approaches to regulation) will be required to address these, we are not yet in a position to forecast with any certainty the form that either the risks or the optimal responses will take.

RAPID UPTAKE COULD MEAN MILLIONS ARE AFFECTED BY RISKS AND LAWS BEFORE THEY ARE UNDERSTOOD

The question at this point is whether existing and forthcoming consumer protection frameworks and principles for financial services (and more widely – i.e. in relation to data protection) can be utilised to fashion responses to the known risks and detriments that FinTech is giving rise to? Of course, answers to that question will vary by jurisdiction. Actions taken by the European Commission will, arguably, ensure EU member states are further ahead on this curve than other regions.

The following offers initial thoughts in response to that question – specifically on whether certain principles¹⁹³ from the G20's High-level Principles on Financial Consumer Protection (FCP, 2011); and High-Level Principles for Digital Financial Inclusion¹⁹⁴ (DFI, 2016),¹⁹⁵ along with other key instruments and initiatives, could offer the basis of a response to the risks and detriments identified.

189 'Big Data & Financial Services - BEUC response to ESA's consultation', BEUC, March 2017

190 FCA website, FCA Project Innovate

191 P. Treleaven, 'Financial regulation of FinTech', *The Journal of Financial Perspectives*, EY, Winter 2015;

192 D.Arner, and J. Barberis, 'FinTech in China: from the shadows?' *The Journal of Financial Perspectives*, EY, Winter 2015

193 While this section focuses only on the principles most applicable to the issues identified, all of the G20 principles remain relevant in a FinTech context.

194 GPMI, *High-Level Principles for Digital Financial Inclusion*, 2016

195 Ibid.

USING FINTECH TO EXPAND ACCESS TO FINANCIAL SERVICES

DFI1: Promote a Digital Approach to Financial Inclusion – Promote digital financial services as a priority to drive development of inclusive financial systems, including through coordinated, monitored, and evaluated national strategies and action plans.

Here, the detriment is exclusion and FinTech provides the means by which it can be mitigated. As highlighted at section 4, in some regions of the world FinTech is not disrupting financial services markets, it is creating them. In those instances, the primary initial benefit that flows to consumers is access. Supporting the continued expansion of FinTech is vital, given the role it can play in advancing consumers' wider economic interests and overcoming wider causes of consumer detriment. In order to deliver the greatest possible benefit, that expansion will need to proceed in concert with the protection principles detailed below, not least in relation to ensuring services are secure, treat consumers fairly and treat their data respectfully.

Of course, in countries with widespread access to banking, incumbents' pursuit of digital by default strategies risks causing detriment through the exclusion of consumers who cannot, or choose not to engage with digital channels, particularly if bank branch closures ensue. It will be important that those working in the consumer interest maintain sight of the interests of these groups and ensure they are treated fairly by providers.

LEGAL, REGULATORY AND SUPERVISORY ISSUES & ROLE OF OVERSIGHT BODIES

FCP1: Financial consumer protection should be an integral part of the legal, regulatory and supervisory framework.

FCP2: There should be oversight bodies (dedicated or not) explicitly responsible for financial consumer protection, with the necessary authority to fulfil their mandate.

DFI2: Balance promoting innovation to achieve digital financial inclusion with identifying, assessing, monitoring and managing new risks.

DFI3: Provide an Enabling and Proportionate Legal and Regulatory Framework for Digital Financial Inclusion.

Around the world, FinTech is catalysing an evolution in the culture and behaviour of financial regulators. RegTech offers the prospect of regulators approaching the performance of their core mandates (i.e. financial stability, prudential regulation, conduct and fairness, and

competition and market development¹⁹⁶) in dynamic new ways. This should go some way to keeping in check any systemic risks that FinTech might present.

Looking beyond core mandates, FinTech is spurring forward thinking regulators to voluntarily develop an additional mandate focused on supporting the growth of FinTech. In some instances this takes the form of innovation hubs that provide for bilateral dialogue, and regulatory 'sandboxes' that allow for the controlled trials of FinTech innovations (e.g. in UK, Singapore). Supporting innovation to better comprehend the risks is a logical step; and accords with DFI3's call to: provide an enabling and proportionate legal and regulatory framework for digital financial inclusion.

With specific regards to the operation of 'sandboxes', exemptions from regulation should be treated as privileges to be earned. Best practice in this respect should see regulators grant exemptions only where the FinTech firm can demonstrate its proposition (i) it represents a genuine innovation, (ii) if consumer facing, is premised on delivering a benefit to consumers, (iii) is cognisant of the risks it could pose; and (iv) can exit the market without causing financial harm to consumers, if it fails. In addition, the exemption granting process offers an opportunity for the FinTech to demonstrate to the regulator its adherence to the relevant FCP (e.g. on data and equitable and fair treatment of consumers).



196 D. W. Arner, J. N. Barberis, R. P. Buckley. 'The Evolution of FinTech: A New Post-Crisis Paradigm?'. University of Hong Kong Faculty of Law Research Paper No. 2015/047; UNSW Law Research Paper No. 2016-62. October, 2015.

PROTECTION OF CONSUMER DATA AND PRIVACY

FCP8: Consumers' financial and personal information should be protected through appropriate control and protection mechanisms.

DF15: Establish Responsible Digital Financial Practices to Protect Consumers – Establish a comprehensive approach to consumer and data protection that focuses on issues of specific relevance to digital financial services.

Consumer data is a fundamental input for FinTech – core to pricing, service delivery, and competition. The volume of consumer data that FinTech firms hold, or seek to hold, grows and becomes more personal in nature – ranging from how and where we have driven during every car journey, to our social media activity. That creates both a privacy concern (how much does my bank know about me?), a consent and permissions concern (how much am I prepared to share with my bank?) and a security concern (am I vulnerable to losing my identity and money in a data breach?). Therefore, commitments to the highlighted principles on the protection of consumer data and privacy and on responsible use of personal data, become even more vital in relation to the functioning of FinTech services.

To truly put the consumer first, FinTech firms will need to embed such commitments at the outset. As the White House whitepaper on FinTech notes in its own principles: the proliferation of cybersecurity threats and the increasingly important role of big data, means that FinTech companies must incorporate robust cybersecurity, data security, and privacy safeguards at the beginning of, and throughout, product and service lifecycles.¹⁹⁷

By guaranteeing that data protection safeguards are built into products and services from the earliest stage of development,¹⁹⁸ the EU General Data Protection Regulation aims to oblige these commitments from FinTech firms operating in EU member states or with customers who are EU citizens. Non-European FinTech firms could match these commitments by internalising the seven foundational principles of Privacy By Design,¹⁹⁹ along with adherence to the OECD's 2013 Guidelines Governing the Protection of Privacy & Transborder Flows Of Personal Data.²⁰⁰ Regardless of jurisdiction, in light of the risks and detriments outlined here, all should have particular regard to provisions relating to collection limitation/data minimisation, use limitation and to the prompt correction and/or deletion of inaccurate data.

With regards to the role that data can play in spurring competition, a right to data portability and a framework that provides for this, along with the right for a third party nominated by the consumer to receive the ported data, is vital. The EU's PSD2 offers one example of how this could be enacted.

On a related note, efforts to provide consumers with a digital identity have the potential to improve the consumer experience by enabling remote account opening with a new banking provider, while also enhancing security and reducing fraud. The European Commission states:

The use of electronic identity schemes, as set out in eIDAS, would make it possible to open a bank account on-line while meeting the strong requirements for customer identity proofing and verification for know-your-customer or customer due diligence purposes. The legal certainty and validity of qualified eSignatures, as provided for under eIDAS, could also enhance the security of electronic transactions.

DF17 is also focused establishing digital consumer identities to help foster financial inclusion, with the important caveat that security, privacy and citizen perspectives must be designed into Digital ID at the outset and not bolted on at the end to meet compliance requirements.

Digital technologies, including biometrics and other forms, provide a unique opportunity to leapfrog traditional, paper-based forms of identification to build a robust and efficient identification system at a scale previously unachievable. The safety and security of such digital identification systems must also be paramount.²⁰¹



PROVIDING DIGITAL IDENTITY HAS THE POTENTIAL TO IMPROVE THE CONSUMER EXPERIENCE

197 National Economic Council, *A Framework for FinTech*, January 2017

198 'Agreement on Commission's EU data protection reform will boost Digital Single Market', European Commission, December 2015

199 'Privacy by Design - The 7 Foundational Principles', Information and Privacy Commissioner of Ontario, 2011

200 OECD, *Guidelines Governing the Protection of Privacy & Transborder Flows Of Personal Data*, 2013

201 'Consumer Financial Services Action Plan: Better Products, More Choice', European Commission, March 2017

EQUITABLE AND FAIR TREATMENT OF CONSUMERS

FCP3: All financial consumers should be treated equitably, honestly and fairly at all stages of their relationship with financial service providers. Treating consumers fairly should be an integral part of the good governance and corporate culture of all financial services providers and authorised agents. Special attention should be dedicated to the needs of vulnerable groups.

This paper has highlighted some areas where providers of FinTech services (both incumbent and challenger) exhibit practices that risk being unfair to consumers in general, or certain consumer segments in particular. A number of these related to the decisions FinTech firms might make based on algorithms (technological bias, cherry picking and price discrimination). The ideas outlined above in relation to data protection (such as internalisation of privacy by design) and regulatory practices (such as granting 'sandbox' exemptions, supervision via RegTech) offer starting points in thinking how to address these issues.

With regards to liability for fraud and loss when account data is shared with a FinTech third party that the consumer seeks to utilise, EU PSD2 and its provisions for secure data portability based on API architecture, offers a blueprint for how to address this issue in a way that can empower and protect consumers. Clearly, there is an important related question here: how can consumers best identify and differentiate trustworthy FinTech third

parties from bad actors? Consumer facing accreditation schemes and a regulator maintained 'whitelist' of approved FinTech firms, with whom incumbents can confidently share data, might offer a way forward, although it would not prevent bad actors from operating.

Instances of FinTech P2P lenders demonstrating hard inflexibility towards distressed debtors indicates that stronger adherence to this principle can drive improvements in that sector too.

FINANCIAL EDUCATION AND AWARENESS & DISCLOSURE AND TRANSPARENCY

FCP4: Financial services providers and authorised agents should provide consumers with key information that informs the consumer of the fundamental benefits, risks and terms of the product. They should also provide information on conflicts of interest associated with the authorised agent through which the product is sold.

Data security and privacy, should be baked into FinTech offerings at the outset

FCP5: Financial education and awareness should be promoted by all relevant stakeholders and clear information on consumer protection, rights and responsibilities should be easily accessible by consumers.

DFI6: Strengthen Digital and Financial Literacy and Awareness Support and evaluate programs that enhance digital and financial literacy in light of the unique characteristics, advantages, and risks of digital financial services and channels.

An appealing feature of some FinTech services for consumers is the way they utilise technology to make consumers' account data and patterns in their financial behaviour more intelligible to them, generating insights the consumer can act on. For example, through using data visualisation techniques. Such services can, in of themselves, enhance consumer education. But providers should also utilise these techniques to help consumers better understand the nuances of the product or service they are considering or already using, their rights in relation to that product or service, and, potentially, how consent is sought in relation to how their data is collected and used.

The risks that cryptocurrencies can pose for consumers arise in part from a sub-optimal understanding of how they function, the security vulnerabilities they can present and their potential volatility, where – despite a seemingly



upward-only value trajectory – they remain a high-risk investment asset; and the fact that, as decentralised ecosystems, they operate for the most part beyond the reach of regulatory and consumer protection frameworks. Consumer education is therefore vital to helping consumers appreciate the risks of buying and using cryptocurrencies and that engagement with a virtual currency truly is a caveat emptor scenario.

PROTECTION OF CONSUMER ASSETS AGAINST FRAUD AND MISUSE

FCP 7: Relevant information, control and protection mechanisms should appropriately and with a high degree of certainty protect consumers' deposits, savings, and other similar financial assets, including against fraud, misappropriation or other misuses.

The Mt.Gox bitcoin heist and resultant losses its users experienced (see section 5) provide ample illustration of what can happen where adherence to this principle is lacking.

As noted above banking fraud is set to increase in the years to 2020. Adherence to FCP7 is therefore something that all regulators should be seeking evidence of in their interactions with FinTech firms and, as with data security and privacy, should be integral to FinTech offerings at the outset.

COMPETITION

FCP10: Nationally and internationally competitive markets should be promoted in order to provide consumers with greater choice amongst financial services and create competitive pressure on providers to offer competitive products, enhance innovation and maintain high service quality.

COMPETITIVE MARKETS SHOULD BE PROMOTED IN ORDER TO PROVIDE CONSUMERS WITH GREATER CHOICE AMONGST FINANCIAL SERVICES



While, in the words of The Economist, FinTech might be doing more than any regulator has to force incumbents to cut costs and improve the quality of their service,²⁰² there appear to be instances where incumbents have sought to obstruct the growth of FinTech challengers. As noted in the previous section, some may have cited concerns around liability to prohibit consumers from sharing account data with third party FinTech services. Clearly, such a practice runs the risk of contravening FCP10.

As highlighted elsewhere in this paper, in Europe the 'open banking' elements of Payment Services Directive 2 is designed to promote competitive markets and will demonstrate how FCP10 can be applied in the FinTech era. Other jurisdictions could look to follow this lead.

Interoperability also plays a key role in breaking down provider silos and facilitating competition, as well as an improved consumer experience – not least in low income countries, where interoperability for mobile payments is essential if people using different mobile networks are to be able to send payments to each other. As the White House FinTech whitepaper notes:

FinTech companies and financial institutions should embed a presumption of interoperability and harmonized (or harmonizable) technical standards in their products and services. Doing so can reduce friction for consumers, helping the underserved and well-served alike connect different functions in their financial life. Interoperability and harmonization also can help industry entities coalesce around best practices and models that promote broad, shared objectives.

202 'The FinTech Revolution', The Economist, May 2015

CONCLUSIONS

This paper has highlighted the revolution that FinTech has sparked in the financial services market. It has outlined the drivers that are fuelling FinTech, as well as the impact it is having on the sectors that comprise the financial services market; and on consumer behaviour in those sectors.

It has also highlighted how there is the potential for FinTech to deliver significant benefit to consumers – in driving greater choice and competition and in opening up access to core financial services in parts of the world where consumers have long been denied these.

In markets where access to banking is widespread and beyond, consumers look set to see the benefits of FinTech take shape in the form of:

- Improved consumer experience – our engagement with banking and wider financial services and the steps we need to take in order to manage these services, are set to become much more convenient.
- Reduced costs, along with greater transparency over what the costs of using a service actually are.
- Richer insights into our own financial well-being, presented in a more engaging and usable form, along with actionable advice on steps we can take to improve (some of which will be automated).



THE CHALLENGE IS THEN HOW BEST TO MAXIMISE THE BENEFITS AND MINIMISE THE POTENTIAL HARM.

The advantages that incumbents enjoy, along with a determination amongst some to embrace FinTech and self-disrupt, will mean banks are unlikely to go the way of Kodak. But in fending off the challenge, they will help drive competition in ways that should deliver the kinds of benefits outlined above to consumers. Indeed, many consumers' first experiences of FinTech look set to be through their existing provider.

But at what cost? As the paper highlights, a number of risks and detriments are emerging from FinTech. Chief amongst these is the prospect of 'fintrusion'. While many consumers would undoubtedly welcome a cheaper car insurance policy, would they also welcome an omniscient insurer as an omnipresent passenger?

And in an ecosystem built around Internet technologies, that in some instances demonstrate vulnerabilities, cybercrime remains a significant concern – more so when people's assets are concerned. Research quoted in the paper indicates that, for consumers who are not yet using certain FinTech services, hacks and breaches can have a toxic effect on their trust and willingness to use.

The challenge is then how best to maximise the benefits and minimise the potential harm. As the paper highlights, regulators have a key role to play here, both in supporting innovation and in mitigating risk. RegTech innovations look set to play a key role in supporting them in this endeavour.

Section 6 has shown where, alongside regulation, elements of existing financial services consumer protection principles and access to digital financial services principles, can act as a starting point in tackling emerging detriments.

If those working in the consumer interest – including FinTech firms who are building for long-term success – fall short in mitigating the risks and addressing the detriments identified here, the potential for FinTech to deliver significant benefits to significant numbers of consumers may be undermined – leaving early adopters as the only adopters.



Consumers International brings together over 200 member organisations in more than 100 countries to empower and champion the rights of consumers everywhere. We are their voice in international policy-making forums and the global marketplace to ensure they are treated safely, fairly and honestly.

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