Making Banks Great Again

A research paper on the disruption of banking

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Abstract

The purpose of this research is to identify the disruption currently occurring in the banking industry. The rise of mobile due to cheaper technology, cheaper access to broadband and popularity of the smartphone has changed consumer's behaviour, which is leading to a change in demand and expectations. Banks now face a world of uncertainty in their retail business model as they face higher costs, new regulation and new entrants with lower costs and a different value proposition, that aim to provide consumers a better experience on their demands, and are looking to steal away market share from traditional banks. These new entrants are making traditional banks start to invest in new technologies such as blockchain, while at the same time revising their strategy towards the customer to retain them and avoid losing them to the new entrants.

Table of contents

1. Introduction

Why are banks still boring? This paper aims to understand if a disruption is occurring in the banking industry. If such disruption is occurring, what are its main causes and possible changes for the industry? To understand this disruption, this paper first start with a literature review where primary and secondary literature are reviewed to guide the author on what is happening with the industry and raise questions. Factors such as advances in technology, culture, consumer behaviour and the industry landscape are to be analysed. Secondly, the author explains the methodology for this research. Thirdly, the reader will have the opportunity to analyse the findings and analyses that the author had accessed to, from interviews and surveys from multiple sources and different groups that interact with banking directly or indirectly. Lastly, the author provides his own discussion, after analysing all the data acquired from primary and secondary research, a set of hypothesis for the future of the industry will be listed and explained using the data gather and analysed during this research.

2. Critical Literature Review

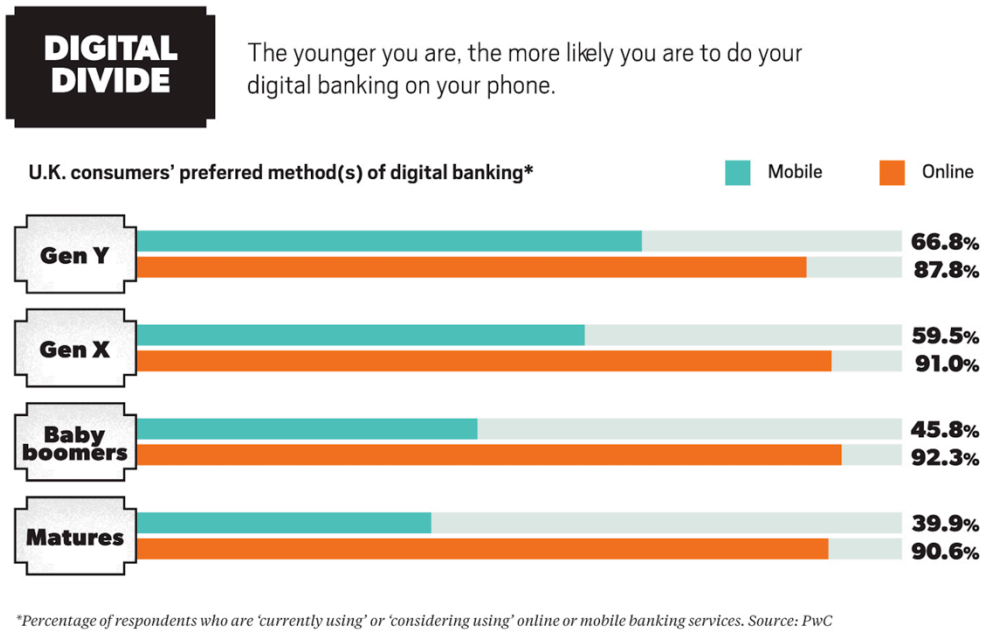
2.1. Mobile banking changing the way consumers use banks

Changes in the banking industry always took some time to occur. Paper money was first introduced in Europe in the 16th century and only by the 18th century it become a well-established exchange system. After telephone lines and computers appeared, credit cards started to quickly emerge as a valid alternative to paper money (King, 2014). At the same time the World Wide Web, alongside the rise of the personal computer, become more accessible, as broadband along side with the tools to use it become more cheaper, easier to obtain and widely available. This new way to communicate transformed people's lives and helped shape businesses, therefore changing economics and consumers behaviours at the same time. (Krishnan, 2014).

The introduction of smartphones such as the iPhone, the increase availability of mobile broadband, and the creation of ecosystem & marketplace of mobile apps initiated today's mobile web. Finance services had now more options to interact with customers, changing consumer behaviours and their demands along the way (Krishnan, 2014; King, 2014). Consumers stop going to branches or calling the bank, instead, all banking needs are now done via an application on their smartphone, which is quicker, easier, free and on the go (King, 2012).

Unhappy bank customers are helping this change. Switching banks before was a nightmare (Jones, 2014), but Switching Bank Guarantee improved that. Consumers can easily change to a provider that offers better mobile banking, this is important for younger consumers.

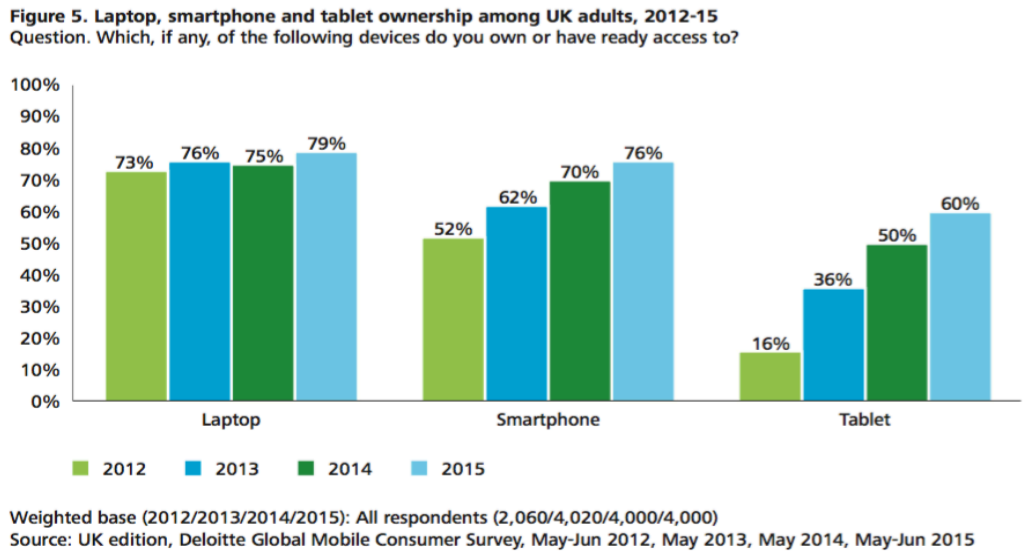
Millenniums today prefer digital banking. They don't believe they benefit going to a branch and they want it done fast. By 2019, according to a 2015 KPMG report, it is forecasted mobile banking will more then double. Millennials will account for most of that growth (Baker, 2016). A survey done by PwC shown that 67% of that demography prefers mobile banking apps (Baker, 2016). Millenniums, or the Y Generation, wants fast, convenient and on the go. The smartphone, Uber, Airbnb are transforming mobile into the standard for current and the next generation.



(Figure 1, How different generations prefer to interact with banks, online vs mobile. Baker, 2015)

2.2. Smartphone usage and change in behaviour by consumers

Ownership of a smartphone, in 2015 reached the same levels of a laptop (Lee & Calugar-Pop, 2015), and it will surpass it very soon.

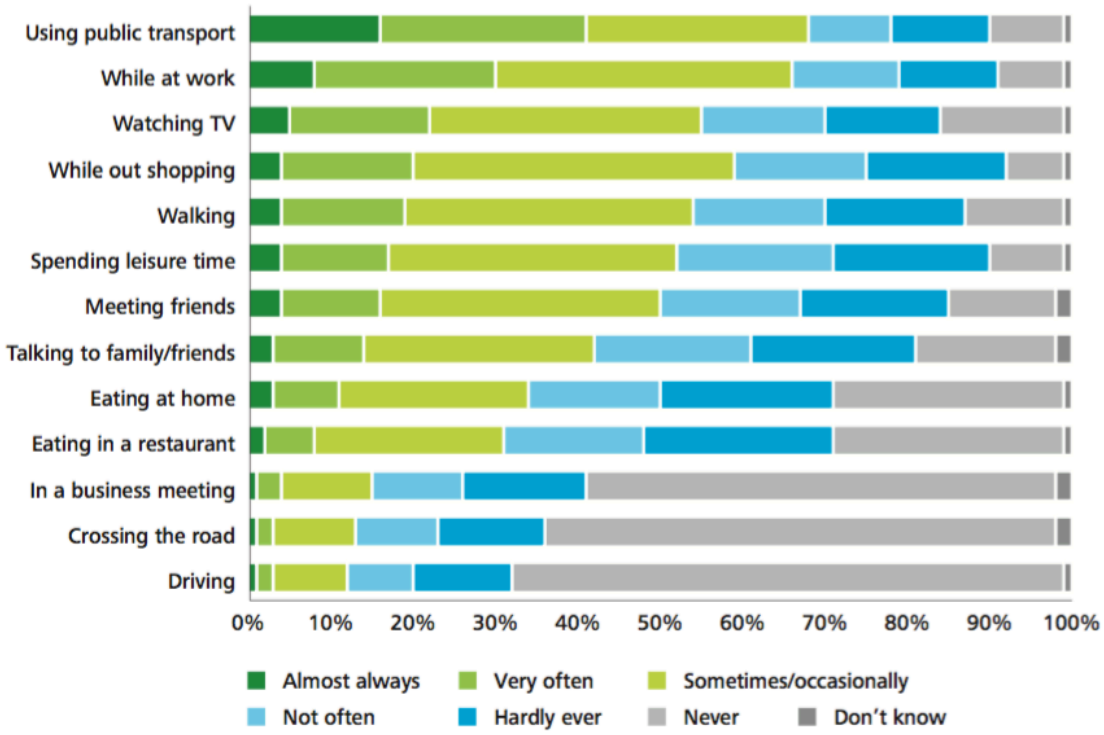


(Figure 2, Laptop, smartphone and tablet ownership in the UK. Lee and Calugar-Pop 2015)

Figure 2 shows levels of smartphone ownership in the UK have now catched up to the levels of laptop ownership (Lee & Calugar-Pop, 2015). There is a trend in place, a shift from the era of desktop to the era of mobile. As mobile evolves and more options become available to consumers on what they can do with their devices, consumers will eventually stop owning a laptop and solely rely on these mobile devices. They are easier to use, allow for more interaction with user surroundings on the go, as the quote-cited bellow from the Deloitte Mobile Consumer 2015 report exemplifies:

"PCs have long been used to book a restaurant. But now a smartphone can easily do this, and also direct us, turn by turn, to the location. At the restaurant, the smartphone can become the menu, and the till too, saving us the time to request, check and pay the bill." (Lee & Calugar-Pop, 2015). The quote reflects Figure 3, from the Deloitte Mobile Consumer 2015 report, showing that UK consumers enjoy the freedom these devices provide them:

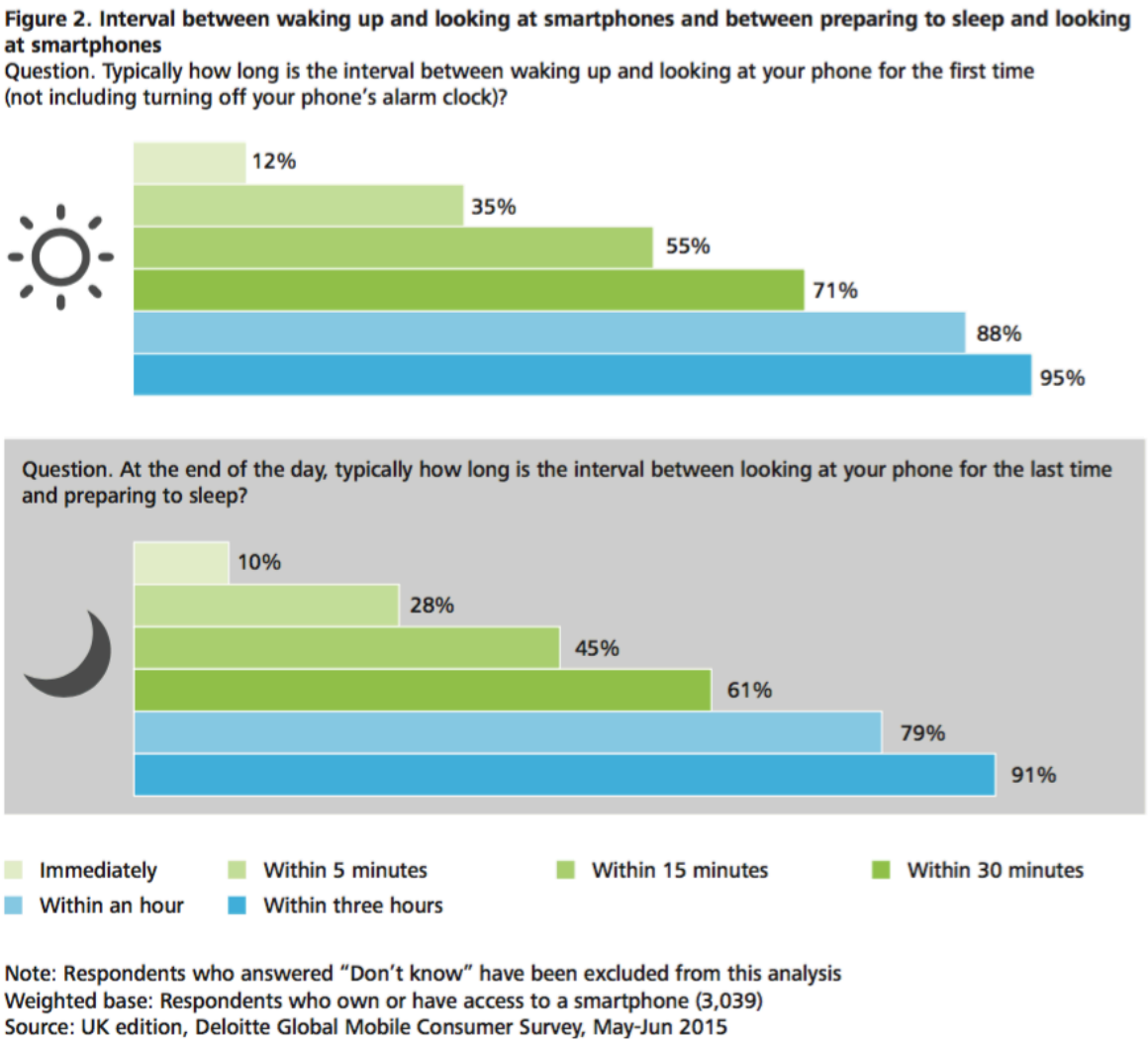
Figure 1. Usage of smartphones while doing other activities
Question. How often, if at all, do you use your smartphone while doing the following?



Note: Respondents for whom a particular activity does not apply have been excluded from this analysis (e.g. respondents who do not work have not been asked if they use their phone in a business meeting).
Weighted base: Respondents who own or have access to a smartphone (3,039)
Source: UK edition, Deloitte Global Mobile Consumer Survey, May-Jun 2015

(Figure 3, Usage of smartphone while doing other activities .Lee and Calugar-Pop 2015)

The smartphone also impacted on what consumers do minutes before waking up or minutes before going to sleep, shown in Figure 4 done by Deloitte Mobile Consumer 2015 report reflecting UK consumers:

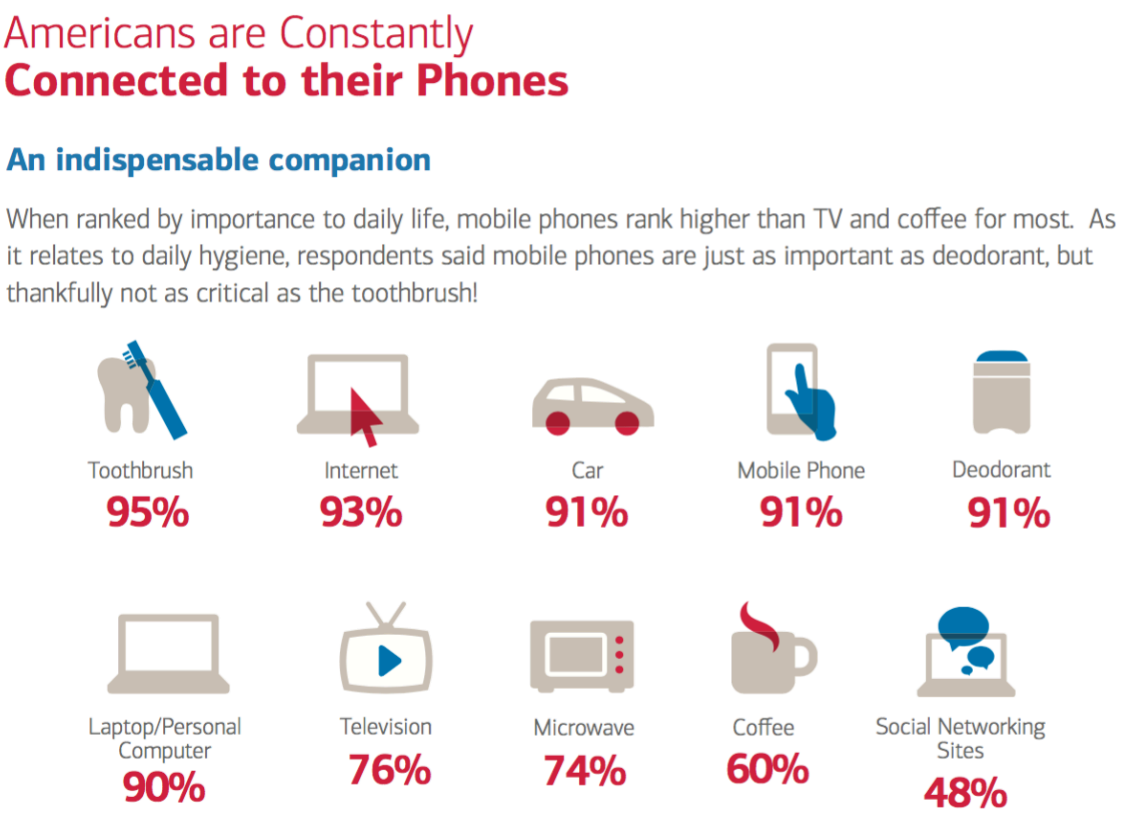


(Figure 4, Consumer behaviour before and after going to sleep. Lee and Calugar-Pop 2015)

Consumers now give high relevance to be able to do their communications, banking, shopping, entertainment and other activities while resting or on the go, leaving the laptop or

any other form of desktop for activities that are yet not available or require more processing power than smartphones can provide at this stage.

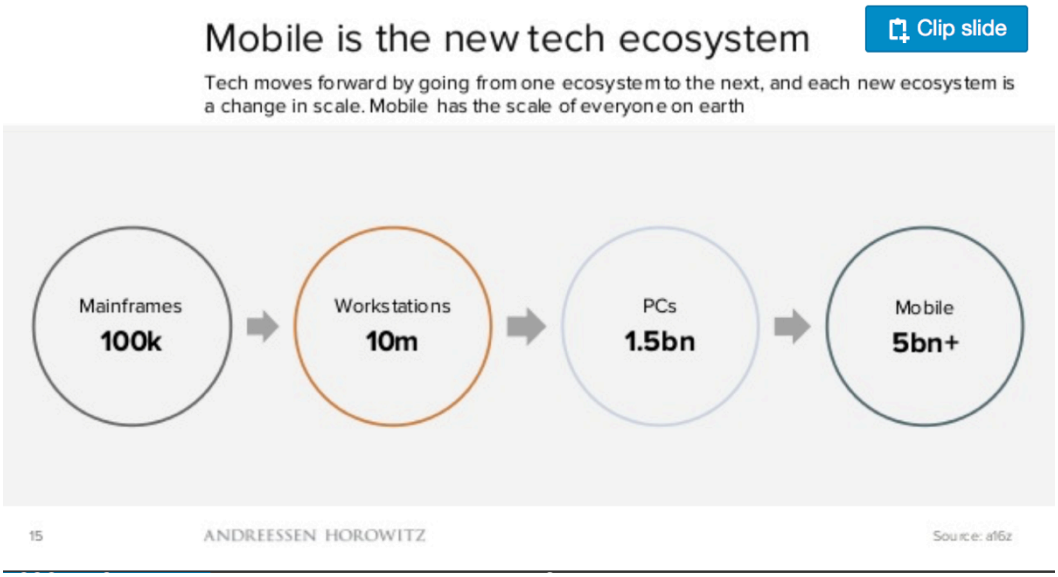
Consumers now in the US valued a smartphone as high as the importance of a car, as shown in Figure 5 from Braun Research report for Bank of America:



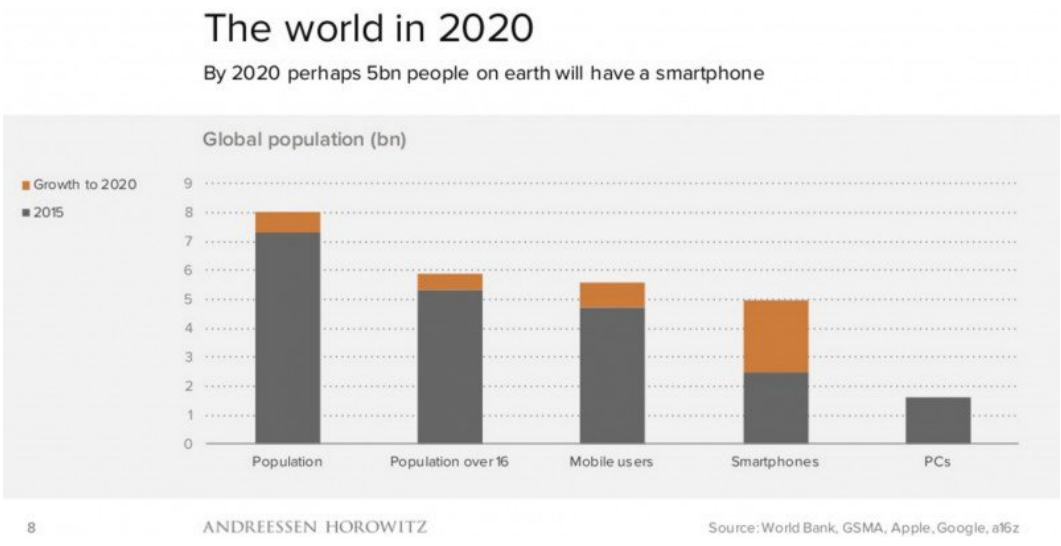
(Figure 5, When are Americans using their phone. Braun Research, 2014)

This smartphone revolution isn't even 10 years old, however as devices become cheaper and more powerful, and data becomes also cheaper and quicker, accessible to consumers not only in developed nations such as UK but also in developing countries like India, it has room to become the main, or even only, device consumers will use and own in the future (World Bank, 2016).

Another interesting consumer behaviour that emerged with smartphones and broadband is the ability to read reviews to make inform purchase decisions on the go. Consumers now compare competitors website or read on social media s others are saying about the product or service. This forced companies to re think how they do business, acquire and maintain customers (Haycock and Richmond, 2015).



(Figure 6, Mobile has outgrown personal computers. A16z, 2016)



(Figure 7, World in 2016: smartphones will grow even more. A16z, 2016)

Comparing Whastapp with Vodafone, the results are clear. A team of 55 people over at Whastapp, in five years, built an audience of 450m users. Vodafone took 23 years and a team of 93,000 employees to achieve a similar number of subscribers (Haycock and Richmond, 2015). Apps like Whatsapp led to a $32.5bn decline in telecoms revenue globally. It is not just in telecoms, there are other examples of incumbents in other sectors who also saw their industry change by startups (Haycock and Richmond, 2015).

Currently 2 billion people worldwide don't own a mobile phone, and around 4 billion people are still offline (World Bank, 2016). With the adoption rate of smartphone and the expansion of cheap and fast mobile broadband, this gap will continue to rapidly decrease.

2.3. Lower costs in technology

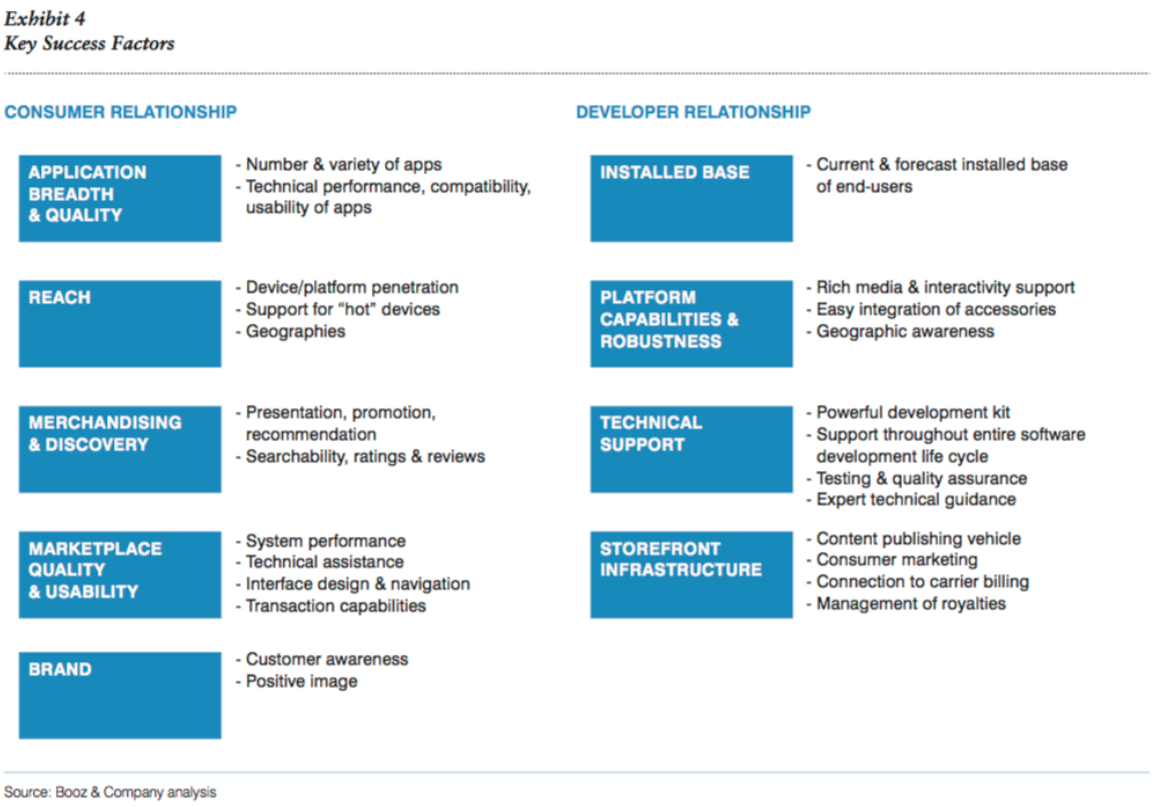
Costs of starting a business have fallen dramatically, technologies have quickly accelerated and that helped reduce costs. Running a basic Internet application, according to Marc Andreessen, founder of Netscape and now a partner at Andreessen Horowitz, in the year 2000 was of $150,000 a month. In 2016 the cost went down to an astonishing $1,500 a month (Haycock and Richmond, 2015).

Cloud changed IT and has facilitated the development of new businesses. Instead of buying servers, hiring a system-administrator to maintain and run the servers, businesses now rent a space provided by another provider such as Amazon, Microsoft or Google, and therefore can increase processing power and storage capacity (Economist, 2015). Scaling a business according to demand is now easy, which allows businesses to save money and headaches as they grow. Costs in this sector are also coming down as competition rises with players like Oracle, IBM, SAP increasing their offer, and also as technology become cheaper. According to Citigroup, prices in the last three years have fallen around a quarter (Economist, 2015).

Open Source Software also had a great impact. It allowed startups to be able to exist today. The movement initiated in the 1990s, impacted the cost and availability of software that developers have access today (Haycock and Richmond, 2015). It transformed the software industry. F/LOSS (free/libre open source software) allowed for open innovation, allowing for convergence and collaboration of individuals alike (Lindman and Rajala, 2012). These startups today can use the infrastructure that were created, developed and maintained by the community. The open source community allows for these startups to share resources,

easily implement a new feature in their application. Open source reduces the time that it takes a startup to develop and release a product, and reduces the cost significantly as oppose of having to build everything from scratch.

Lastly, the role ecosystems or marketplaces, such as the Apple App Store and Google Playstore had in allowing for "the software company" category to exist (Haycock and Richmond, 2015). Developers, in return of a cut from their sales don't need to worry any longer about the channel where they are going to display and sell their creations. These mobile application stores serve as gateways to apps (Appling and Pappalardo, 2010). These apps stores are linked to the explosion we seen in the smartphone penetration. As it shown in the Figure 8 from the report on "The Rise of Mobile Application Stores" by Booz & Company, the marketplace model facilities not only the developer but also the consumer:



(Figure 8, Key success factors for the apps marketplaces. Appling and Pappalardo, 2010)

This model 1) brings confidence to the consumer and 2) makes it easier for the consumer to get to the application with "no frills". This is because the consumer comes trusts Apple or Google, by being the owners of the store, to take care of the verification of the app quality and for taking care of the payment. Apple or Google also ensure the app complies with their rules to exist in that ecosystem; therefore, the consumer doesn't doubt the developer and has reassurance in regards to his safety. As costs continue to go down and technology that was expensive before starts to become accessible, it will benefit startups that are developing technology products, but also consumers.

2.4. Opportunities for more disruption

These changes for banks are causing more fear than opportunity (Krishnan, 2014; King 2014). According to Scott Bales, a founding member of Moven and the innovation director at Next Bank: "Mobile is changing our ideas of how the world works. In the past, when you needed information, you went to a library. When you needed a book, you went to a bookstore. When you needed your favourite recording artist's newest album, you went to a record store. Today, you can do all of that on your mobile device—you don't have to go somewhere to do something." (Krishnan, 2014).

Retail banks fear this change, because it means that like other business models that were disrupted recently, theirs could be next. Banks fail to understand so far that the force behind mobile banking is not technology, but behaviour transformation from the consumer (Krishnan, 2014). Internet has impacted sales and distributions industries, yet in regards to retail banking model we are recently starting to see changes in this space because of the Internet (Haycock and Richmond, 2015).

Most banks haven't changed their client web since the 2000s (Haycock and Richmond, 2015), with basic functionalities that make it more of an digital static statement than a platform which clients can interact with and fulfils their banking needs. The problems don't end on their web offering, it affects also their mobile offering, which leaves room for new entrants to enter the market and disrupt (Haycock and Richmond, 2015). Consumers expect banking to allow them to use mobile in the same way like other services they have on their pocket, always on, no interruptions on the service and from anywhere, everywhere. Banks

understand that mobile is important and they can't combat it by creating fear among consumers of insecurity, instead they need to understand that they need to tackle it heads on to remain relevant (Krishnan, 2014; King, 2014). Currently mobile is already the largest banking channel for the majority of banks by volume of transactions, and the growth of mobile is higher in developing countries such as China and India, as contrast with developed countries such as the UK and US (Hodgkinson, 2015).

More people are using smartphones. Costs of developing apps are lowering, plus, consumers are changing their behaviour to centralise their life around their personal device. All of these are opportunities for new entrants to enter the market ready to disrupt.

(Figure 8, State of connectivity around the world in 2015. Facebook, 2016)

2.5. Fintech startups disruption of the current retail bank business model

Fintech startups are aiming to disrupt the retail bank business model, stealing market share that once belong solely to finance service providers such as traditional banks. Startups benefit from being more agile by having smaller teams, less physical infrastructure to sustain, and a product that is essential just computer code (Haycock and Richmond, 2015).

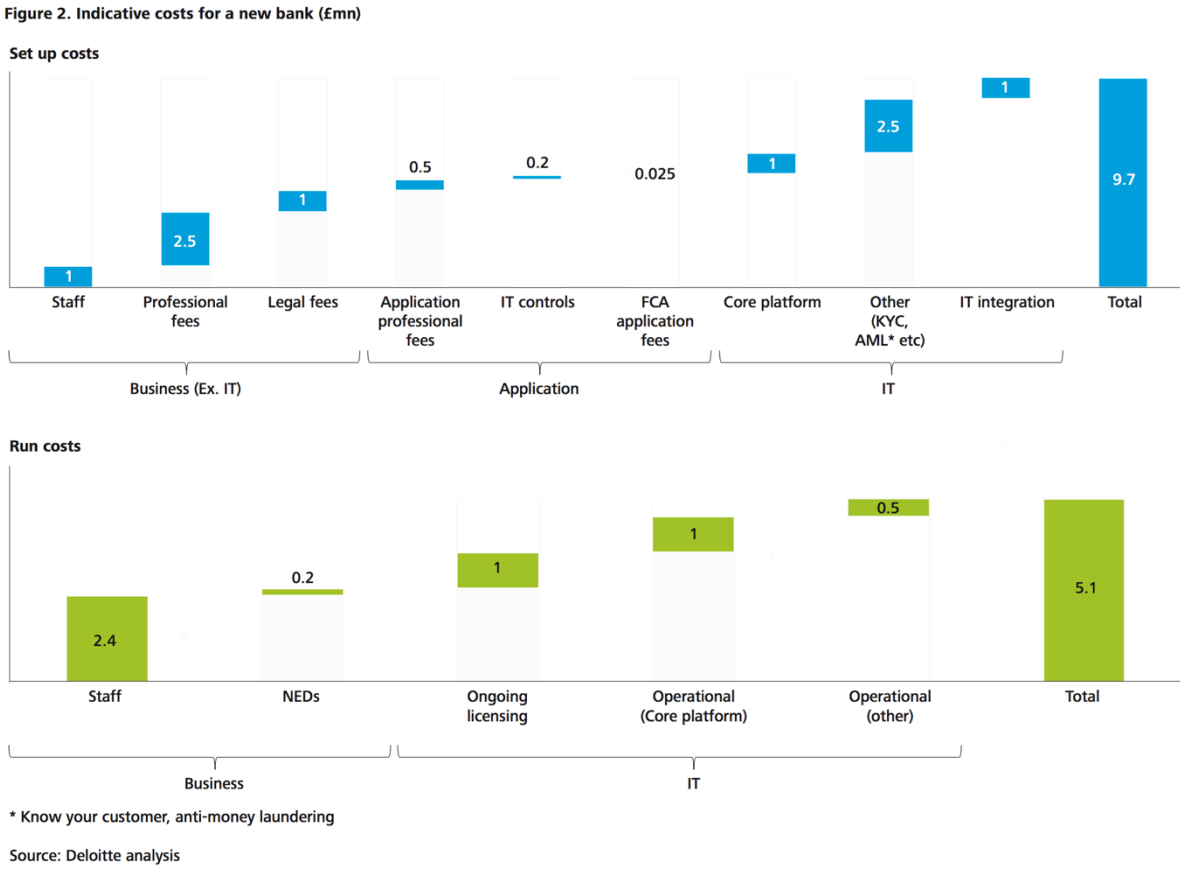
Disruption can happen anywhere. As seen in Kenya, the mobile phone and deregulation allowed the creation of a service like M-Pesa, giving population quicker access to transfers, adding safety and effortless, with the simplicity of using text messages. M-Penza users send money from the city to countryside in seconds, and this service presented as a great alternative to creating a banking infrastructure which would have cost more (World Bank, 2016). Initially lack of regulation and because of the operator of M-Pesa monopoly, a transaction cost of a transfer of KSh500 (US$4.91) was KSh66, but in 2014, Kenya's Competition Authority changed the rules and opened the system to other mobile operators making the transaction cost fell to KSh44 (US$ 0.43) (World Bank, 2016).

Banks have been eager to customise experiences for users to try to lock them in, so they can return as a valued customers and drive their business, locking them down and making it harder to change (Dapp, 2014). However, they have fail in comparison with other Internet startups that are at its core technology-driven operated businesses (Dapp, 2014).

According to Thomas Dapp from Deutsche Bank Research:

"Many large internet platforms and technology-driven start-ups operate their business with (personal customer) data in a very professional manner. They offer diverse individualised services based on data analysis. With the help of sensor technology, smart tracking software, a multitude of data sets, including personal profiles and smart algorithms, they will in future be able to make automated predictions about certain behavioural preferences (not only online) on the basis of simple correlations and transform these into innovative products and accompanying services." (Dapp, 2014).

Startups are competing with traditional retail banks by improving customer experience first (Haycock and Richmond, 2015). This is currently the biggest advantage for the new entrants in the market. They also benefit from a simpler and smaller organisational structure and infrastructure costs, allowing it to easily change their offering, adapting to customer needs and requests, ability to quickly experiment as iterations are constant and updates frequency are fast (Dapp, 2014).



(Figure 9, Costs by department to set up and run a new bank. Deloitte, 2016)

Deloitte estimates that the cost of setting up a small bank is of £10m today, and the cost to run it per year is of £5bn (Deloitte, 2016).

2.5.1 Unbundling the traditional business model

Some fintech startups are not only offering the same product offering as a traditional bank, some are going a step further by dismantling it, and offering a new product, different from what we have until today (Haycock and Richmond, 2015).

Banks offer many products that interconnect to the same client, however these products are all separate businesses in itself, with separate compliances teams, technologies, experience and this causes more problems when trying to integrate it to try to change it. Legacy systems or even compliance makes this integration hard, fail often and create problems for banks to innovate. This also happens in other sectors such as health, because of inflexibility in their legacy systems, the myriad system and processes make it hard for the hospital to handle the patient records, being unable to provide a good and consistent customer experience to the patient.

In specialising in only one product offering, fintech startups focusing in providing a better user experience to the customer. They remove any burden that comes from mixing different teams and departments, which also brings costs down that allows them to continue to invest in improving the product and offering to the customer.

We can categorise these startups into different areas:

- Everyday Banking
- Lending
- Savings and Investments
- Payments
- International Currency Transfers
- Personal Finance

(Figure 10, Some of the startups currently trying to disrupt each sector group by different areas)

2.5.2. Everyday Banking

These fintech startups provide digital banking accounts, deposits, mortgages or savings to customers. Their model focus on having no branch network, everything is carried out over the smartphone (and online). Infrastructure is sometimes outsourced, and most importantly,

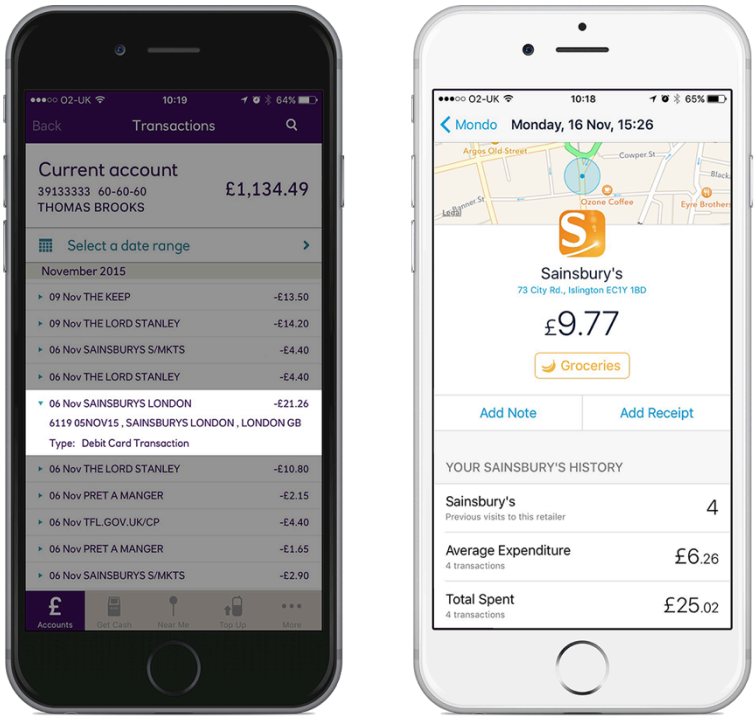
they have no legacy issues (Haycock and Richmond, 2015). Customers get a reply to their query in less then one day, making the experience spotless and consistent. They offer automatic savings, real times updates, where you spend the money via geolocation heat maps within the app.

Atom manage to raised £25 million without having a product out in the market, and Mondo managed to raise a total of £7 million in funding, off which £1 million was done over crowd funding (Baker, 2015; Williams-Grut, 2016). These shown that investors believe that these entrants can disrupt the everyday banking scene with their propositions, or it could be that some are just hoping for a buyout from a traditional bank, as BBVA did in 2014 when it acquire Simple (Alden, 2014).

The people in charge of these startups have past experience within banking or at least been involve with finance. Atom bank is lead by Mark Mullen, previous CEO of First Direct. First Direct improved telephone banking and introducing online banking when it was created. Anne Boden, former COO of Allied Irish Banks, founded Starling. Tom Blomfield, that previous founded GoCardless, founded Mondo. Initially these startups could only act as digital skins to other bank, as they operated under that bank's license. However, with the recent changes in regulation to attribution of baking licenses, it has changed their ambitions and what they set out to accomplish. Atom has already been granted a banking license, while Mondo is still waiting for its approval. These changes were desired for a long time.

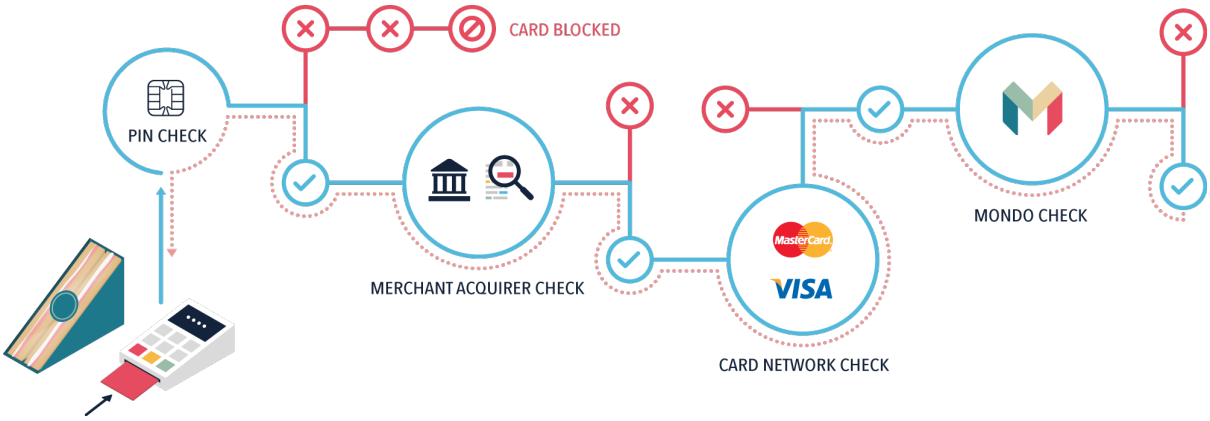
Mondo on Everyday Banking

Mondo at the time of writing is invite only, unless joined in the alpha group or as an investor. Everyone can register, however to get an invite you need to wait in a queue system, just like it happen to Mailbox or Robinhood. This creates hype, rewards first timers and lets them control the inflow to ensure a consistent product and avoid under capacity. Mondo allows in app searching by metadata groups such as Groceries or Eating out, provides graphs to check our spending on a specific month, shows a map where we did that specific transaction or a monthly report of where we spent our money, sends users alerts as soon as they used the card, as if it was a WhatsApp message. All of these in an iPhone app. Mondo is more than a digitalised bank statement, it actually provides a unique new experience that joins together form with function. It makes banking enjoyable.



(Figure 11, Comparing a legacy bank mobile app on the left with Mondo on the right. Blomfield, 2015)

Mondo does things that banks could already have implemented with their existent offerings, yet these features still amaze some banking executives, according to Tom Blomfield at a recent Mondo Alpha event. A user can freeze or unfreeze its card in app with a push of a button without having to call the bank, which it is still a novelty in a big retail bank. Mondo uses MasterCard data to track users expenditures, so if a user buys something on Sainsbury, Mondo grabs that data from MasterCard, which allows Mondo to provide the user a lot more info on the purchase when they are using the app. Even something simple like ordering a replacement debit card can be done over their app, while on a traditional bank a call or branch visit is necessary. This is already available to others, so why don't traditional banks use the same data and provide the same tools for consumers? Legacy problems? Perhaps.

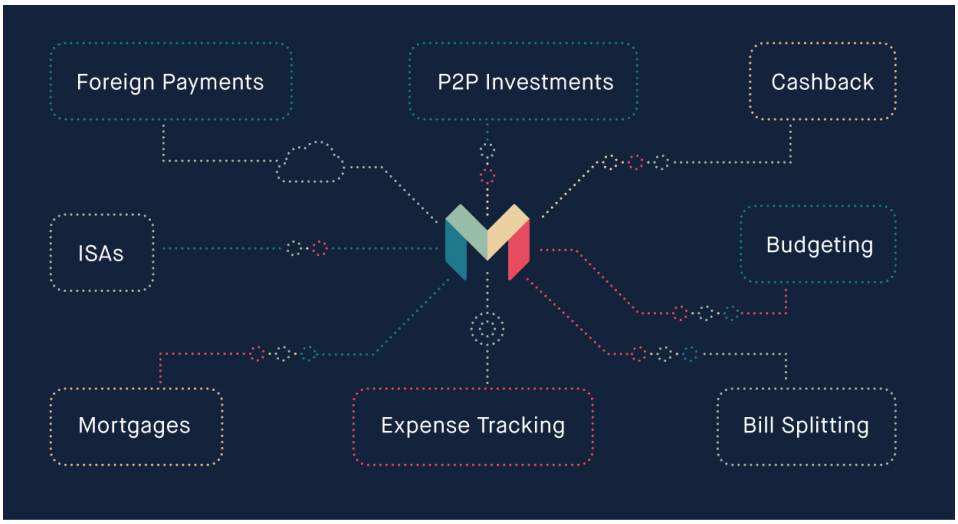


(Figure 12, How a card payment works. Blomfield, 2015)

According to Tom Blomfield, one of Mondo biggest tools is that it specialises on everyday banking and therefore focuses on developing a consumer experience that benefits users

solely on this particular area. Being a small startup with one unique specialisation allows them to change the product fast, meeting customer's demands and necessities.

It is not smart to think of Mondo or any other everyday bank fintech startup as just replacement, instead one should think of them as marketplaces. Its wrong to think that Mondo is striking to go after the same culture used by traditional banks of "owning the customer", bringing customers in, by offering incentives and then profit from selling a higher profit financial product such as a mortgage (Blomfield, 2016). Instead, Mondo is aiming to create a marketplace, where Mondo is the platform that connects to other services from within Mondo, removing the need to change provider. A costumer can send a transfer abroad with TransferWise or lend money in Zopa from within Mondo. Integrating these services allows for them to compete with each other, having the customer benefit in the end, while at the same time doesn't remove the focus of Mondo of being good at everyday banking, allowing to save costs and avoid legacy problems moving forward as they grow.



(Figure 13, Showing Mondo as a marketplace in the future. Blomfield, 2016)

Mondo users will be able to decide base on price, convenience and customer-service (Blomfield, 2016). Tom Blomfield acknowledges that Mondo isn't for everyone (Baker, 2015), he understands millennials will have the biggest appeal to use such bank. Mondo is now building towards millennials — the future clients that will have the most access to income in the next decades and can sustain their business model.

2.5.3. Lending

Lending is normally the department where banks make the most revenue (Haycock and Richmond, 2015). There are two types of lending startups:

1) Direct lending focusing on providing consumers access to loans directly via their website based on consumer credit scoring that are access via machine learning or other methods. Wonga is one of most well known.
2) Marketplace lending startups provide platforms for consumers to connect to borrow or lend to other consumers. These are known as peer-to-peer marketplaces, although some institutions nowadays are also present in these marketplaces.

Let's focus on peer-to-peer lending solely for simplicity. Peer-to-peer lending has grown tremendously recently, as banks 1) lowered their savings rates dramatically due to central banks interest rate cuts, and 2) made it harder for people to get access to credit.

Zopa launched in the UK on 2005, Lending Club followed in 2007. In the US, Prosper was funded in 2006. Since then more startups entered these market. These startups were under a

lot of pressure at the beginning, when a lot of lenders defaulted on payments, making investors lose their investment. However, in order to fix this they improve the credit risk profiling for lenders, which is now one of the their biggest core assets (Haycock and Richmond, 2015).

These startups have grown tremendously. Lending Club IPO valued the company at $8.5bn. Lending Club has facilitated over $1.4bn in loans in Q4 of 2014, doubling 2013 (Haycock and Richmond, 2015). Looking at Lending Club website today, numbers from Q4 2015 show the amount of loans they facilitated was of $15bn, more than double in the same period of 2014 (Lending Club, 2016). It is also possible to see that the Adjusted Net Annualised Return for interest on loans ranges from 5.24% to 9.3% (Lending Club, 2016). In the UK, Zopa has lent £530 million in 2015, which equals now to over £1.2 billion in total since it started operating. According to the Peer-to-Peer Finance Association, in the UK, P2P has serve to lent more than £2.2 billion in 2015. (Zopa, 2016).

In a period where interest rates are dramatically low, these provide a good alternative for consumers comparing to savings accounts offers by traditional banks, currently with interest rates lower than 1% (Verity, 2016).

2.5.4. Savings and Investments

These startups help investors save with automated investment vehicles and advice, and serve as alternatives to bigger traditional brokerages. Some pair human advice on portfolio management with algorithms. Also worth mention is the rise of robo advisor, startups that

take care of investor necessities by recurring solely to fully automated algorithm base investments.

Nutmeg in the UK, founded in 2011, managed to attract $32m on an investment from Schroders (Williams, 2015). In the next decade, assets managed by robo advisers could reach $5tn (Williams, 2015). Citigroup says millennials will powered this grow, since they are comfortable investing online (Williams, 2015). Looking at the numbers Nutmeg sent the Companies House in 2014, the firm made a loss of £5.3m on a turnover of £635,381 (Williams, 2015), meaning they are still operating in the red, even though more and more people are switching from active investments funds to passive funds, with the rise of ETFs popularity, such as the ones sold by Vanguard, BlackRock (iShares) and Fidelity (Forbes, 2015). Maybe millennials still don't have the necessary capital? Or is it because consumers still aren't looking for a sexy digital interface in investing as they look in everyday banking? Because they don't recur to is as often. Can it be because Nutmeg fee is 0.95% and Vanguard for example offers 0.35% + brokerage commission? Nutmeg provides an easier process when a customer wants to start using them compared to other providers. Also, traditional asset managers are also looking into getting a piece of the pie. Some even want to remove the middleman of the brokerage firm. Fidelity has started a pilot to test automated robo investing service, hoping to combat these new entrants but also be competitive with the likes of Vanguard, offering fees for automated money management under 0.4% (Tergensen and Maxey, 2016).

Startups like Acorns and Digit in the US and Wollit in the UK, allow for consumers to link their accounts or debit cards, and round up every time they do a purchase and save that

amount. All of these three work solely within an app on the costumer's smartphone (Cipriani, 2015). It can be an effective way for consumers to save money without realising and has the potential to grow, unless banks capitalise to this within their mobile apps.

Lastly, is worth mentioning Robinhood in the US. Robinhood allows users to trade equities at a very low commission using their smartphone. It got so much popularity that the queue to get an account spiral out of control. It serves for anyone to trade at $1 commission on its iPhone, anywhere they are. It focus in providing a much better user experience to the user, with better interface plus the added convenience of a cheaper commission compared to traditional competitors.

2.5.5. Payments

Payments are one of the biggest areas where most startups are now trying to disrupt. Either by sending payments to friends (Venmo), easing merchants on accepting payments from online or offline customers (Stripe and Square), by making bank transfers simpler and easier, cheaper and simpler to do (Dwolla and GoCardless) or simply by being a Wallet where you can store your cards to use anywhere (Apple Pay and Google Wallet). Paypal is one of the biggest household names. This is probably the sector from fintech startups that currently has more exposure to consumers, since Paypal exists now for over 10 years and others like Apple and Google using their dominant power in resources, marketing, market share are spread the word on the technology for people to know about and use it. Therefore, is the author opinion that this is the section, which deserves the least attention on this paper.

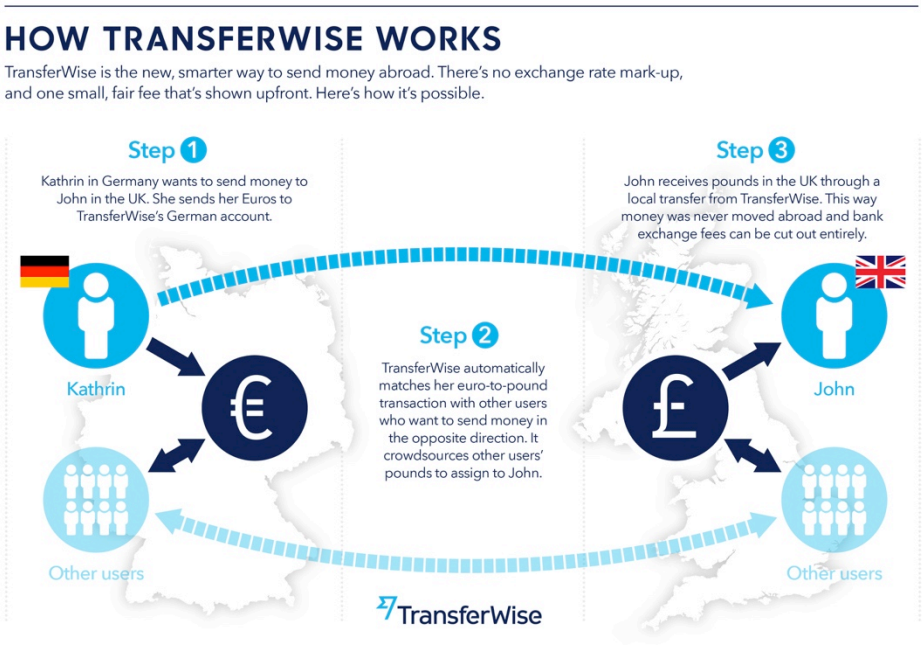
Still is worth mention that communication apps are also getting into the payment area. Examples are Snapchat and Facebook Messenger, which now allow users in the US to send payments by just typing "$10" in their conversation chat with a friend.

2.5.6. International Currency Transfers

These startups enable people to transfer money to another region of the world, either between personal accounts, friends, family or to pay other businesses.

They have been gaining tremendous popularity because they offer a very competitive fee compare to other traditional banks or services, and are very quick at transferring the money to its final destination, something that competitors can't offer on most cases.

Their business model is different from other traditional players. They focus on peer-to-peer transfer. Using TransferWise as an example. A peer from Germany wants to transfer money to the United Kingdom. It transfers domestically in Euros, taking advantage of the Single Euro Payments Area to TransferWise account in Europe (Estonia currently). After, TransferWise will do the conversion to British Pounds, and then transfer that amount directly from its UK account to the final destination. Meaning peers exchange currencies "domestically" with TransferWise acting as middleman. That same explanation can be seen in the image bellow.



(Figure 14, How Transferwise works and peer-to-peer transfer work. Harvard Business School, 2015)

TransferWise and FundingCircle manage to achieve a billion dollar valuation in less than five years, showing that new entrants are already disrupting the retail banking model (Haycock and Richmond, 2015).

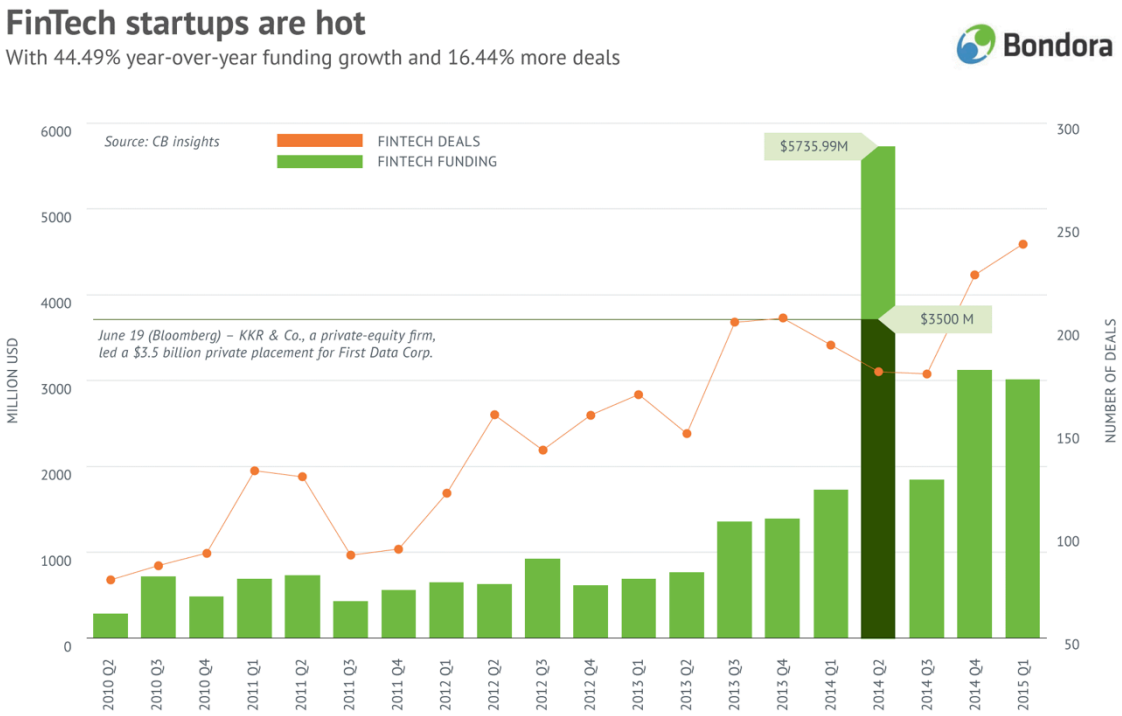
These are also the hardest startups for a traditional bank to replace. Rather than trying to compete or buyout, banks would prefer to collaborate with the likes of TransferWise, because their operation is more lean than a bank can every achieve. However these startups pose big treats to WesterUnion and MoneyGram a like services, that have high costs with branches and have a big complexity of legacy problems within that make it complicate for experimentation with new business model propositions.

2.5.7. Personal Finance

Startups that offer tools and advices to manage personal accounts, expenses, budgeting, and personal financial planning. In the US Mint allows users to connect a bank to its platform, and from there they can see how much they spent, budget and track everything related to their financials. In the UK OnTrees was bought by SuperMarket.com, meaning that this companies that provide insurance, credit cards and such comparisons understand that having platform like this in house can feed them with a lot of data for prospective clients.

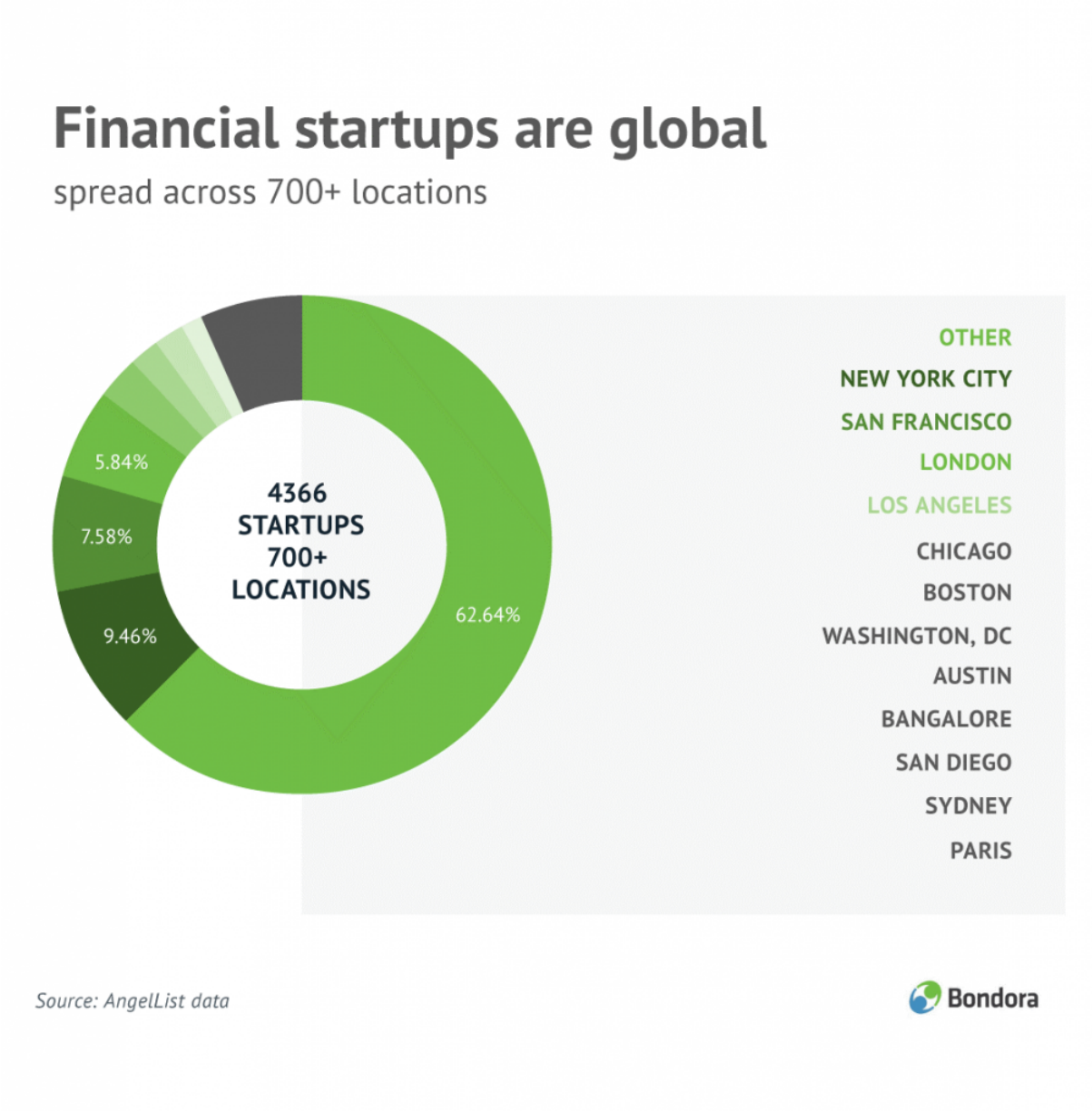
(Figure 15, SLEPT analyses on specialisation of these Fintech startups).

Fintech continues to attract a lot of money from venture capitalist, private equity angel investors and even some institutional investors (Bondora, 2015).



(Figure 16, Showing how much money has been invested in Fintech Startups. Bondora, 2015).

Fintech startups are now attracting mega rounds, which are deals that are worth more than $50 Million (CB Insights, 2016). It is easy to assume that most of it is done in cities like San Francisco, New York or London, yet, if we look at AngeList, over 60% of these startups are spread across the globe. So while the money is in the US, the startups are everywhere.



(Figure 17, Showing where the money has been invested around the world. Bondora, 2015).

What about security? Can consumers trust their money to these startups? The biggest problem could be, being unable to coupe with an attack on their infrastructure. However here the provider of that same infrastructure protects them, unless the infrastructure is in house. These startups will adapt more quickly to any security threat than banks. Such as using the latest technology such as biometrics (voice, face, finger recognition) or 2 Factor Authentication like many apps already use. From a consumer point of view, the fact that

these apps are on the Apple App Store and Google Playstore also brings them added reassurance that they are legitimate, making these stores the pillar for these startups to gain consumer confidence. Regulators also verify these startups like the FCA, which brings another layer of trust to consumers. Is it true that consumers are looking for change, and scandals with banks, especially since the Financial Crisis in 2008, make less scared of trying something new, someone that is less greedy and actually thinks of the costumers for a change instead of profits, or at least it portraits that way.

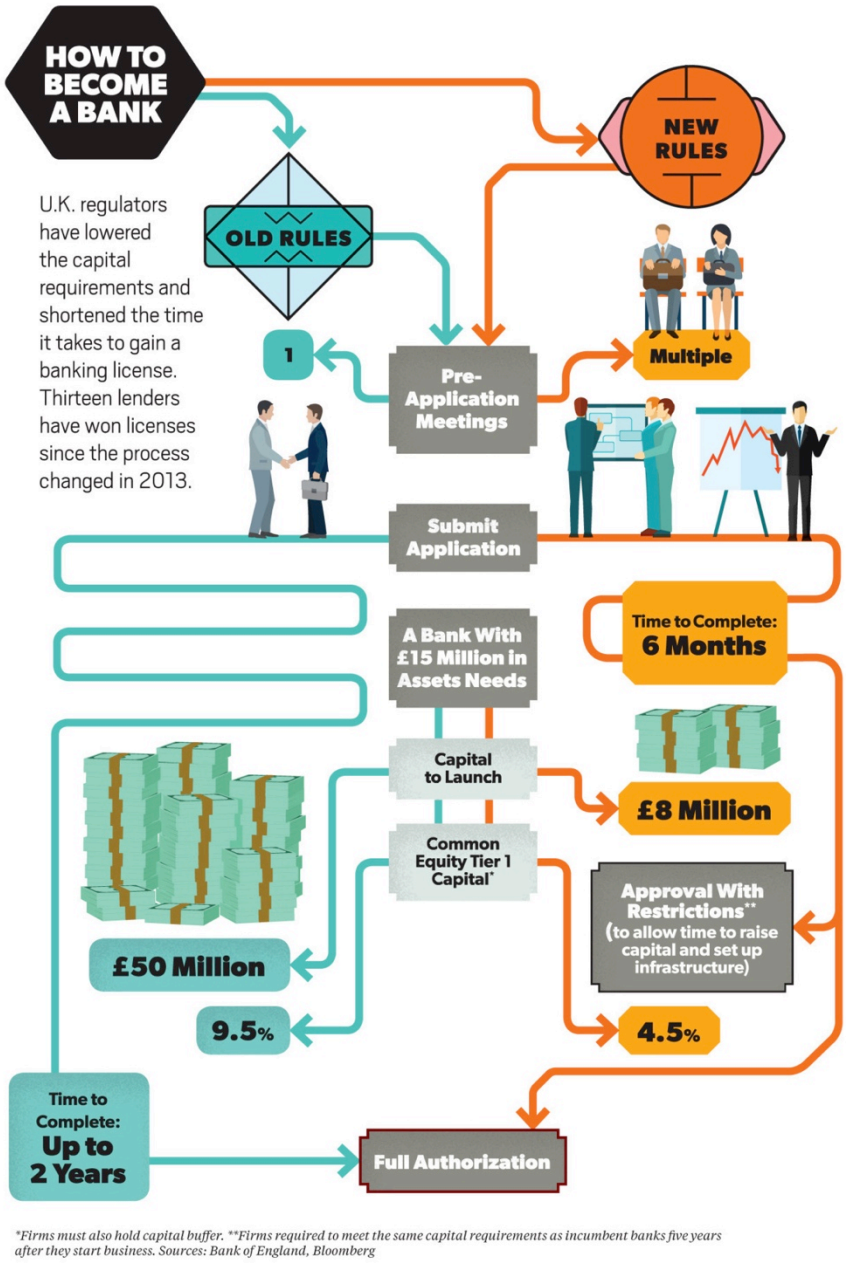
Traditional banks are still acting like traditional banks, while these startups that are aiming to disrupt them are acting like technology companies, and this has already cause disruption in other industries in the past.

2.6. Regulation, a double hedge sword

Regulation at this point can't keep up with the rate that Fintech is growing and this is alarming. It benefits traditional established competitors, but it makes entry of new players harder. This is a common complain by startups trying to establish a new enterprise in this area.

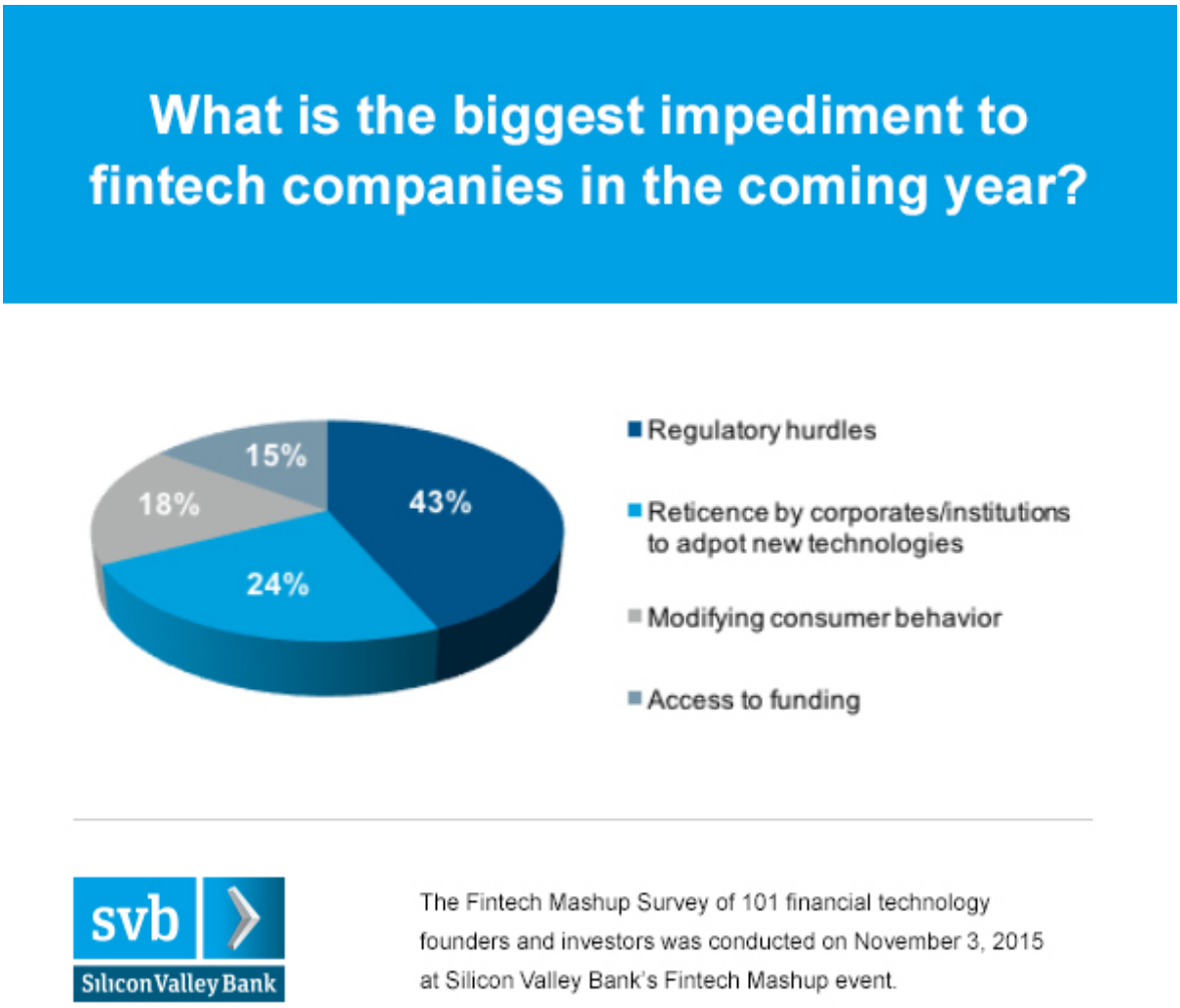
It used to be hard to open a bank in the UK, the process was long and it required millions of pounds of upfront as capital with no guarantees if the regulator would issue the license to operate (Baker, 2015).

Regulators understand these roadblocks, and together with the push from government started to make room for these startups to enter the market and compete with established institutions. These can been seen by initiates like the New Bank Startup Unit, that serves to provide information and support to new authorised banks and also for any startup thinking of becoming a bank in the UK (FCA, 2016; Bank of England 2016). As regulation eased more and more startups are eager to apply for a bank license, in 2014 a total of 29 firms applied within the FCA (Boyce, 2014). Startups like Mondo already applied for a banking license to operate as a bank, while Atom has been granted a banking license already to operate (Boyce, 2015). The changes in the process can be seen in Figure 18.



(Figure 18, Before and after on the requirements on how to become a bank. Baker, 2015)

Fintech startups always argued that the biggest roadblock for their growth was regulation (SilliconValley Bank, 2015), as shown bellow on survey result done by SilliconValley Bank in 2015.



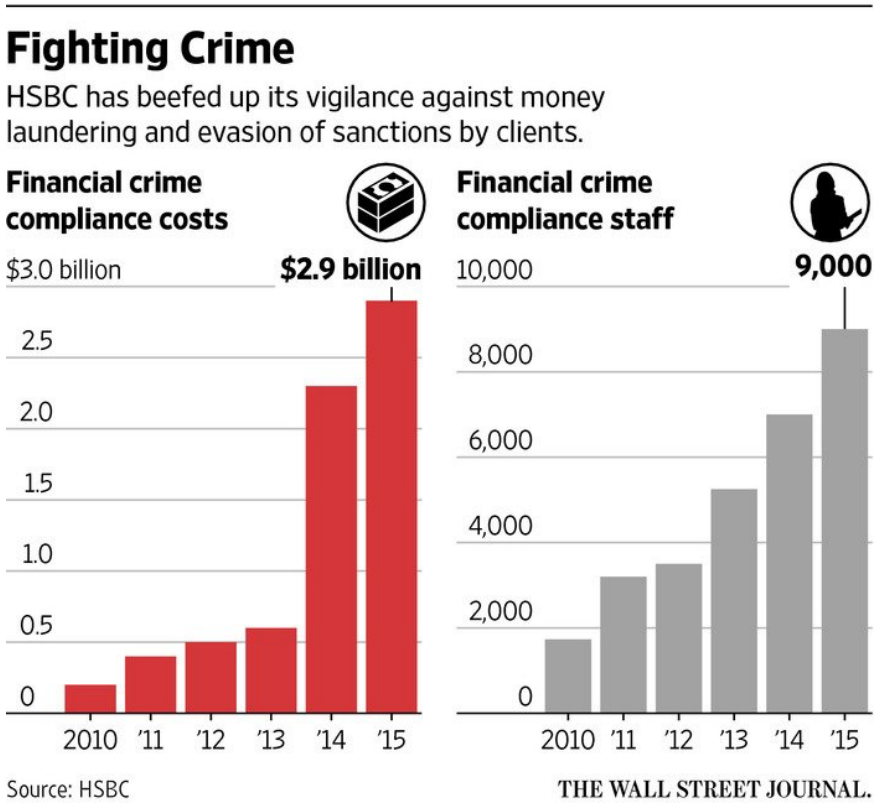
(Figure 19, Biggest impediments to Fintech growth in 2016 in the US. SilliconValley Bank, 2015)

Many in the industry assumed that regulation acts as a pillow, protecting the established traditional banks (Haycock and Richmond, 2015). Could this be the inversion of the trend? Traditional banks getting hurt with easing of regulation? Allowing fintech startups to grow, pushing the sector to innovate.

2.7. Traditional retail banks

British banks innovation is lacking. The big four banks, control 77% market share of a total of 65 million personal accounts in the UK (Baker, 2015). Customers are unhappy with their current bank, only 60% said they were satisfied with their bank, in a survey done in 2014 by Accenture (Baker, 2015).

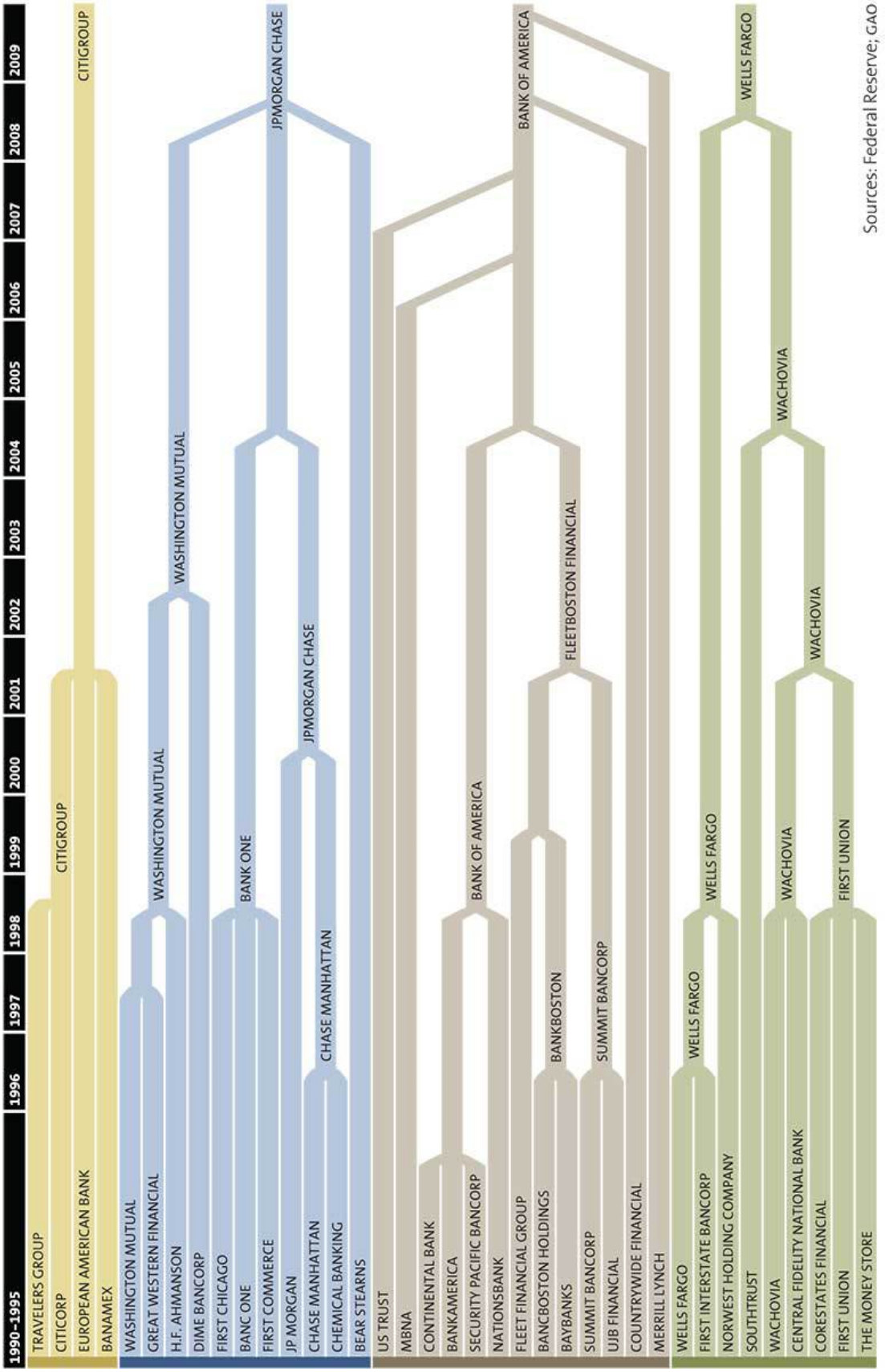
Banking giants are facing the challenge of having very high costs in big departments like compliance. This also makes creating changes hard, as oppose to the fintech startups that have a more agile and lean structure, with less costs (Haycock and Richmond, 2015).



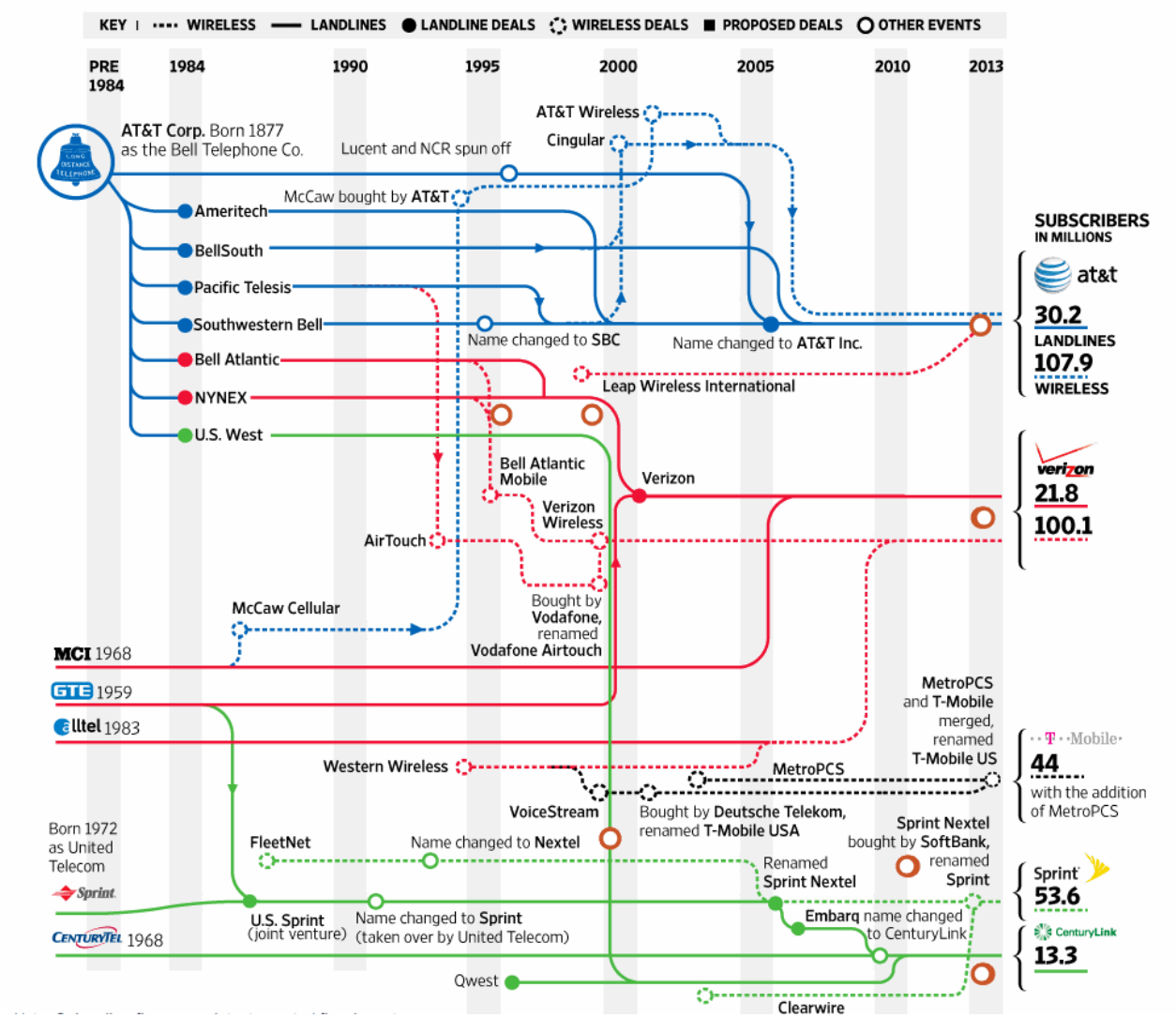
(Figure 20, HSBC increasing spending on compliance staff. Erheriene and Patrick, 2016)

HSBC has 9,000 employees working in compliance, still monitors found that HSBC since the 2012 settlement with Justice is still struggling at preventing money laundering (Erheriene and Patrick, 2016). That puts banks in a position where they can be disrupt, because the snowball keeps getting bigger and bigger, but it doesn't effectively revolve the problem or eliminates costs.

Problems arise on the front end but also on the back end. What if blockchain serves as a solution for solving this? Can this be happening because margins are getting smaller, costs are getting higher due to legacy problems, and consolidation is the only way to continue on top with extra power to combat this new way of competitors? In the same way to what happen with telecoms, that started to merge in the US because as consumers and businesses moved away from phone calls and text to data, new competitors cut margins and to avoid losing leverage, scale and dominance the established players recurred to consolidation as a solution?



(Figure 21, Recent history of bank consolidation in the US. Wright, 2016)



(Figure 22, Recent History of telecom consolidation in US. Altenburg, 2013)

It is a reality that banks are cutting costs by closing branches and reducing employees (MacAskil and White, 2016), technology is helping with requiring less employees (Baer and Rexrode, 2016). But lower interest rates are damaging the banks, as well as lower spreads on mortgages and the increase in competition (Verity, 2016).

Some traditional banks are trying to correct the fact that they didn't invest as they should until today in technology. They are now spending billions a year, not only to maintain old

legacy systems, but trying to get them up to date (Jenkins, 2015). Some banks are also trying to buy other emerging models. BBVA from Spain recently bought Simple. Santander from Spain has also created funds to purchase Fintech startups (Jenkins, 2015). BNP Paribas created Hello, a bank focusing solely on mobile that operates in the Eurozone (Jenkins, 2015). But did Simple agreed to sell because the founders wanted to cash out, or because they were having trouble growing?

Do consumers trust the new entrants? They haven't been here for long compared to traditional banks. Banks have always been known for security. Some of them exist as for more than 100 years. Consumers know regulations are in place to protect them. Banks are able to contain attacks in regards to cyber security, although that is costly because they control the whole infrastructure, and therefore are ultimately responsible for it. Banks like HSBC are now embracing biometrics in their mobile apps, such as using Apple TouchID (Zillman, 2016). Banks like Lloyds use telephone automated calls to verify costumers, although in today age we have to ask if the telephone line is still as secure as it was once.

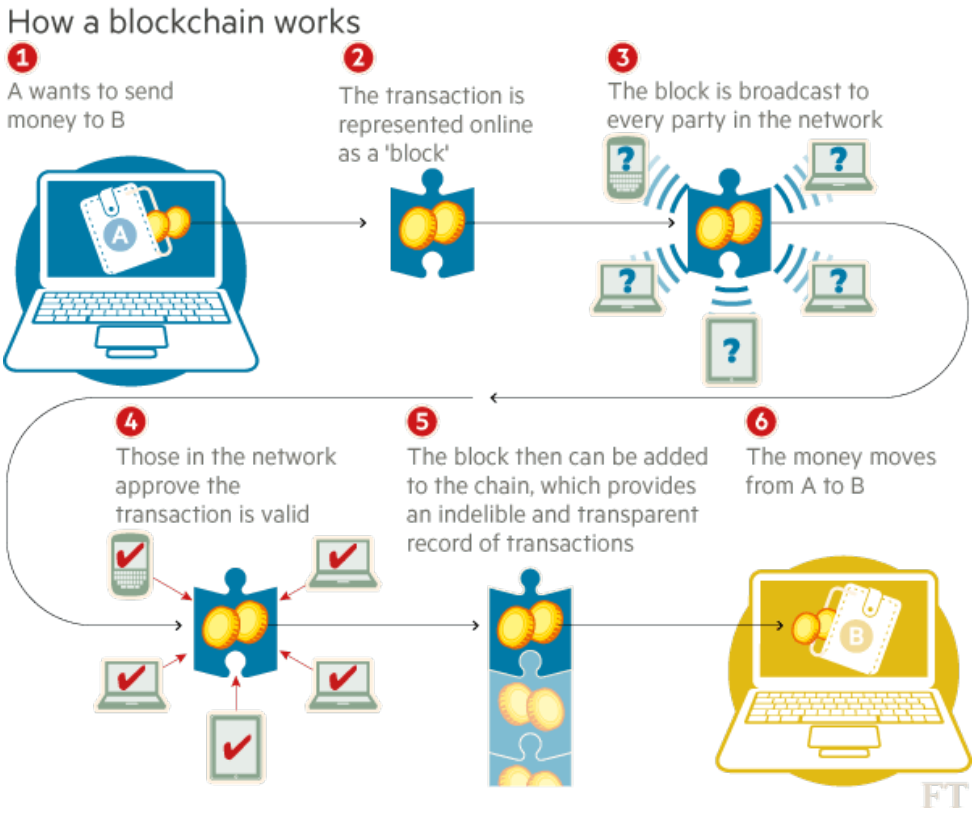
The 2008 financial crisis affected banks reputation. Until today none of the more prominent startups haven't gone bust, that helps consumers trust. Banks are now focusing in improving their offering. A good customer experience on digital or mobile just is not enough for them anymore. Could banks be in trouble if consumers enjoy more the new experience and new value proposition that these new startups bring? As a past example, Western Union once saw its business as a telegrapher delivering messages being disrupted in 1910 by AT&T telephone lines, but they didn't close it doors, it simple focus on its other model which was of delivering money worldwide (Wu, 2012).

Not everyone is looking for the latest trend in baking. James Moed, consultant to Fintech startups and former director at IDEO, says that most people find managing money boring, and apps might not be enough to make them switch (Baker, 2015). But the reality is people still hate banks. A Viacom research discovered that 71% from 18 years old to 34 years old would rather go to the dentist than to interact with their banks (Baker, 2015).

2.8. Blockchain, a stepping stone for the future of baking

Blockchain the future hopes of banking to help revolutionised the way banks operate, reduce costs and also ensure banks stay relevant in this technology uprising. Blockchain is the heart of cryptocurrencies like bitcoin (Karp, 2015).

Blockchain is "a peer-to-peer public ledger maintained by a distributed network of computers that requires no central authority or third party intermediaries." (Karp, 2015). Barclays was the first major bank to add blockchain to its ecosystem for customers to use when doing international transfers (Sharma, 2016).



(Figure 23, How Blockchain works. Wild et all, 2015)

Blockchain consists of three key components:

1.A transaction;

2.A transaction record;

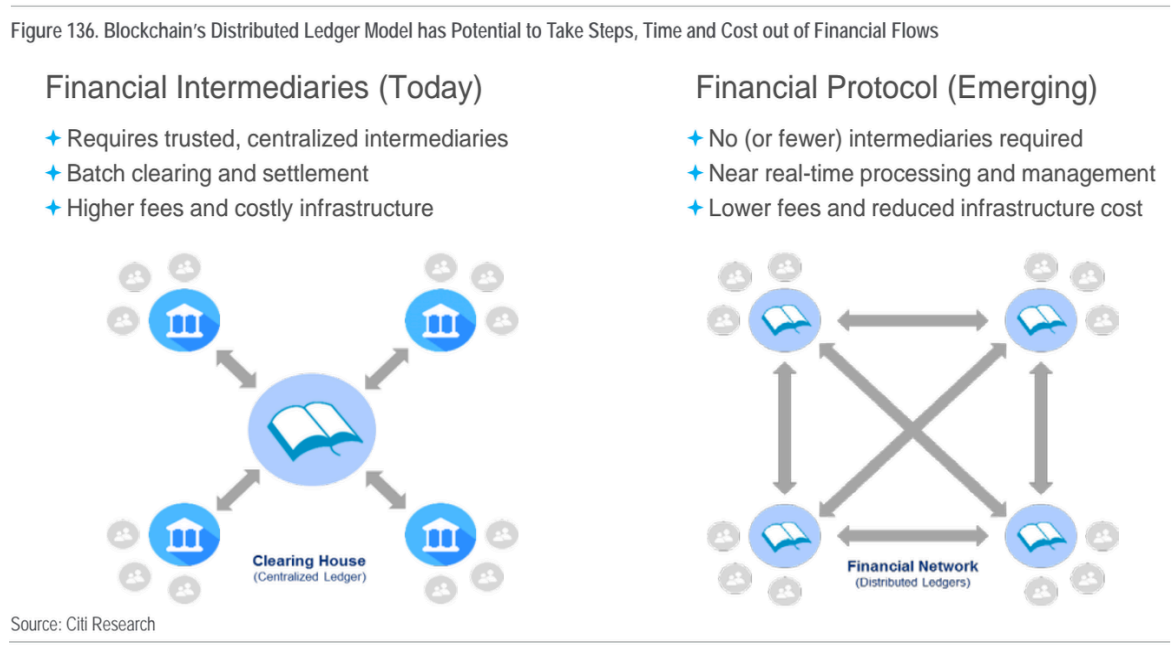
3.A system that verifies and stores the transaction;

The biggest point in favour or blockchain that can change the industry is: "The blocks are generated through open-source software and record the information about when and in what sequence the transaction took place. This "block" chronologically stores information of all the transactions that have taken place in the chain, thus the name blockchain. In other words, blockchain is a database of immutable time-stamped information of every transaction that is replicated on servers across the globe." (Karp, 2015) The possibilities are endless. Imagine the uses for a system, where all the previous transactions are stored in the next transaction, that auto regulate itself that requires minimal overview.

The emergence of blockchain, sometimes also referred to as distributed ledger technology or "DLT" for short, can revolutionise the world of finance (Robinson and Leising, 2015). Bank of England is calling this the first attempt to create an Internet of finance (Robinson and Leising, 2015). Blockchain has the potential to link networks of legal record keeping, which can affect financial markets way of operating, increase settlement efficiency, speed linking records, keeping networks and reducing costs. Its impact in this area can go from payments, to banking, to securities settlement, cyber security or reporting and analysing trading (Giancarlo, 2016). According to the US Commodity Futures Trading Commission Commissioner, J. Christopher Giancarlo, blockchain could have been a key element in detecting what happen to Lehman Brothers in 2008. If an accurate report on all transactions

from Lehman Brothers would been available in 2008, the regulators in charge could have use data mining tools, smart contracts, divergence in counter party exposure, widening credit spreads and disruptions in short term funding activity (Giancarlo, 2016).

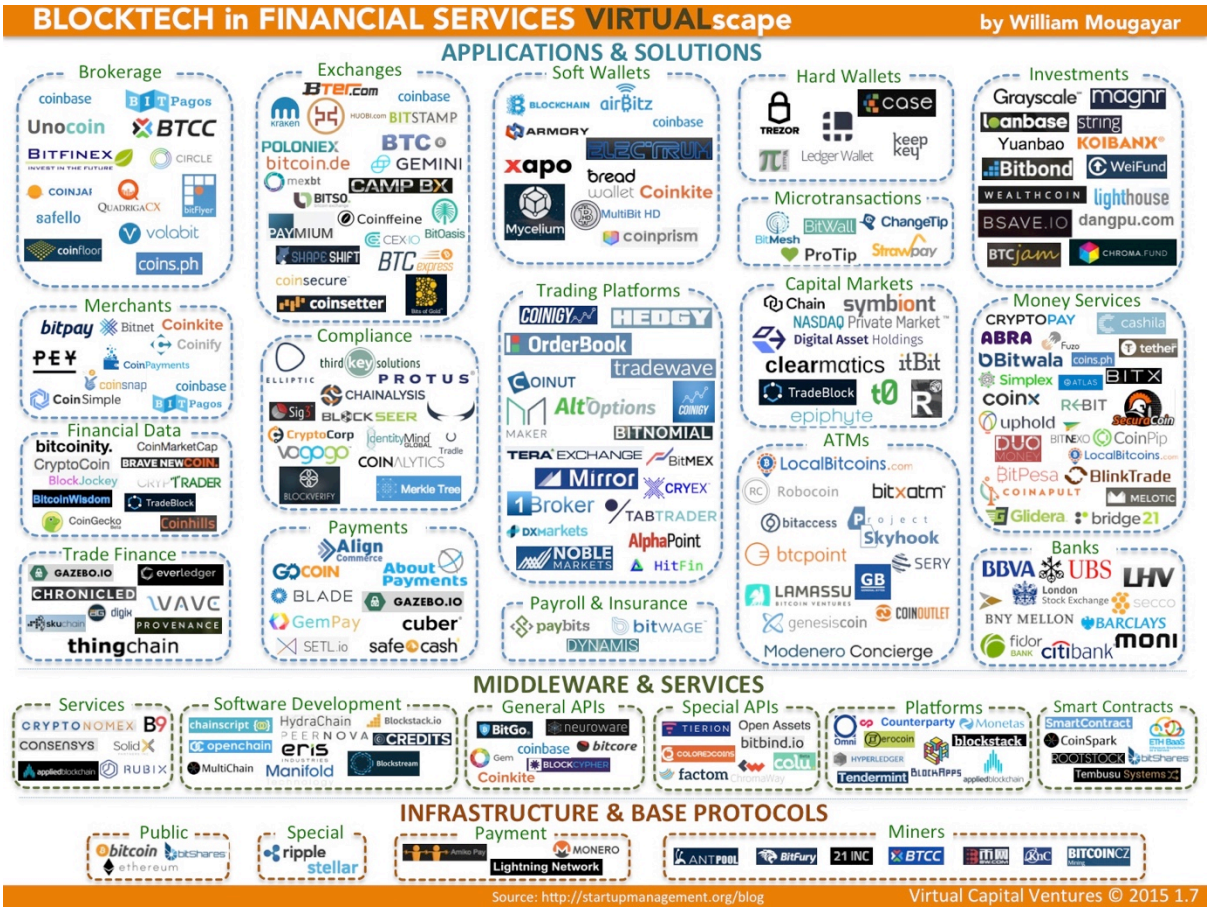
These could have made regulators act sooner to reduce Lehman Brothers credit rating. If prompt and a better informed regulation intervention wasn't enough to prevent Lehman Brothers run, the records that were held by trading counter parties, which would have been available to regulators, would shown Lehman Brothers open positions (Giancarlo, 2016). These means that instead of having to wait eight years to acquire all information on Lehman exposure, it would have taken minutes instead after bankruptcy filling to know the dimension of the problem, and therefore, settlement of open positions would have been taken care of in weeks and not years (Giancarlo, 2016).



(Figure 24, Comparing protocols: using a clearing house VS a model using blockchain "DLT". Ghose et al, 2016)

Blockchain removes the need for an intermediary or a centralised entity to keep control of records. Applications inside a bank or a group of banks range from foreign currencies exchange, bank transfers, and registration of equities when they were bought or sold (Karp, 2015). It is easy to understand the appeal of blockchain to banks. Imagine banks could lower their costs with compliance by developing a system that using blockchain technology would make it more efficient, leaner and quicker using less human resources. Banks can increase margins, do deals quicker and this leads to them starting to become more like technology companies that turn to automation to drive performance, scale and growth.

In short, blockchain, together with the cryptography behind it, remove the need of a transaction being verified by a trusted third party, such as a bank (Haycock and Richmond, 2015). Blockchain also offers other possibilities for non-banking applications, such as land and property registration titles or government usage such as council tax. Still blockchain is still in a very slow adoption curve at this stage (Economist, 2016), but without doubt it appears to be the future for banking and finance, as startups that focus on blockchain technology continue to attract more funding, surpassing now cryptocurrencies startups (Reback, 2016; Economist, 2016).



(Figure 25, Some startups working with blockchain for Finance. Mougayar, 2016)

These startups eventually could disrupt the finance sector (Wild et al, 2015). It is very easy today for anyone to develop a blockchain network. Ethereum for example, allows for the development of a decentralised platform that runs smart contracts, applications that run exactly as programmed without any possibility of downtime, censorship, fraud or third party interference. Blockchain could even be the future infrastructure of the sharing economy.

Cryptocurrencies

Bitcoin has been the cryptocurrency that has received more attention, however people in the industry believe that RSCoin can in fact replace bitcoin. RSCoin has been gaining traction in

the UK (Simrin, 2016). It has been recently unveil at UCL and Distributed System Security Symposium in San Diego (Simrin, 2016). RSCoin uses the same backbone technology as Bitcoin. It has appeal to major financial institutions that believe that existing cryptocurrencies have flaws, but RSCoin can help with their technology in regards to their payment systems. (Simrin, 2016). Cryptocurrency can also eliminate risks we are exposed to by trusting intermediaries with our sensitive financial information (Valkenburgh, 2015). There is room for cryptocurrencies to act as a layer when we are paying someone, but we are far from seeing it replace physical currency, as we have known until today.

Adding cryptocurrencies together with blockchain. The possibilities in cyber security, regulation, transparency and other changes that will benefit society makes for an exiting time for the finance sector, as more innovation can unveil and disrupt the sector as we know today.

3.0. Research

3.1. Research Question

How is disruption occurring in the banking industry?

3.2. Research Aims

Identify who is disrupting the banking industry, and how it is being disrupted. Understand the possible reasons behind that disruption.

3.3. Research Objectives

1. Draw parallels between the rise in popularity of the smartphone and the disruption occurring in the banking industry;
2. Understand why consumer behaviour changed since the popularisation of mobile apps, and consequently mobile banking;
3. Analyse the Fintech startups that are trying to disrupt, what is the opportunity and what are they doing differently;
4. Analyse the banking industry to understand the threat and response level to this disruption from traditional banks;
5. Understand blockchain appeal to both sides, traditional banks and startups;

3.4. Research Approach

Deductive together with inductive research approaches will be used. Deductive approach will allow for "generalising from the general to the specific" in regards to the landscape of baking and its use of data collection allows us to "evaluate propositions or hypotheses

related to an existing theory". Inductive approach will allow us to use "known premises to generate untested conclusions", and also allow to "generate and build a theory" in regarding to this disruption of banking (Saunders et al, 2016).

3.5. Research Scope, Method and Strategy

Due to the imposed time and availability of resources, the scope of this paper will only comprises of both the UK and the US, analysing mostly millennials behaviour towards banking, since they are the present and future of this industry and the ones that are shaping this disruption.

The research method chosen was a mixed model method. Due to constrains on time and resources, plus the limitations encountered during the research, the following procedures were used to research and gather data, with the end goal of finding, collecting, crossing and analysing that same data. The use of qualitative and quantitative data helps explain and link between the archive and documentary data, to the surveys and interviews. The chosen method allows for the facilitation of the "discovery of new insights" to be "followed up thought with the use of other method" (Saunders et al, 2016). This method also helps resolving the problem of having insufficient data collected from archives and documentary data, that can be also one sided, to be complemented with the data that has ben collected from consumers during the survey. Lastly, this method also allows for the triangulation of the data, which allows for the "combination of the findings" from one method to "mutually corroborate the findings from the other method" (Saunders et al, 2016). This paper used two research strategies. *Surveys and interviews*, plus, use of *archive and documentary data*.

3.5.1. Primary Research

As primary research this papers uses *Surveys and Interviews* as a method of research. A survey online, opened to all ages and genders, specifically made for US and UK markets, was created to understand consumer's feelings towards traditional banks, fintech startups and mobile banks. It was analysed what they knew about fintech startups, how much they value mobile banking, if they were happy with their current bank, how much they trust fintech startups and what they understood in regards to cryptocurrencies. This survey was distributed among social media channels such as facebook and twitter, together with online communities such as reddit, voat and snapzu. Interviews were also made. In these interviews industry experts that are currently employees or were previously with a bank or a fintech startup were interviewed, and this help bring industry exposure to this paper. The author also had the chance to interview one reporter and a capital manager, that also helped raised some interesting points on the industry and provided fresh insights on the banking industry as a whole from an outsider perspective. Everyone interviewed had direct or indirect exposure to banking and fintech startups.

Survey

Designing a survey allows for the gathering of a large pool of data, which can be then analysed "quantitatively using descriptive and inferential statistics" (Saunders et al, 2016). Combining this survey with the interviews, allow us to enforce and support the triangulation of the data.

Subject: Everyone (UK and US).

Objective: Understand what people feel in regards to banking industry and fintech startups. Support findings from interviews and literature review.

Design: Using Google Forms, the survey was divided into eight questions. One question to determined the subject age, and the other seven questions focus on getting to know what the subject feelings towards his current mobile banking experience, fintech services, regulation and cryptocurrencies.

Sampling: Using a snowball sampling strategy, using social media and online communities, everyone was targeted. A minimum of 100 respondents was the target aimed for this survey to ensure results were accurate and unbiased.

Advantages

- *Sample size,* is larger than any other form of data gathering this paper could have used;
- *Automatisation of the survey* process, once the design for the survey was finished, it could be sent out to a unlimited number of people;
- *Lower cost*, due to the amount of time and resources involved for the researcher;
- *Coverage*, it would be physically impossible and costly, due to geolocation to cover the US and UK in a timely manner at the same time;
- *Anonymously*, subjects feel more at ease to provide answers;

Disadvantages

- *Incomplete opinion*, contrary to interviews, it is impossible for subjects to be further questioned on their feelings or knowledge on the field;
- *False data*, subjects might provide false data, that doesn't reflect what they believe in;

- *Lack of understanding*, subjects might not understand questions and decide to dropout of the survey, lowering the participation rate;

Interviews

One on one interviews were conducted with the interviewee face to face if possible. When the interviewee wasn't available due to time constraints, phone or email were used instead. Interviews followed the same objectives, but different design and depth depending on the subject. Interviews over the phone might follow a slightly different design to allow conversation to follow naturally and converge new points.

1. Banking and Fintech Startups Individuals

Subject: These individuals are currently directly or indirectly involved, or have previously been involved, with the banking industry. This could be either in a bank, retail bank, capital management, or, a fintech startup, venture capitalism fund or covering the industry for the media.

Objective: Questions to understand what is now currently happening in this industry, and beliefs of what the industry might become in the future with this disruption.

Design: Interviews were conducted in Q&A style, focusing on what they think of disruption of banking industry, smartphones and mobile banking role on these and their thoughts on fintech startups and blockchain as a disruption factor.

Sampling: All the executives, analysts, journalists or researchers that were questioned were contacted using connections, referrals or were contacted directly using LinkedIn, institution websites and research reports or other social media. At least 4 samples will be provided.

2. Millennials that use banking products

Subject: These are millennials in direct contact with banking products, either mobile banking or fintech products.

Objective: Questions to understand their views on mobile banking and fintech, understand how they use these products and why not choose the competitor, example, transfers using TransferWise instead of traditional bank.

Design: Interviews were conducted in Q&A style over email; focusing on what experiences and feelings they had while using these products.

Sampling: All the individuals questioned were contacted using connections and referrals. At least 3 samples will be provided.

Advantages

- *Quality of information*, as all interviews were made one to one, the direct contact provides a better result in answers provided in regards to clarity and authenticity;
- *New scenarios*, interviews provided the research with newer scenarios, due to interviewees points of view, that could be explored by the author to enhance the research;

Disadvantages

- *Time constraints*, one to one interviews lead to a further discussion of points, which sometimes due to the busy nature of interviewees removes the possibility of covering all Q&A points;
- *Small sample*, the sizing will always be inferior to surveys, due to resources, connections and time, plus some people contacted refused to be interviewed;
- *Disclosure of information*, because some of the work nature of some of the interviewees, they can't disclose some information, which sometimes leaves the point uncompleted;

3.5.2. Secondary Research

As secondary research, this paper uses secondary and primary literature from *archive and documentary data*. Primary literature includes sources such as research papers from UK government and public institutions, US public institutions, research papers from various universities, research done by various banks, consultancies or research private institutions. Secondary literature includes sources such as startups blogs, industry books, Internet articles, newspaper or magazine articles, industry leaders blogs or venture capitalist funds blogs and articles. This allows the author to be able to understand the banking industry, the shift to smartphone and mobile apps leading to mobile banking. It also served to understand whom the accessibility of technology open the door for these disruption. Understanding how the disruption is occurring, who are the main propellers, which sectors and what is the response from the banking industry.

Advantages

- *Amount of information available*, on the subject is widely available;
- *Information is recent and relevant*, due to the nature of fintech startups, some information is very recent and relevant to the case;

Disadvantages

- *Reliability of some information*, source can be bias towards one particular idea;
- *Interpretation of data*, paper author might not interpret data as the document author intended, leading to wrong conclusion on the ideas exposed;

3.6. Research Timeline

Research for this paper was done in following time horizon:

1) Secondary research took place between November 2015 and April 2016.

2) Primary research took place between January 2016 and April 2016.

The timespan of six months for secondary research, and four months for primary research creates time constraints on the ability to conduct long-term research for secondary research, but especially in regards to primary research. Therefore this paper time horizon is cross-sectional, as is it analysing the current snapshot of the banking industry, and the current disruption by fintech startups and its potential for the future as it stands today. However is it worth mention that the author also provides some questions for the future, still this doesn't make the paper time horizon longitudinal.

3.7. Research Ethics

The author will safeguard all the population that are referred in or contributed to this paper. Interviewees were made aware of the aim and purpose of this paper, and how their ideas were going to be used. The author also asked permission for the usage of the name and recording of the call or exposure of email communications with the interviewee. All the individuals interviewed that wished to remain anonymous will have their request granted and the author will safeguard all information regarding their person. All survey questions were asked in complete anonymity, with the author not taking down any names, just the age group which the individual was in.

3.8. Limitations and Improvements

Some limitations were encountered and some improvements could be made to the paper.

• *Sample size is small*. Increase the number of survey participants to 1000 would result in a better pool of data, representing a bigger group of preferences in the population;

• *Geographic restriction*. Go beyond the scope of US and UK, would enable to compare more data such as when behaviour started to change, dates were smartphones and mobile banking become mainstream, comparing developed countries to developing countries behaviours and technologic factors;

• *Difficulty in getting interviews from the industry*. Contact more banking and fintech startup representatives, specially in the US, would allow to get a better view on the disruption the sector is facing;

• *One quantitative survey is too short*. Create another survey, that allow for more qualitative data from users to be inputted, on their preferences and why they use mobile banking or fintech startup services;

• *Extremely difficult to cover all startup fintech areas and their players*. This paper acts only as an overview, it was hard to convey due to word limit the industry in depth;

4. Finding and Analyses

In this section of the paper, results from survey and interviews will be revealed and interpreter. This will allow for a triangulation of the data for later to analyse on the discussion part of this paper.

For primary research, this paper contains insights from interviews with five industry experts, and five millennials. Those interviews can be read in full detail on Appendix B and Appendix C. The factors obtain from these interviews on Fintech Startups (Blue), Millennials (Red), Banks (Green) and Cryptocurrencies & Blockchain (Black) are displayed bellow in the following table bellow.

Factors from Interviews

Fintech Startups
Smartphone Popularity
Apps
Apps Marketplaces
Cloud Computing
Regulation easing
Disintermediation
Low cost infrasctruture
Smaller infrasctructure
Outsourcing sometimes
Advance Security
Convinence
Low fee for consumer
Faster
Specialised
Flexibility
Ease of Use
Branchless model
Mobile important
Security
Keep data safe

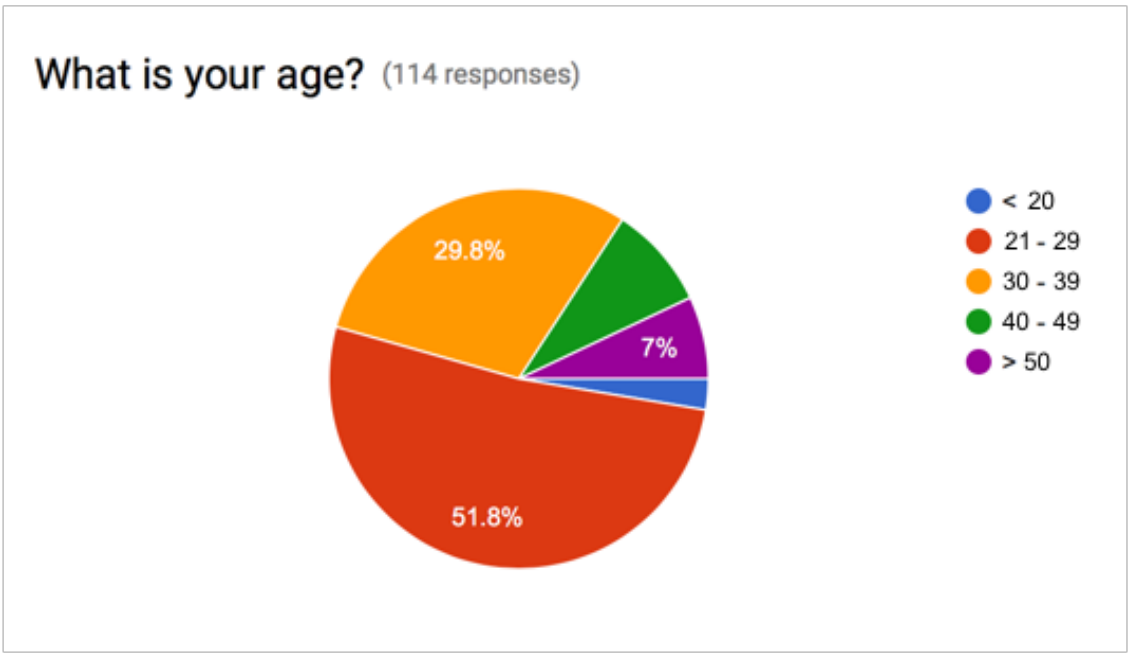
Millennials
People are now mobile
Social Side, share things online
Device agnostic
Don't love banks
Don't like friction when changing services
Different types of sharing, consumer age
Wants convinence, flexibility and ease of use
Consumer needs changed
Mobile experience slow
Peer to peer transfers are bad
Payments to friends are dificult
Service from banks can definatly improve
Not completely sastisfied with banks
Wants safety to be a concern
Wants to check hes personal finances in real time
Wants a fast service

Cryptocurrencies & Blockchain/DLTs
Lower costs
Powerful technology, could be the future
Strong Investment by banks
Bitcoin no defined case
Bitcoin as a complement, not a substitute

Banks
Partner with fintech startups
Acquire fintech startups
Scale
Trust because of intrinsic guarantee
Big infrasctructure
High Costs for infrasctruture
Hides fees from consumers
Regulators priviledges
Slow
More than one service
Entrenched in our daily lives
Branch model obsulute
Government support
Accountability and peace of mind for consumer
Safe and realible
Too big
Overcapacity
Margins come down
Consolidation to overcome dificulties
Expertise
Mobile important
Security
Keep data safe

(Table 1, Factors mentioned by interviewees during interviews)

Table 1 factors, together with the survey will allow for a triangulation of the data that was acquire from primary and secondary research. On the literature review, it was discussed that the biggest target for banks and fintech startups were millennials, since they represent the future of its clientele. There were 114 participants in total that provided their views on the survey for this paper. Survey example and results by participant can be found in Appendix D.

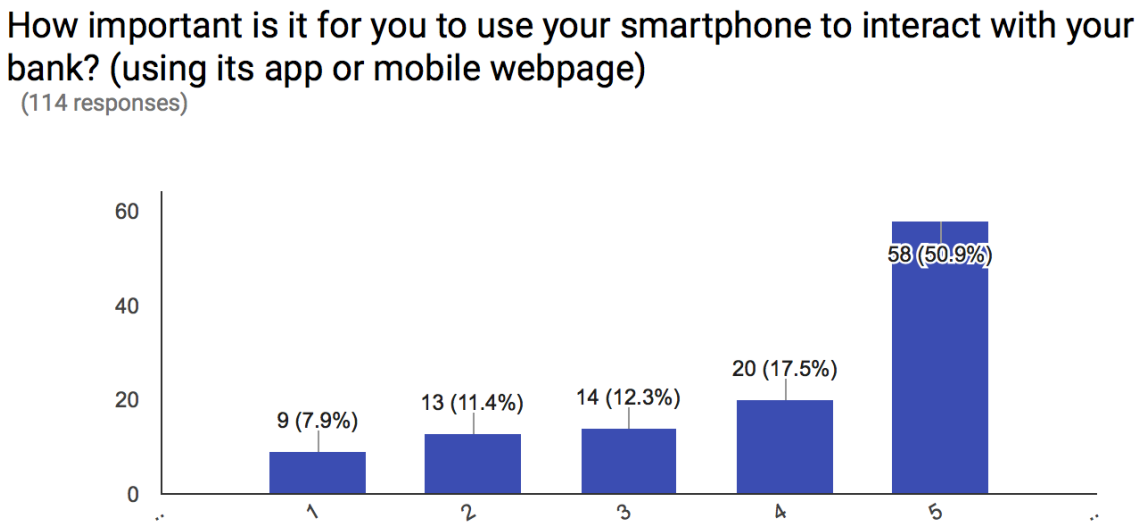


(Table 2, Age of participants of this survey)

Table 2, shows that the age of survey participants was mostly comprised of millennials, or Generation Y, born after 1976 until 1995. They represent 81.6% of the survey responses, making the survey represent the views of that generation mostly. This is the age group that together with Generation Z (2.6%), 20 years old or younger, are the biggest target for banks and fintech startups at this current time since they represent the present and future of their sustainability as potential clients, as discussed previously and from the interviews findings.

Also they are the ones witness first hand the "digital revolution" that the Internet introduced. A very small minority of the Generation X is also represented in this survey (8.8%), together with the Silent Generation (7%). This was the generation that grew up before the revolution of the personal computer and Internet.

Participants were asked to rate how value for them is the possibly of using their smartphone to interact with their bank, using a mobile app, in a scale from 1 (Not Important) to 5 (Very Important).

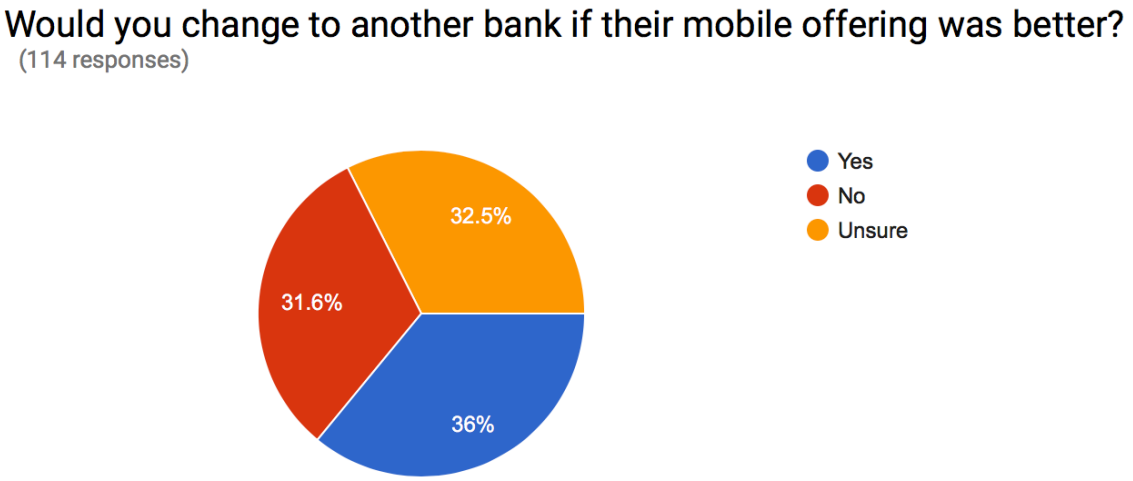


(Table 3, Importance of smartphone to interact with mobile banking for participants, on a scale of 1 to 5)

Data on Table 3 reflects that it is very important (5) for almost 51% of the participants, the possibility of using their smartphone to interact with their bank. As discussed previously, the smartphone now plays a big role in everyone lives. It allowed people to go mobile, to connect with other people anywhere and everywhere, as interviews also mentioned. This is transforming branches network of financial services obsolete. It is no surprise that at least

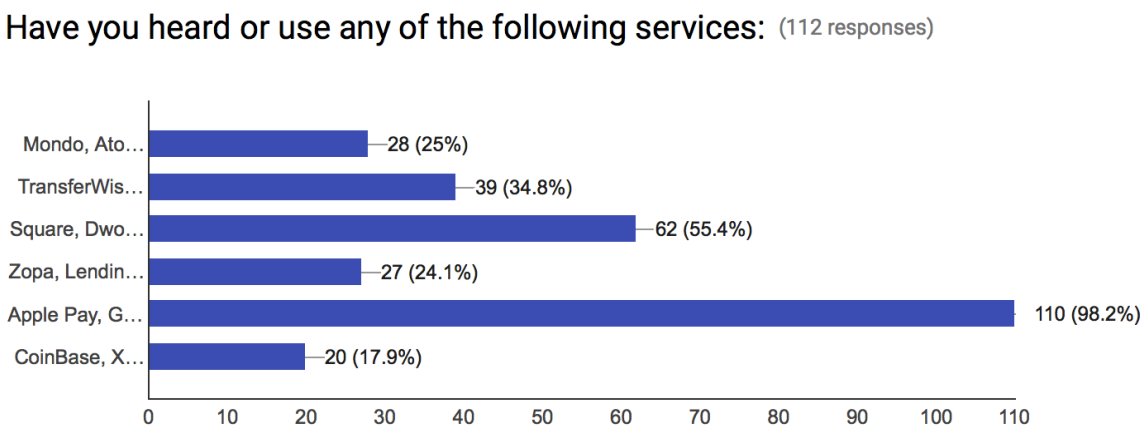
68.4% of the participants say its important for them. Did certain participants give the lowest importance, because they don't really see any value as pointed out by a small minority of millennials in the interviews? Is it because the bank that they chose to use provides an inferior experience on the product, making the participant unaware of the potential of interacting with the bank using its smartphone? 19.3% of the participants see that interacting with their bank using their mobile is not important to them. This could be because some participants still prefer to use the branches or internet banking, not necessary mobile. It could be also the minority here is represented by older generations that participated in this survey.

The following question of the survey might help us understand more on the importance that mobile banking offering can have for participants, and helping us understand table 3.



(Table 4, Would the participant change bank if the mobile offering was better?)

Table 4 shows that opinions of the participants are divided. Even though they value the interaction with their bank using their smartphones, there are mix feelings towards changing bank if the experience is indeed better. This can also be seen with the mix opinions from millennials in Appendix C. This can be because of what was discussed previously, the fact that is an hassle to change bank, or because at this stage there is still nothing in the market, that justifies or eliminates the friction of changing. Maybe because for consumers there is yet something new and refreshing that consumers want to adopt, as they adopted Uber when the value proposition was worth the change from regular cabs.

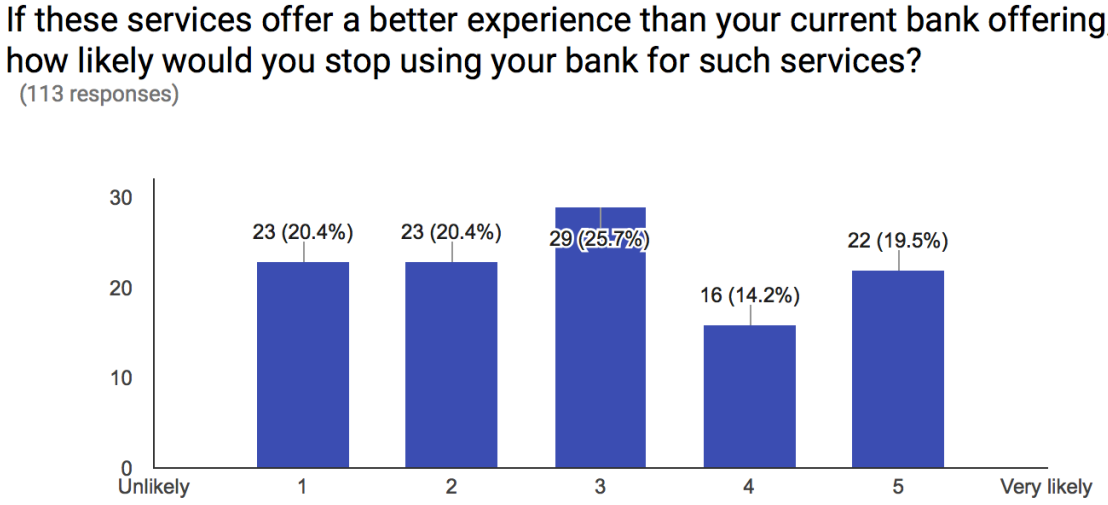


(Table 5, participant's awareness of fintech services that replace traditional banks)

Table 5 show that payments, due to the rising popularity of the Apple Pay, PayPal and Venom, is what most participants are aware of (98.2%) together with the (55.4%) from merchant like Square, Dwolla and iZettle. It is without the doubt the service that as currently more room to grow parallel to traditional big bank. Also these are the services that all the interviewees have referred too at least once, in part due to the popularity of Apple Pay. After that, again we have international currency transfers (34.8%), such as TransferWise

or Azimo, which is the sector which millennials refer for convenience, the speed, the lower price, that traditional banks never were able to provide them. Marketplace lenders, like Zopa or Lending Club, also have the same awareness in the survey as international currency transfers, however the millennials interviewed didn't mention it. Lastly, services that revolve around cryptocurrencies and blockchain, such as Coinbase or Xapo, where the ones less known by participants of the survey (17.9%), which could point out that cryptocurrencies indeed don't have yet a defined used case, therefore not a lot of people have the need to know such services, as one industry interviewee noted.

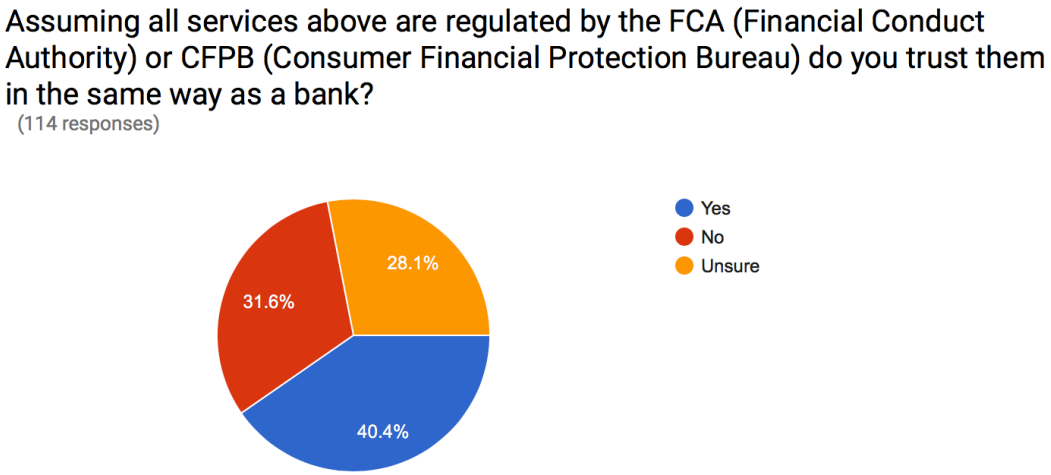
Table 5 shows participants don't know about all the specialised startups divided in the various sectors described in the literature review, where alternatives are present to a traditional bank. It can be that they don't know that alternatives exist in the market.



(Table 6, How likely a participant would change a bank for a fintech startup from a scale of 1 to 5)

It could also be that currently they don't value these services in the same order as they value banks. As seen in table 6, participants had mix feelings of exchanging their current bank for a fintech startup. There isn't a clear majority as results were close, but this can show, as pointed by our industry experts interviews, that fintech startups are not yet as convenient as banks, that customers still value more the guarantees in place by regulators that make banks more secure, and even though banks fail to lead on these industry, their measures to slow down the trend, by continue to prioritise security, stability and scalability as a strategy is still working. Interestingly, consumers are still not entirely happy.

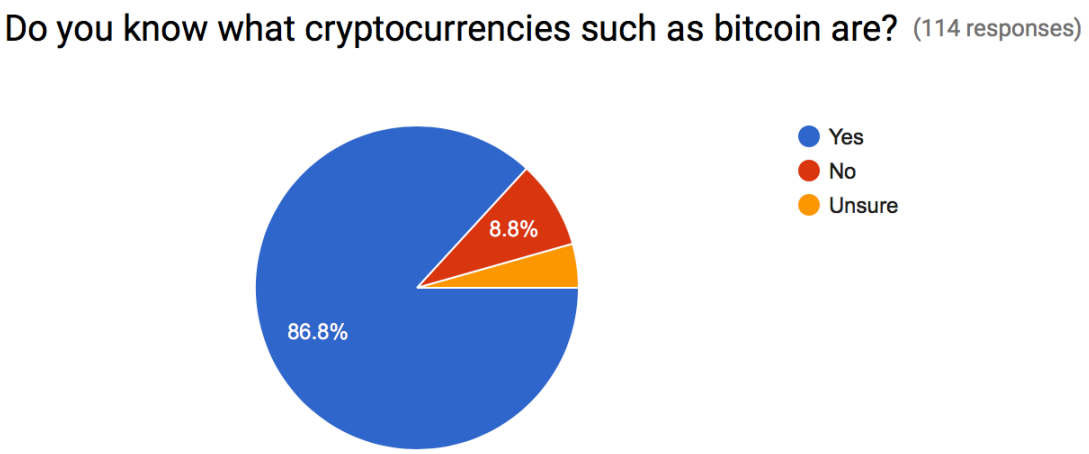
Some millennials might be using these new startups, as complements instead of replacements as they recognise it is better at doing what they need. They still don't love banking brands, but they trust and rely on them. That same trust and the headache that changing a provider is, seems to be holding them back, unless when the alternative proves to be faster, popular and better in experience. Examples would be PayPal, Transferwise or Venmo.



(Table 7, Would the participant trust a fintech startup in the same way as a bank if regulated by the same body)

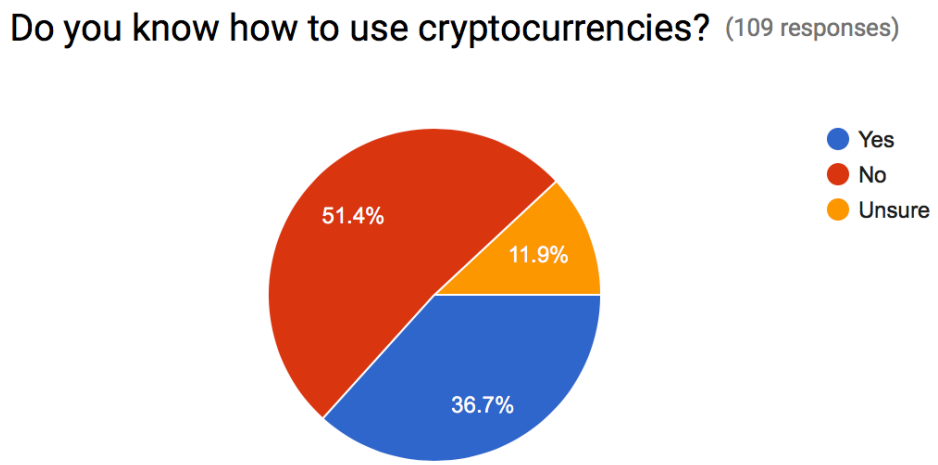
Table 7 might reveal why fintech startups haven't still reach scale. The number of participants that trust them in the same way as a bank (40.4%) is slightly higher than the number of participants that don't trust them in the same way as a bank (31.6%). However, the more important story here is the ones that are unsure (28.1%). Being unsure, chances are that they are not going to leave a bank, especially when as discussed before security and trust are very important.

If these services can indeed remove the friction, giving consumers the digital convenience, flexibility in the ecosystem they are looking for, from within their smartphones, assuming they can achieve the trust level expected, build the love brand and therefore become popular enough to achieve scale, as industry experts interviews noted, can this be the turning point for these startups? It is the author opinion that in order for this to happen they first need to convince the "Unsure" percentage to turn into "Yes", but it would be interesting if the move happened before, and "Unsure" group change their position due to explosion of popularity.



(Table 8, Amount of participants that know about cryptocurrencies)

It was impressive that in the sample of 114 responses, a large majority of 86.8% knew what a cryptocurrencies is. As referred in this paper literature review, bitcoin received a lot of attention recently and there are a variety of services available that use bitcoin.



(Table 9, Amount of participants that know about cryptocurrencies)

Still, out of 109 participants 51.4% answered that they don't know how to use cryptocurrencies, and 11.9% that they were unsure. This could be because bitcoin doesn't has a define use case, as pointed out in one of the interviews, or because bitcoin is associated with illegality. These results help show that technologies such as cryptocurrencies and blockchain are still in their early stages.

The findings of the paper from literature review, interviews with industry experts, interviews with millennials, together with the results from the survey, allow for the author to try some hypothesis of what is undergoing and what could happen in the future. Such hypothesis will be discussed briefly in the next chapter.

5. Discussion

Can these new entrants with a different branding, different value proposition, a different model, all bundle together with a great customer experience, disrupt traditional banks?

Hypothesis A

Fintech startups, as new entrants reduce market share of traditional banks substantially. They manage to convince consumers with their new value proposition, being flexible, fast, removing friction, enabling real time, more transparent, convenient and easy to use, which helps scale. The Uber moment occurs in the banking industry. Millennials loved these new brands, they trust them and it feels like them understand their needs. Lastly technology like blockchain lowers costs even further, disintermediation continues to happen in tech sector and regulation stops protecting traditional banks, helping enhance this disruption.

Hypothesis B

New entrants fail to attract a significant number of users, they are not successful at scaling, failing to steal significant market share from traditional banks. Millennials don't see much value on their propositions, they prefer to continue to use a traditional bank, they don't want to bother with the hassle of moving, the fact that they already rely on banks could also be an issue. They continue to prefer the peace of mind, the safety and trust their data and money to a bank. The recent changes to mobile experience are enough, and as long as banks improve slightly on some areas, that is enough for consumers. Banks consolidate to increase margins and power of negotiation, slowly start to invest in blockchain to reduce their costs and increase margins further. Real disruption in banking doesn't occur.

Hypothesis C

Traditional banks adapt and succeed stopping the grow of the new entrants, by increasing the number of acquisitions with fintech startups, rebranding themselves, they invest heavily in providing the fast, convenient, easier interaction that consumers want, plus bet on blockchain/DLTs to reduce costs, to increase margins and provide more and better services. Government and regulation still continues to support them. Fintech startups lose the appeal because banks now offer the same solutions to consumers; therefore the friction for change still exists and slowly increases.

Hypothesis D

New entrants are surprise by big a tech entrant, that removed the need for banking in the traditional form that we know currently, stealing market share from both traditional banks and fintech startups. Companies like Apple or Google, that already have millions of consumer data and process payment, can be the unexpected entrants to these markets. Consumers already devote much of their attention to these brands; they love the brands attitude and how they engage with them. These brands don't give consumers a bank; they give them something different that syncs with the personal device, such as a smartphone, that they use everyday. They are flexible, convenient and easier to use. Consumers trust them, they rely heavily on the cloud, everything is real time, and they are fast, safe and focus on customer experience first. Technologies like blockchain and cryptocurrencies are part of their backbone, and therefore, they are extremely competitive since they solve the problem of consumer's needs and wants by thinking and acting as tech company first and a bank after.

6. Conclusion

Whatever happens, banking will never be the same again. Technological advancements that changed the world, and allowed for developments that changed consumer's behaviours, changing they way they communicate and interact with each other. Data now is more valued than anything else in this world, judging by the amount of data consumers used and generate. Lower margins in baking and high costs, together with high competition from other services, plus a need for change demand by consumers that believe is it time for bank to change, are forcing every company that operates in the banking industry to re-think its strategy. Possibly reasons for these were highlighted in this paper.

Millennials interviewed want banking to improve and change. Industry experts interviewed believe banking will change. Together with other prominent voices, such as the Head of European Commission Digital Agenda, Neelie Kroes, "I've met with bank CEOs who tell me all their business models are about to torn to shreds, that the future is mostly virtual banking and their main competitors are tech companies not other banks" at Davos 2014 (Haycock and Richmond, 2015), or Mark Carney, the Bank of England Governor in Davos 2015, where he stated that the banking sector was vulnerable to an Uber type disruption and such was about to happen soon (Haycock and Richmond, 2015). According to Karl Max, the economy is always undergoing a revolution, denominated this as "Creative Destruction" (Zook, 2012). Is this disruption going to destroy more than it is creating? When and how are still uncertainties, but change is inevitable in the industry. It was long overdue.

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Appendix A (Secondary Research)

Figure A1 (Average company lifespan on S&P has decrease)
Available at: http://www.innosight.com/innovation-resources/strategy-innovation/upload/creative-destruction-whips-through-corporate-america_final2015.pdf

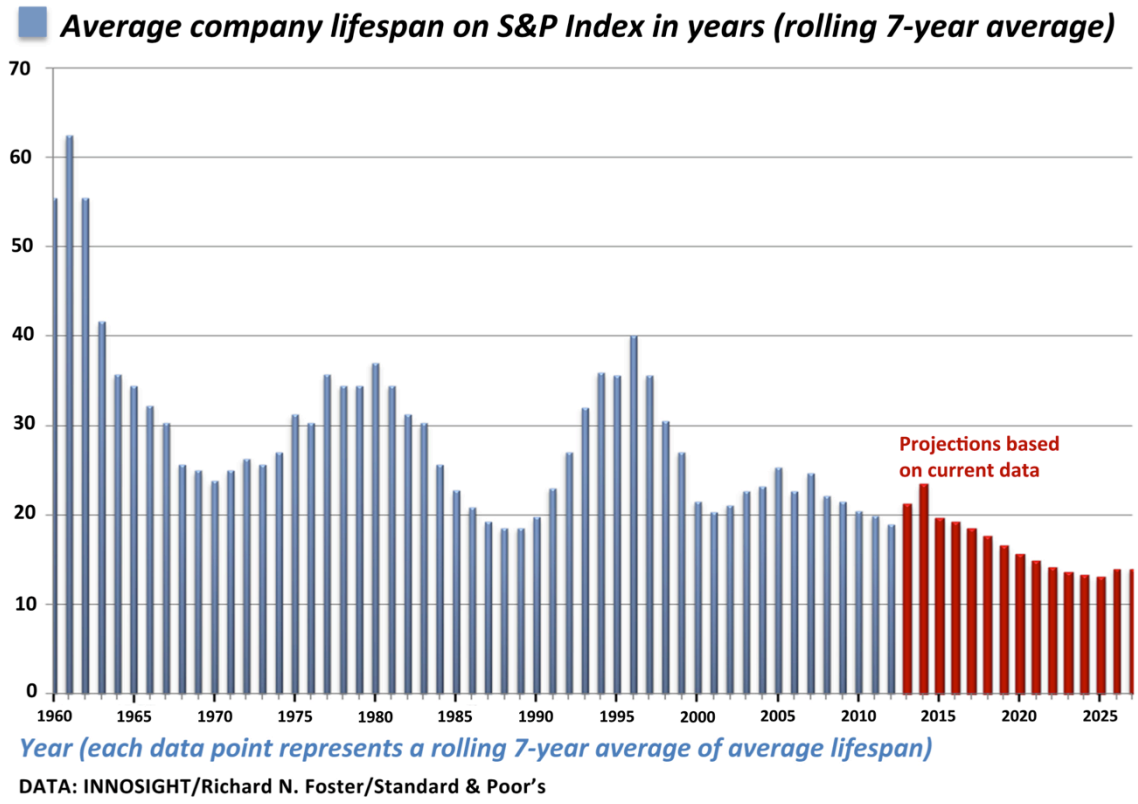
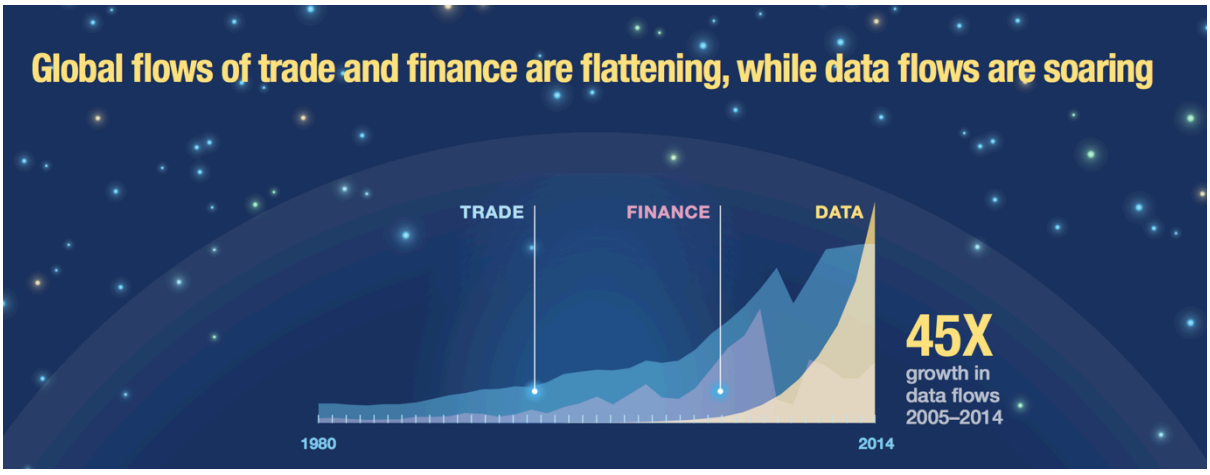


Figure A2 (Global flows of data are soaring, in contrast with finance and trade)
Available at: http://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/digital-globalization-the-new-era-of-global-flows



Appendix A (Secondary Resarch)

Figure A3 (Decline in traditional flows of goods, services and finances)
Available at: http://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/digital-globalization-the-new-era-of-global-flows

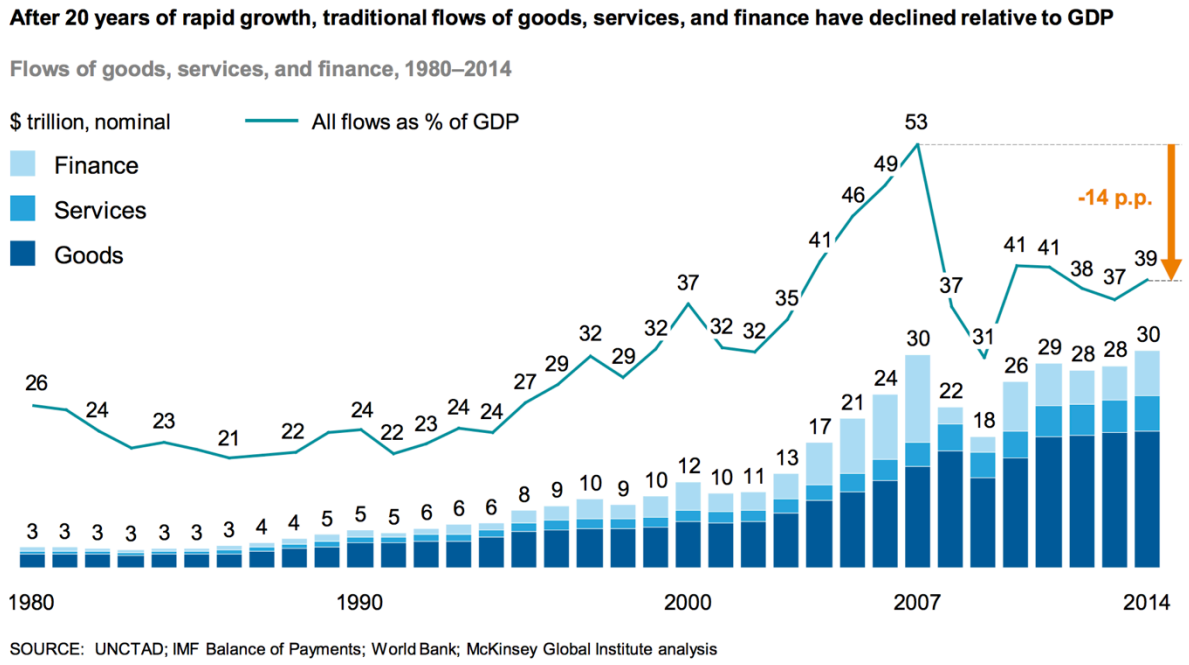
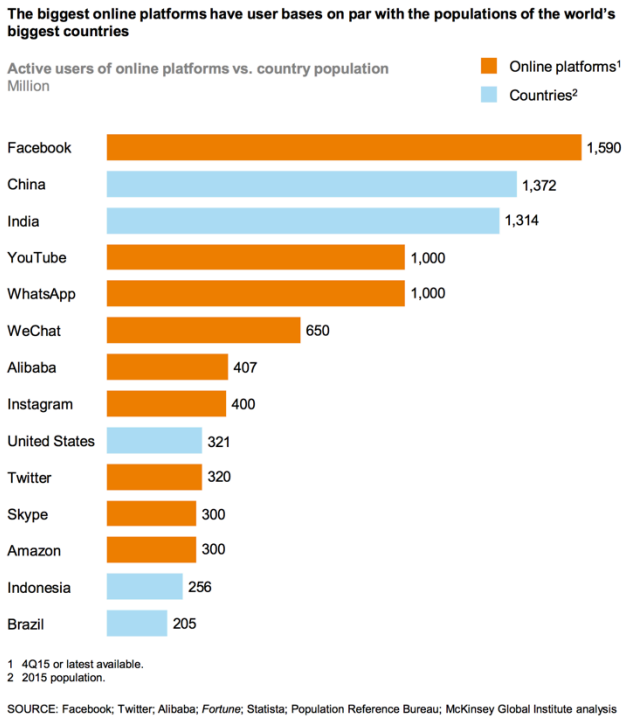


Figure A4 (Biggest user base by platform, comparing to population of biggest countries)
Available at: http://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/digital-globalization-the-new-era-of-global-flows



Appendix A (Secondary Research)

Figure A5 (Number of online transactions in the US vs mobile and branches)
Available at: http://www2.deloitte.com/content/dam/Deloitte/pt/Documents/financial-services/dttl-fsi-uk-Banking-Disrupted-2014-06.pdf

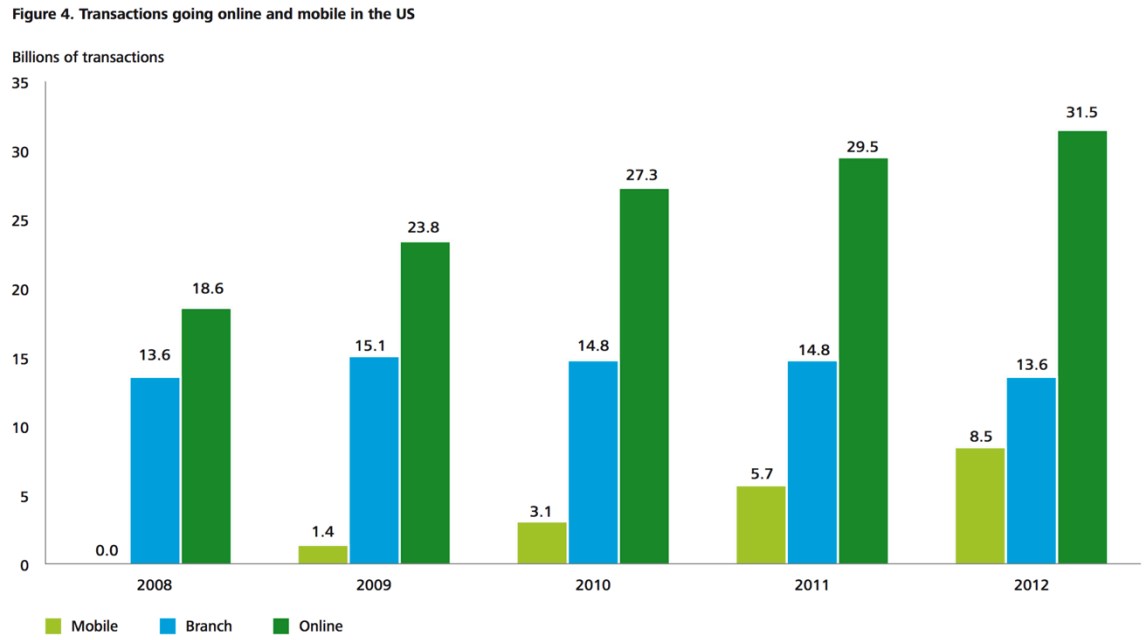
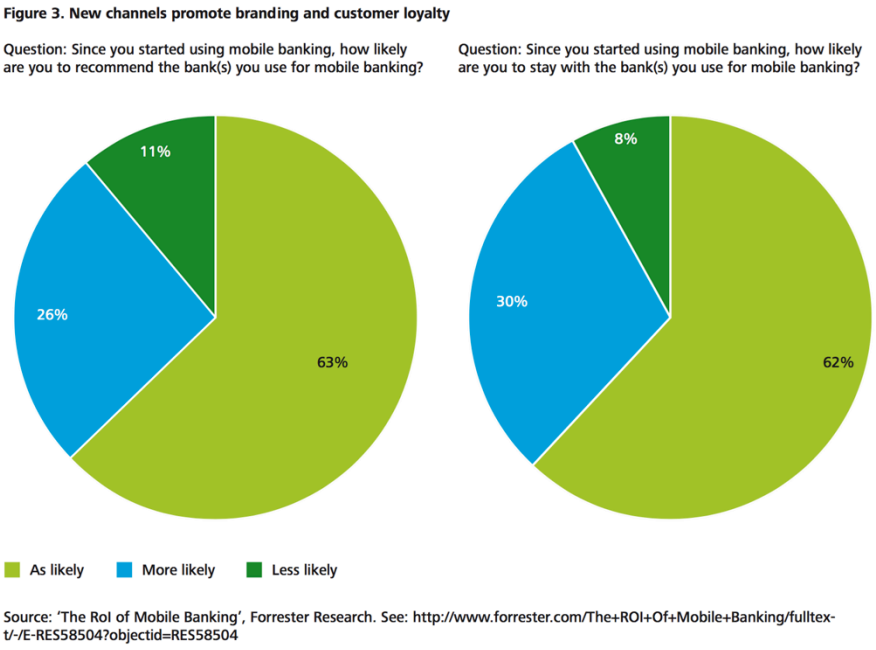
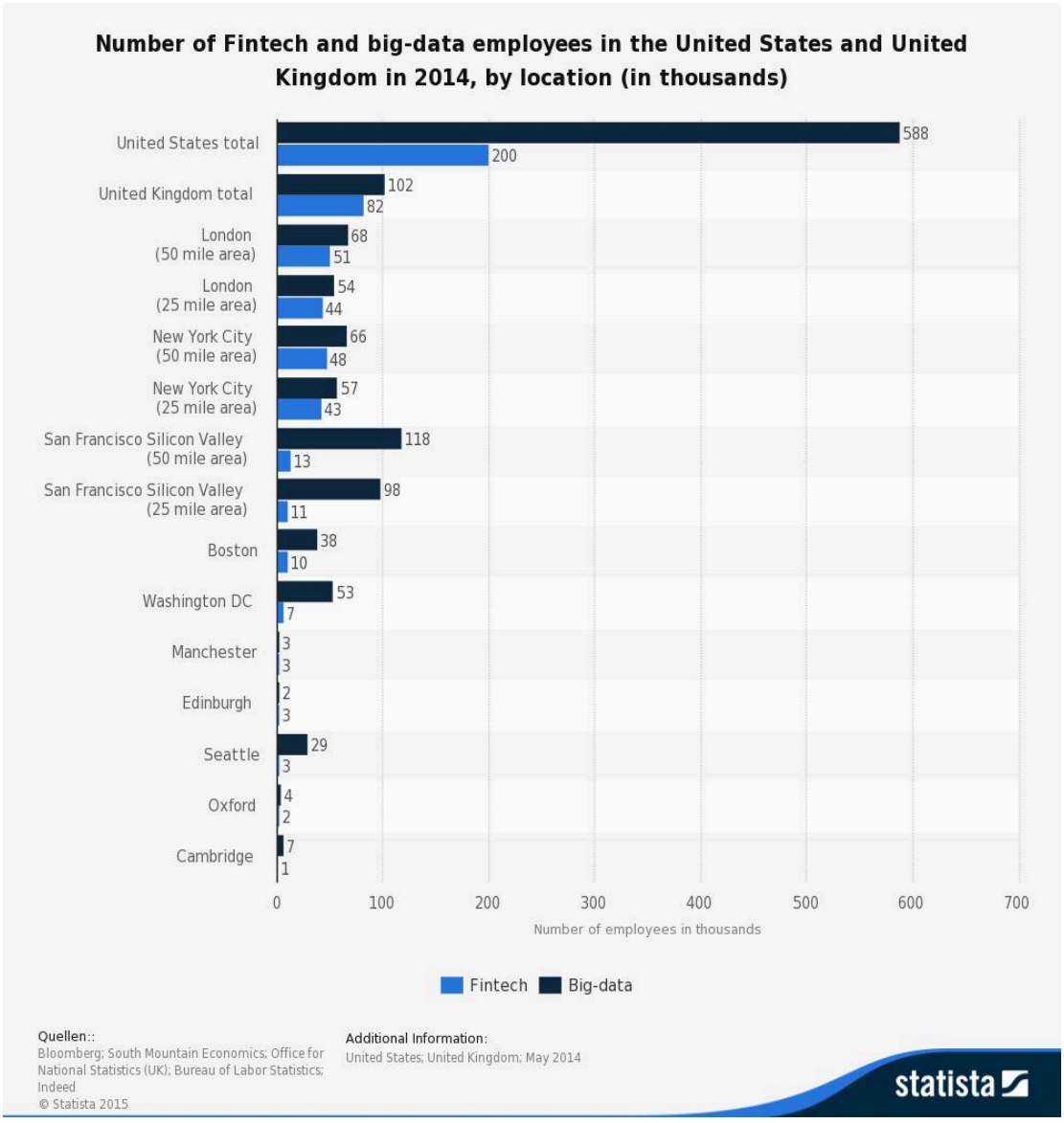


Figure A6 (New channels such as mobile banking promoting more loyalty from consumers)
Available at: http://www2.deloitte.com/content/dam/Deloitte/pt/Documents/financial-services/dttl-fsi-uk-Banking-Disrupted-2014-06.pdf



Appendix A (Secondary Research)

Figure A7 (Number of Fintech and Data startups employees in the US and UK)
Available at: http://www.statista.com/topics/2404/fintech/



Appendix B1, Industry experts interviews (Oscar Williams-Grut)

Oscar Williams-Grut, reporter covering fintech, markets, finance & technology at Business Insider
Notes from phone conversation on the 18th March 2016

1) Smartphones affecting retail banking, specialisation

- Could be one of the factors, rise of smartphones definitely helped.
- Apps especially, you don't need a one stop shop where one entity provides everything propagated the marketplace model.
- eBay this marketplace model was popular, but took off with App Store.
- Apple App store has a close grip with the quality, you know the app has quality and you know you can trust them with your email.
- That popularises the idea of having one app for a specific thing.

2) Other factors

- Rise of cloud computing and lowering of the costs to startup a business
- Easier to disrupt these spaces.
- It is not enough to have customers wanting to use these apps, you also need to be able to build these companies.
- Regulation has been eased up and much lower capital is needed to start a financial service, than 10 - 20 years ago.

3) Blockchain

- Still very early days for blockchain, certainly has the potential to lower the cost.
- Either it will? it is still too early to say.
- Technology itself has the potential to do all sorts of things, but this means you need blockchain services companies, example, a company that can offer compliance on blockchain as a service, rather than as it stands at the moment, for anyone to go and built their own, that would be costly which doesn't make much sense. At the moment it is probably cheaper to build an old compliance system, that you can outsource to a consultant.
- However, if there is a company providing blockchain compliance as a service, a company that eventually grows, this can decrease the costs.
- Banks are very interested in this technology.
- An advisor at a boutique tech investment bank, mentioned to me that if you are starting a company doing international currency transfer, you have to at least consider if you are going to build your technology in blockchain, even though it only started to spring last year, it is a very powerful technology and it seems to be the way to go in the future.

Appendix B1, Industry experts interviews (Oscar Williams-Grut)

4) Trust by consumers

- EY study recently in tech usage, who uses all these tech and why, that founded trust was not a big issue when it come to adoption.
- Big concern for consumers with fintech products is convenience, is it going to be easier or make my life easier? couple of reasons could be:
    1. Apple App Store, if the website looks good, you feel you can trust the app, Millennials are very used to using digital services;
    2. No massive disasters yet. An accident that would make people wary. No platform like this has crashed. Small cases, like P2P Finnish startup, but no big names that could scale consumers awareness and avoidance.
    3. Shadow of 2008 Financial Crisis. People are more willing to embrace challengers cause they don't trust big banks anymore. If there is a possibility of big banks not providing the right treatment or I get damaged from them, I probably have a better change on going with a challenger that says it will look better after my money. People believe this because they lost trust in big banks.

5) Big Banks Comeback

- Really depends where the disintermediation occurs.
- Businesses like TransferWise, are probably better for banks to partner with them, because they are trying to build a global businesses that are quite different than what a bank would do. Banks do international transfers very differently.
- Newer banks, the mobile only banks. They are much more likely to get bought by banks (BBVA bought Simple in the US). It is too early to tell, most haven't lunch properly. Historically the first ones that come online, Simple and Egg struggle to really reach scale, so the most viable thing came to sell the business in the end. They manage to get early adopters but then become harder to convince 40 years old.
- Everyday banking entrants need to do to a good job to win over millennials consumers, but they might struggle to also scale in the end.

6) Cryptocurrencies

- Bitcoin for example doesn't has a define use case.
- It may become useful in the same way as blockchain, as a utility, a it gets build into services as a layer, services can use this as a way of transferring value.
- Not as a currency, like I will pay you in bitcoin. More like, I will pay you via this service which runs on bitcoin, so you might not even know that you are using it.
- As a complement, not as a substitute.

Appendix B2, Industry experts interviews (Craig Iley)

Craig Iley, MD Business Banking (Founder Member) at Atom Bank

Notes from phone conversation on the 4th April 2016

1) What smartphone did to the market

- People are now mobile
- Social side, we share more things online
- People are now device agnostic.
- Intercession of going from mainframes, have a computer at home to personal device that is with us every time, even replacing what we have at home. One device for everything, our personal device.
- We don't now what future devices will look like (wearables, clothing, watches, implanted chips).

2) Consumers don't love banking brands

- Consumers value retail banks due to the intrinsic guarantee of institutions such as Bank of England, that ensures their money is safe by creating regulation for these banks to follow.
- New banks need to prove that they can create brands that consumers love, by being easier to use, while offering less friction on using the bank for payments, transactions and such.
- We still not in the Uber moment, the transformative point for the industry that has the power to change it. We lacking the "one more thing moment" for the retail banking.
- New entrants still need to show their models and visions can attract the consumers.

3) Disintermediation

- Someone else coming between you and your customer. To protect your relationship and income stream you need an engaging interface;
- Need to take the friction out of dealing with banks
- Tech startups valuations, why there are companies willing to buy them;
  Startups buying others, such as Facebook and Whastapp, Whastapp not profitable, Search in app, instead of searching on Google, making Google looking at other venues for future disintermediation.
- Current account, payments, direct transactions.
- Apple Pay, Android Pay (Google Wallet), start distributing. They still rely on the banking system on the backend, but Apple and Google are the ones having the conversation with the customer. Would you prefer to talk with an excited Apple or your current bank?
- Slowly Apple or Google start to swept away customers, they offer more services and remove the need for a bank. They control the negotiations, because they have the customers on their side. Customers prefer to deal directly with Apple that they love than retail banks, becoming dissident of banks.

Appendix B2, Industry experts interviews (Craig Iley)

4) Specialisation

- Banks bundle the products to be able to hide things, such as fees, that customers don't know. Banks have a bigger infrastructure, that needs to be cover by such fees.
- Specialisation is happening and it seems to be the way to go. The creation of a digital ecosystem is a possibility. Example is I use this everyday banking app, and use currently X service to transfer money abroad. I can change provider from within the everyday banking app to Y service of transfer money abroad, all linked together. Same can be said for investments or P2P lending providers. This provides zero friction to the consumer, as its easy and instantaneously done from the smartphone app. This could be the moment where this new offer explodes (Uber moment, referred before on the text).
- If the consumer uses a traditional bank for an example, he needs to change from the provider entirely to use another one, causing a lot of friction.
- The regulators are the banks best friends – without regulation I believe all banks would be gone in 10 years because they are not engaging enough.

5) Security and Data

- Security is paramount. Biometrics big key.
- Is #1 concern, but there is no foolproof security. What it we create we can also break.
- Enhance security, by having layer security, examples:
  - facial recognition to check banking statement
  - facial recognition + voice to make a payment
  - facial recognition + voice + passcode to make a big payment
- Regulation always catches up in regards to security, not lead.
- Regulation in the are of data security needs to catch up to current trends – you cannot "put the genie back in the bottle";
- Generations think different of sharing or not data
- While we are using our smartphone, our smartphone looking at us (and importantly learning about our, habits, preferences etc). We are known in ways we have never been known before
- Information sharing online, depends on age.
- Older generation more secretive on what they share " do they need to know" attitude.
- Millennials typically less so more a case "I need to share".
- Keep data safe, shared concern by everyone
- Younger generations are more willing to provide data, they were born into a world of internet and assume that is normal.

- Positive insight
  - banks know about you, what you buy, what you spend so can flag if pattern differs to prevent.

Appendix B2, Industry experts interviews (Craig Iley)

- Negative insight
- people can look into you online, information can leak and you end up in the wrong places.
- Double hedge sword, which means that risk needs to be balanced.

- Although the internet opened up new data risks – most people would choose to accept that as a price for the convenience it brings so a difficult area for companies (especially banks, regulators etc) to get right.

6) Cloud Storage

- Today all financial data still have to have hold in a physical server, could can't be used, especially outside UK. Finance regulators still rule. But technology interconnection as the world and this services globalise can make this change. Also proven security measures, and the fact that the current technology might not be supported in the future might make this change.

7) Revolution

- Physical Revolution (Industrial Revolution) took 200 years
- Digital Revolution took 20 years
- Next generation how long? AI Revolution might be next.
- Data is now more valuable.

Appendix B3, Industry experts interviews (Kian Chun Lim)

Kian Chun Lim, Director at Sixcents Capital Management
Email Q&A on the 27th March 2016

1) What is your opinion on the state of Retail Banking Business Model?

I think that the core business of retail banking is still in good health. Other than the ability to open savings accounts, retail banks continue to facilitate many transactions in a standard economy. You've got things like personal loans and mortgages that aren't going away any time soon. Retail banks are very much entrenched in our daily lives; not to forget that many countries also offer retail banks structural and substantive support. Of course, the retail banking space is no different from any other sector; the adage "adapt or die" still applies. Retail banks have to be alive to changing consumer needs.

2) Do you think that smartphones, can or are, acting as disruption forces to that same model, forcing banks to rethink their strategy towards consumers?

My view is that the general uptick in smartphone use and mobile transactions reflect changing consumer needs and expectations. Consumers today value flexibility, convenience and ease of use. whereas I would say that banks prioritise security, stability and scaleability when formulating their wider business strategy. Banks have been slow to realise that they don't necessarily have to forego any of these original priorities while still serving an evolving consumer landscape. In fact, developments such as fingerprint identification and 2FA provide even greater security for retail banking transactions.

Are smartphones disrupting the retail banking model? If you're talking about how banking transactions are facilitated, then the short answer is yes. We could very well see traditional physical branches becoming obsolete and a complete automation of your savings/transactional accounts. Even loan and mortgage automation is a likely possibility in the future (especially with the amount of user data your smartphone is able to access and analyse). However, insofar as the core business of retail banks go, I would say that the smartphone is merely a tool to better serve changing consumer expectations and would actually help retail banks to become more efficient in meeting these expectations. Banks might have to rethink their strategy to keep consumers happy, but the essence of the business hasn't changed.

Appendix B3, Industry experts interviews (Kian Chun Lim)

3) What is your view on the market development that fintech companies appear to be collectively creating the next generation of banking ecosystem, with each fintech company carving out a specialisation in one particular product offering. (Everyday banking is done by Mondo or Atom, transfers abroad are done by Transferwise, lending is done by Zopa or Lending Club, Investment is done by Nutmeg, and collectively they offer what historically one single bank has offered, offering consumers access to an ecosystem with no affiliation to a product/app).

My feeling is that although banks have been late to the fintech party, they are not as stupid as to ignore this new demand for greater control and visibility in managing your own finances and transactions. We can see that many retail and investment banks have been acquiring tech or tech companies that augment their current banking ecosystem. They are slow to change but have the resources to build an ecosystem that is specific to that one bank. Furthermore, banks are "public institutions" and are seen as critical to a well functioning economy, and as such are heavily supported by governments. This governmental support provides consumers something that many of these startups are not able to: namely accountability and peace of mind. Is this inefficient? Perhaps. But it remains to be seen if fintech companies can overcome this bias. However, that is not to say that fintech companies will not be able to carve out their own slice of the pie; if they can provide a better mousetrap then the banks, then why not? Consumers are flexible and are not above using more than one service to meet their needs.

Appendix B4, Industry experts interviews (Anonymous Banker)

Anonymous with previous experience in Investment Banking and Consulting
Email Q&A on the 11th March 2016

1) What is your opinion on the state of Retail Banking Business Model?

I think the retail banking model is very outdated. In fact, if you think about it, it hasn't changed much for over 150 years. The classic "banker" used to be a wealth manager, they used to do what we would consider 'retail banking' today. In many ways banks don't add much value other than providing you with a debit/credit card and giving you an account to place your money in. There's potential to transform the industry here.

2) Do you think that smartphones, can or are, acting as disruption forces to that same model, forcing banks to rethink their strategy towards consumers?

I definitely think smartphones are disrupting the industry. We're already using things like Apple Pay, for instance.
Do I think they will disrupt classic banking? Yes, unless traditional banks really do rethink their strategy. Barclays, for example, doesn't let its clients use Apple Pay. That's a massive inconvenience for tech-savvy users, who want to make use of this cool new technology. It's not enough to get clients to switch to another bank just yet, but if Barclays continues fighting against these forces I think we will see a lot of switches to those banks that have become open to new tech.

3) What is your view on the market development that fintech companies appear to be collectively creating the next generation of banking ecosystem, with each fintech company carving out a specialisation in one particular product offering. (Everyday banking is done by Mondo or Atom, transfers abroad are done by Transferwise, lending is done by Zopa or Lending Club, Investment is done by Nutmeg, and collectively they offer what historically one single bank has offered, offering consumers access to an ecosystem with no affiliation to a product/app).

I think the market is indeed shaping itself in that way - fintech companies appear to be carving out areas of specialisation. I think that's great, because the financial industry is so big, with such a wide range of services, that I don't think one service provider can be market leader in all. If you think about it, it's like that in any other industry as well: you wouldn't expect Audi to produce wheels, all electronics inside a car, the engine, the seats etc etc they outsource this to Bosch, who is the worlds largest car components provider. If you

frame the industry this way, I think its odd that specialisation hasn't occurred in the financial sector as much. The only specialisation we've seen is in the big investment banking sector, where large investment managers have emerged (Blackrock, Pimco, Vanguard etc.), Investment Banks (Lazard or Rothschild) and Trading houses (brokerage firms). But even here big banks like Citi, MS, JPM, GS, DB all offer a wide wide range of services.

Any other thoughts you might have that you would like to share (such as cryptocurrencies, regulation easing, security concerns by regulators and consumers, blockchain) I would be extremely thankful as that would help a lot on my research.

I don't think the industry is in imminent danger just yet - big banks will be smart enough to cooperate with smaller fintech companies, maybe even help finance/fund them. But over the next 5-10 years banks' focus will definitely shift. The advantage big banks have at the moment is still their influence and the amount of cash they have, which allows them to move markets - fintech companies (even if they're valued at 1bn plus, they don't really make that money yet) by contrast don't have that power.

Appendix B5, Industry experts interviews (Anonymous Banker)

Anonymous Investment Manager

Email Q&A on the 23rd March 2016

1) What is your opinion on the state of Retail Banking Business Model?

The traditional retail banking business model is very much under stress because overcapacity, historic low interest rates and modern alternatives are bringing down margins and increasing competition. In a mature market like retail banking, its products become a commodity and price competition among banks bring down margins, while risks remain high (main risk for retail banks is of course credit risk), i.e. in particular in a context where asset bubbles and busts brings vulnerability to the value of their collateral, e.g. in the mortgage business.

2) Do you think that smartphones, can or are, acting as disruption forces to that same model, forcing banks to rethink their strategy towards consumers?

Difficult to answer at this stage. Retail banking players have had, and are adapting to new ways of making data accessible to customers, however this can act both as an opportunity and a threat to individual players. I anticipate that the changing character of modern banking will incentivise consolidation in the sector, where the bigger and first players to use new technology as a comparative advantage will be better off.

3) What is your view on the market development that fintech companies appear to be collectively creating the next generation of banking ecosystem, with each fintech company carving out a specialisation in one particular product offering. (Everyday banking is done by Mondo or Atom, transfers abroad are done by Transferwise, lending is done by Zopa or Lending Club, Investment is done by Nutmeg, and collectively they offer what historically one single bank has offered, offering consumers access to an ecosystem with no affiliation to a product/app).

I think this is a great point. There are some niches of banking in which modern alternatives such as the ones mentioned may continue to become more and more popular. However, in the foreseeable future I do not see the expertise and solutions offered by global banks in areas such as capital markets under threat. The scale and expertise of universal banks is not easily replaceable.

Appendix C, Millennials Interviews

These are the conversations that the interviewees had with the author over email, where they were ask to provide some answers on the authors questions.

1. **Do use your smartphone to take care of your banking needs instead of going to a branch or calling the bank?**

Millennial #1

- Yes;
- Usually rely on using my smartphone or the app my bank offers for most banking needs;
- Other needs like changing bank notes or depositing are obviously take care of going to a branch;

Millennial #2

- Yes, I use my smartphone, I only go to the branch if it's the only way to get something done;

Millennial #3

- Mostly, I've got my Barclays app downloaded on my phone;
- I am able to use the mobile app to do most things I need; transferring money from my savings to current account, vice verse; setting up a new payee UK account to transfer to others from another bank; have access to information of my bank account (balance) quickly by inputting the password on that I've chosen instead of calling the bank, going to the branch or using the token to do it online;
- Currently, I only go to the bank when I need to exchange currencies; this service is currently not provided by Barclays yet;

Millennial #4

- Yes;
- Saves much more time;
- Calling the bank can be very time consuming, especially when they put you on hold;
- Banks can get busy during lunch and off work hours;

Millennial #5

- Yes;

Appendix C, Millennials Interviews

2. Are you happy with the mobile experience provided by your current retail bank? Why?

Millennial #1

- It's improved enough to take care of simple needs but not quite happy as compared to trying other virtual banks like mondo;
- Mobile experience is very slow and used to require lots of time to login although now hsbc offers touch ID to log in which is good;
- Peer to peer transfer is limited to recent contacts i've transferred to if not I need to add them through desktop which is quite slow;
- Bank balance is slow and does not update in real time which is bad to manage my personal finances;

Millennial #2

- I'm somewhat happy - its not flexible enough, doesn't have enough insights into my spending, lacks functionality;

Millennial #3

- Yes, providing the mobile app is convenient and time- saving and the mobile app could be used to replace the 'bank token' if I need to use Internet banking on the web;
- However, if I have to transfer money to an overseas account, I will have to do it through Internet banking on the web instead;

Millennial #4

- Not completely satisfied. it's not terrible but the service can definitely improve;
- Transferring money is a tedious process;
- Mobile banking prioritized safety —> need to answer one security question (randomly selects one out of three questions) every time we sign in;

Millennial #5

- Yes I am;
- Lets me use my fingerprint to log in: very convenient and safe;
- Lets me transfer money between savings and checking account easily;
- Settings are very convenient - lets me check balance and look at activity easily;

Appendix C, Millennials Interviews

3. **Do you feel that smartphone made you expect more from your bank in regards to service and experience? Why do you think that is happening? Could fintech services changed your perception in any way?**

Millennial #1

- Yes there's more expectation towards how millenials operate in the sense that we want to be able to handle everything online and have banking statements stored and sorted out online instead of having them sent in physical copy. I think there will always be more expectation with anything especially tech related because tolerance builds for convenience fast and more convenience offered is something consumers look out for to patronise a service;
- Having tried Mondo, it has definitely changed my perception and is instant, real time and gives me a conducive way to handle my personal finances. I'm able to track my monthly expenses better and organise what I spend on. This gives me an idea on how I should save;

Millennial #2

- I do expect banks to keep up-to-date and become digitalised themselves. I would switch to a bank that has a better online service;

Millennial #3

- Yes, I would expect higher and stronger security services from my bank in preventing this to happen because it also raises security threats;
- Fraud could happen to any bank users despite how banks try to enhance security;
- Fintech is providing services that is undersupplied by retail banks;

Millennial #4

- Yes, if other applications can provide the same service but a much simpler service the bank should be able to provide the same;
- It's more personalized and everything is more right under your fingertips so I expect complete convince; I would prefer if everything i can do at a bank via calling or visiting a branch can be easily completed under 5 minutes online;

Millennial #5

- I expect more convenience and faster service. I don't really see the need to go to a bank teller anymore unless I have an issue with my account

4. **Do you use any services such as TransferWise/Azimo, PayPal, Mondo/Simple, Zopa/ LendingClub, Nutmeg/Betterment or Apple Pay/Google Wallet instead of a similar offering from your traditional retail bank? If yes, could you care to give me one example and tell me why?**

Millennial #1

- I've used Apple Pay which completely revolutionises payment as it replaces using a card firstly, and for certain purchases like in app purchases, I'm required to key in my card details or scan it in. With Apple Pay I'm rest assured that I do not need to give another organisation my card details and can use Apple Pay to facilitate the transaction simply and seamlessly

Millennial #2

- PayPal, Mondo, Apple Pay. It's convenient, particularly apple pay.

Millennial #3

- Revolut; I am able to exchange currencies and Revolut provides a card with the exchanged currency inside to be used. I can also send money to an overseas bank account without being charged, which preferable compared to traditional retail bank.I can also link my retail bank account to Revolut and transfer money between the two accounts

Millennial #4

- I use TransferWise, Paypal, Venmo and Apple Pay
- I use TransferWise and Paypal to transfer money because their process is much more simple and the wiring fee is less
- It takes roughly the same time to wire money (internationally) on TransferWise and Paypal as my bank
- Venmo allows you to charge people, making it easier to collect money from friends
- Although same day money transfer within Bank of America is efficient, the process and information required is a long process. Compared to Venmo which only requires the user's ID name or phone number

Millennial #5

- I use venmo quite often. I haven't gotten used to Apply Pay because I lose my phone quite often and I don't feel comfortable putting so much important information on my phone.

Appendix D1, Survey example

Retail Banking and its alternatives

I'm currently finishing my BSc at University College London, and this survey serves for me to research data on how consumers relate with their retail banking current offering, especially its mobile offering and the alternatives that are now emerging thanks to the big recent push in fintech.

What is your age? S1

- < 20
- 21 - 29
- 30 - 39
- 40 - 49
- > 50

How important is it for you to use your smartphone to interact with your bank? (using its app or mobile webpage) S2

	1	2	3	4	5	
Not Important	○	○	○	○	○	Very Important

Would you change to another bank if their mobile offering was better? S3

- Yes
- No
- Unsure

Appendix D1, Survey example

Have you heard or use any of the following services: S4

- [ ] Mondo, Atom, Simple, Sterling, Fidor, Number26, Moven
- [ ] TransferWise, Currency Fair, Peer Transfer, Currencies Direct
- [ ] Square, Dwolla, iZettle, GoCardless
- [ ] Zopa, Lending Club, Funding Circle, Rate Setter
- [ ] Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo
- [ ] CoinBase, Xapo, Armory, airBitz

If these services offer a better experience than your current bank offering, how likely would you stop using your bank for such services? S5

	1	2	3	4	5	
Unlikely	○	○	○	○	○	Very likely

Assuming all services above are regulated by the FCA (Financial Conduct Authority) or CFPB (Consumer Financial Protection Bureau) do you trust them in the same way as a bank? S6

- ○ Yes
- ○ No
- ○ Unsure

Appendix D1, Survey example

Do you know what cryptocurrencies such as bitcoin are? S7

- ○ Yes
- ○ No
- ○ Unsure

Do you know how to use cryptocurrencies? S8

- ○ Yes
- ○ No
- ○ Unsure

Appendix D2, Survey results, part 1

Timestamp	S1	S2	S3	S4	S5	S6	S7	S8
3/14/2016 15:53:25	21 - 29	5	Yes	Mondo, Atom, Simple, Sterling, Fidor, Number26, Moven, TransferWise, Currency Fair, Currencies Direct, Square, Dwolla, iZettle, GoCardless, Zopa, Lending Club, Funding Circle, Rate Setter, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo, CoinBase, Xapo, Armory, airBitz	5	Yes	Yes	
3/14/2016 16:02:05	21 - 29	5	Yes	TransferWise, Currency Fair, Currencies Direct, Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	2	Unsure	Unsure	
3/14/2016 16:02:32	21 - 29	5	Yes	Mondo, Atom, Simple, Sterling, Fidor, Number26, Moven, TransferWise, Currency Fair, Currencies Direct, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	4	Yes	Yes	
3/14/2016 16:04:21	21 - 29	4	No	TransferWise, Currency Fair, Currencies Direct, Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	1	Unsure	Yes	
3/14/2016 16:04:56	21 - 29	5	Yes	Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	5	Unsure	Yes	No
3/14/2016 16:05:35	21 - 29	5	Yes	Mondo, Atom, Simple, Sterling, Fidor, Number26, Moven, TransferWise, Currency Fair, Currencies Direct, Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	5	Yes	Yes	No
3/14/2016 16:05:40	30 - 39	5	Unsure	Mondo, Atom, Simple, Sterling, Fidor, Number26, Moven, Zopa, Lending Club, Funding Circle, Rate Setter, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	4	Yes	Yes	No
3/14/2016 16:06:46	21 - 29	5	Unsure	Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	3	Yes	Yes	No
3/14/2016 16:10:59	21 - 29	2	No	TransferWise, Currency Fair, Currencies Direct, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	2	Yes	Yes	No
3/14/2016 16:14:49	21 - 29	5	Unsure	Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	3	Yes	Unsure	No
3/14/2016 16:15:25	21 - 29	5	Unsure	TransferWise, Currency Fair, Currencies Direct, Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	1	No	Yes	No
3/14/2016 16:15:37	21 - 29	5	No	TransferWise, Currency Fair, Currencies Direct, Square, Dwolla, iZettle, GoCardless, Zopa, Lending Club, Funding Circle, Rate Setter, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	1	Unsure	Yes	No
3/14/2016 16:15:42	21 - 29	2	Yes	TransferWise, Currency Fair, Currencies Direct, Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	2	Unsure	Yes	No
3/14/2016 16:21:42	40 - 49	3	Yes	TransferWise, Currency Fair, Currencies Direct, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	4	Yes	Yes	Yes
3/14/2016 16:49:37	30 - 39	2	Unsure	Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	3	No	Yes	Unsure
3/14/2016 16:50:07	> 50	2	No	Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	1	Unsure	No	No
3/14/2016 16:50:34	< 20	5	Yes	Mondo, Atom, Simple, Sterling, Fidor, Number26, Moven, TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo, CoinBase, Xapo, Armory, airBitz	5	Yes	Yes	Unsure
3/14/2016 16:51:01	40 - 49	3	Yes	TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Zopa, Lending Club, Funding Circle, Rate Setter, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	4	Unsure	Yes	No
3/14/2016 16:51:24	30 - 39	5	Yes	Mondo, Atom, Simple, Sterling, Fidor, Number26, Moven, TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Square, Dwolla, iZettle, GoCardless, Zopa, Lending Club, Funding Circle, Rate Setter, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo, CoinBase, Xapo, Armory,	5	Yes	Yes	Yes
3/14/2016 16:56:20	21 - 29	5	Unsure	Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo, CoinBase, Xapo, Armory, airBitz	1	Unsure	Yes	Yes
3/14/2016 16:57:18	21 - 29	5	Unsure	TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	3	Yes	Yes	Yes
3/14/2016 16:57:30	21 - 29	4	No	TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	2	No	Yes	Unsure
3/14/2016 17:14:08	21 - 29	5	Unsure	TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	3	Yes	Yes	No
3/14/2016 17:15:09	21 - 29	5	Yes	TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	5	Yes	Yes	No
3/14/2016 17:15:27	21 - 29	5	Yes	Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	3	Unsure	Yes	No
3/14/2016 17:27:39	21 - 29	4	Unsure	Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	2	No	No	No
3/14/2016 17:35:11	30 - 39	4	Unsure	Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	2	No	Yes	No
3/14/2016 17:36:20	21 - 29	4	Yes	Mondo, Atom, Simple, Sterling, Fidor, Number26, Moven, Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	2	No	Yes	Yes
3/14/2016 17:38:44	21 - 29	5	Yes	Mondo, Atom, Simple, Sterling, Fidor, Number26, Moven, TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	5	Unsure	Unsure	Unsure
3/14/2016 17:48:05	40 - 49	5	Yes	TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Square, Dwolla, iZettle, GoCardless, Zopa, Lending Club, Funding Circle, Rate Setter, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo, CoinBase, Xapo, Armory, airBitz	5	Yes	Yes	Yes
3/14/2016 17:50:34	21 - 29	4	Unsure	Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	3	Yes	Yes	No
3/14/2016 17:53:09	21 - 29	3	No	Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	2	Unsure	Yes	No
3/14/2016 17:53:18	21 - 29	5	Unsure	Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	2	Yes	Yes	No
3/14/2016 18:15:08	30 - 39	3	No	Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	1	No	Yes	No
3/14/2016 18:21:03	21 - 29	3	No	Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	3	Unsure	No	No
3/14/2016 18:33:56	30 - 39	5	Unsure	Mondo, Atom, Simple, Sterling, Fidor, Number26, Moven, TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Square, Dwolla, iZettle, GoCardless, Zopa, Lending Club, Funding Circle, Rate Setter, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo, CoinBase, Xapo, Armory,	4	Yes	Yes	Yes
3/14/2016 18:35:43	30 - 39	5	Unsure	Square, Dwolla, iZettle, GoCardless, Zopa, Lending Club, Funding Circle, Rate Setter, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	4	Yes	Yes	No
3/14/2016 18:36:29	21 - 29	5	Yes	TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	3	No	Yes	Yes
3/14/2016 18:37:53	40 - 49	5	Unsure	Mondo, Atom, Simple, Sterling, Fidor, Number26, Moven, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo, CoinBase, Xapo, Armory, airBitz	3	Unsure	Yes	Yes
3/14/2016 18:43:09	21 - 29	2	Unsure	Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	1	Yes	Yes	Yes
3/14/2016 19:06:54	> 50	1	No	Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	1	No	Yes	No
3/14/2016 19:31:20	21 - 29	5	No	TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	2	Yes	Unsure	No
3/14/2016 19:37:19	21 - 29	5	Unsure	TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	4	Yes	Yes	Yes
3/14/2016 19:38:02	21 - 29	3	Unsure	Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	2	Yes	Yes	Yes
3/14/2016 20:27:37	21 - 29	5	Yes	Mondo, Atom, Simple, Sterling, Fidor, Number26, Moven, Square, Dwolla, iZettle, GoCardless, Zopa, Lending Club, Funding Circle, Rate Setter, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo, CoinBase, Xapo, Armory, airBitz	5	No	Yes	Yes
3/14/2016 20:40:39	30 - 39	4	Yes	TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	4	No	Yes	Yes
3/14/2016 20:41:06	40 - 49	3	Yes	Zopa, Lending Club, Funding Circle, Rate Setter, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	3	No	Unsure	No
3/14/2016 20:41:29	> 50	2	Unsure	Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	1	No	No	No
3/14/2016 20:41:54	< 20	5	Yes	Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	5	Yes	Yes	No
3/14/2016 20:42:21	30 - 39	4	No	TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	3	Unsure	Yes	Unsure
3/14/2016 20:43:31	30 - 39	5	Unsure	Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	2	Unsure	Yes	Unsure
3/14/2016 20:43:56	< 20	5	Unsure	Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	4	Unsure	Yes	No
3/14/2016 20:44:16	30 - 39	2	No	Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	2	No	No	No
3/14/2016 21:17:28	21 - 29	1	No			Yes	Yes	Yes
3/14/2016 21:24:45	21 - 29	1	No	Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	1	No	Yes	Yes
3/14/2016 21:56:59	30 - 39	5	Unsure	Mondo, Atom, Simple, Sterling, Fidor, Number26, Moven, Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	3	Unsure	Yes	No
3/14/2016 21:57:26	30 - 39	1	No	Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	1	Unsure	Yes	Unsure
3/14/2016 22:12:21	30 - 39	5	Unsure	Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	5	Unsure	Yes	No
3/14/2016 22:19:03	30 - 39	1	No	Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo, CoinBase, Xapo, Armory, airBitz	1	No	Yes	Yes
3/14/2016 22:23:47	21 - 29	3	No	Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	3	Unsure	Yes	Unsure
3/14/2016 22:27:33	30 - 39	5	No	Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	5	Yes	Yes	No
3/14/2016 22:58:02	21 - 29	4	No	Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	1	No	No	No
3/14/2016 23:40:59	21 - 29	3	No	Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	2	No	Yes	Yes
3/14/2016 23:41:48	21 - 29	1	No	Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	3	Unsure	Yes	No
3/14/2016 23:50:42	30 - 39	5	Unsure	Square, Dwolla, iZettle, GoCardless, Zopa, Lending Club, Funding Circle, Rate Setter, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	1	No	Yes	Unsure
3/15/2016 0:35:15	21 - 29	5	Unsure	Square, Dwolla, iZettle, GoCardless, Zopa, Lending Club, Funding Circle, Rate Setter, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	3	Yes	Yes	No
3/15/2016 0:54:12	21 - 29	5	Yes	TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	3	Yes	Yes	No
3/15/2016 0:57:14	40 - 49	4	No	Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	1	No	Yes	Yes
3/15/2016 1:23:34	30 - 39	5	Unsure	Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	1	No	Yes	No
3/15/2016 2:22:37	30 - 39	5	Yes	Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	5	Unsure	Yes	Yes
3/15/2016 2:51:04	21 - 29	5	Yes	Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	1	No	Yes	Yes
3/15/2016 3:11:35	30 - 39	5	Yes	Mondo, Atom, Simple, Sterling, Fidor, Number26, Moven, TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Square, Dwolla, iZettle, GoCardless, Zopa, Lending Club, Funding Circle, Rate Setter, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo, CoinBase, Xapo, Armory,	5	No	Yes	Yes
3/15/2016 3:27:07	> 50	4	Unsure	Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	2	Unsure	Yes	No

Appendix D2, Survey results, part 2

Timestamp	S1	S2	S3	S4	S5	S6	S7	S8
3/15/2016 3:42:59	30 - 39	4	Unsure	Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	3	Yes	Yes	No
3/15/2016 5:02:44	21 - 29	5	Yes	Mondo, Atom, Simple, Sterling, Fidor, Number26, Moven, Square, Dwolla, iZettle, GoCardless, Zopa, Lending Club, Funding Circle, Rate Setter, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	5	No	Yes	Yes
3/15/2016 5:58:42	21 - 29	3	Yes	Mondo, Atom, Simple, Sterling, Fidor, Number26, Moven, TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Zopa, Lending Club, Funding Circle, Rate Setter, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo, CoinBase, Xapo, Armory, airBitz	5	Yes	Yes	Yes
3/15/2016 6:08:37	21 - 29	5	No	Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	2	No	Yes	No
3/15/2016 6:18:48	30 - 39	5	Yes	Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	5	Yes	Yes	No
3/15/2016 6:48:26	> 50	5	Yes	Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	4	Yes	No	No
3/15/2016 6:56:20	30 - 39	5	Yes	Mondo, Atom, Simple, Sterling, Fidor, Number26, Moven, TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Square, Dwolla, iZettle, GoCardless, Zopa, Lending Club, Funding Circle, Rate Setter, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo, CoinBase, Xapo, Armory,	4	Yes	Yes	Yes
3/15/2016 9:24:44	30 - 39	3	Yes	Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	3	Unsure	No	Unsure
3/15/2016 9:25:04	21 - 29	2	No	TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	2	No	Yes	No
3/15/2016 10:39:16	21 - 29	5	Yes	Square, Dwolla, iZettle, GoCardless, Zopa, Lending Club, Funding Circle, Rate Setter, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	3	Unsure	Yes	No
3/15/2016 11:42:11	21 - 29	3	Unsure	TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	5	Yes	Yes	No
3/15/2016 11:43:11	30 - 39	5	Yes	Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	3	Unsure	Yes	No
3/15/2016 12:05:48	21 - 29	4	Unsure	Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	3	Yes	Yes	Unsure
3/15/2016 12:26:29	40 - 49	1	No	Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	5	Yes	Yes	No
3/15/2016 12:35:32	30 - 39	1	No	TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo, CoinBase, Xapo, Armory, airBitz	1	No	Yes	Yes
3/15/2016 13:33:26	30 - 39	5	No	Mondo, Atom, Simple, Sterling, Fidor, Number26, Moven, TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Square, Dwolla, iZettle, GoCardless, Zopa, Lending Club, Funding Circle, Rate Setter, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo, CoinBase, Xapo, Armory,	4	Yes	Yes	No
3/15/2016 14:08:15	30 - 39	2	No		3	Unsure	Yes	Yes
3/15/2016 15:47:08	21 - 29	5	Yes	Mondo, Atom, Simple, Sterling, Fidor, Number26, Moven, TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Square, Dwolla, iZettle, GoCardless, Zopa, Lending Club, Funding Circle, Rate Setter, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo, CoinBase, Xapo, Armory,	5	Yes	Yes	Yes
3/15/2016 16:11:32	30 - 39	3	Unsure	TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	3	Unsure	Yes	Yes
3/15/2016 17:07:21	> 50	2	No	TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	2	Unsure	Yes	Yes
3/15/2016 17:07:47	30 - 39	2	Unsure	TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	4	Unsure	Yes	No
3/15/2016 17:48:56	21 - 29	3	No	TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	2	No	No	No
3/15/2016 17:55:01	40 - 49	4	No	Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	2	No	Yes	Yes
3/15/2016 17:58:54	21 - 29	4	No	TransferWise, Currency Fair, Peer Transfer, Currencies Direct	2	Yes	No	No
3/15/2016 19:00:19	30 - 39	4	Unsure	Mondo, Atom, Simple, Sterling, Fidor, Number26, Moven, TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Square, Dwolla, iZettle, GoCardless, Zopa, Lending Club, Funding Circle, Rate Setter, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo, CoinBase, Xapo, Armory,	3	No	Yes	Yes
3/16/2016 0:21:43	21 - 29	5	Yes	Mondo, Atom, Simple, Sterling, Fidor, Number26, Moven, TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Square, Dwolla, iZettle, GoCardless, Zopa, Lending Club, Funding Circle, Rate Setter, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo, CoinBase, Xapo, Armory,	5	Yes	Yes	Yes
3/16/2016 3:54:25	30 - 39	1	No	Mondo, Atom, Simple, Sterling, Fidor, Number26, Moven, Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	1	No	Yes	No
3/16/2016 4:55:43	> 50	5	Unsure	Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	1	No	Yes	Unsure
3/17/2016 10:15:33	21 - 29	5	Yes	Mondo, Atom, Simple, Sterling, Fidor, Number26, Moven, TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Square, Dwolla, iZettle, GoCardless, Zopa, Lending Club, Funding Circle, Rate Setter, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	5	Yes	Yes	No
3/17/2016 13:22:23	30 - 39	5	Yes	Mondo, Atom, Simple, Sterling, Fidor, Number26, Moven, TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Square, Dwolla, iZettle, GoCardless, Zopa, Lending Club, Funding Circle, Rate Setter, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo, CoinBase, Xapo, Armory,	3	Yes	Yes	Yes
3/17/2016 15:40:25	> 50	2	No	Mondo, Atom, Simple, Sterling, Fidor, Number26, Moven, TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Square, Dwolla, iZettle, GoCardless, Zopa, Lending Club, Funding Circle, Rate Setter, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo, CoinBase, Xapo, Armory,	4	No	Yes	Yes
3/17/2016 21:48:46	21 - 29	5	Yes	Mondo, Atom, Simple, Sterling, Fidor, Number26, Moven, Square, Dwolla, iZettle, GoCardless, Zopa, Lending Club, Funding Circle, Rate Setter, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	4	Yes	Yes	No
3/18/2016 7:40:47	21 - 29	5	Unsure	Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	3	Unsure	Yes	Yes
3/18/2016 19:55:33	21 - 29	5	Yes	TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	4	Yes	Yes	No
3/19/2016 2:01:28	40 - 49	2	No	Zopa, Lending Club, Funding Circle, Rate Setter	1	No	Yes	Yes
3/20/2016 20:23:41	40 - 49	4	Unsure	Mondo, Atom, Simple, Sterling, Fidor, Number26, Moven, TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Square, Dwolla, iZettle, GoCardless, Zopa, Lending Club, Funding Circle, Rate Setter, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo, CoinBase, Xapo, Armory,	2	Yes	Yes	No
3/21/2016 13:30:08	21 - 29	4	Unsure	Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	3	Yes	Yes	Unsure
3/21/2016 23:36:37	21 - 29	4	Yes	Mondo, Atom, Simple, Sterling, Fidor, Number26, Moven, TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	2	No	Yes	Yes
3/23/2016 10:42:31	30 - 39	5	No	Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	1	Unsure	Yes	No
3/24/2016 21:34:16	21 - 29	4	Yes	TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Square, Dwolla, iZettle, GoCardless, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	3	Yes	Yes	Yes
3/27/2016 3:21:26	21 - 29	5	Yes	Mondo, Atom, Simple, Sterling, Fidor, Number26, Moven, TransferWise, Currency Fair, Peer Transfer, Currencies Direct, Apple Pay, Google Wallet, Amazon Payments, PayPal, Venmo	1	No	Yes	Yes