



*Department of Economics and Finance*

*Chair of Money and Banking*

Fintech: how technologies are shaping banking future

SUPERVISOR

Prof. Paolo Paesani

CANDIDATE

Edoardo Valli

Matr. 212531

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## INTRODUCTION

During the last decades, the world economy has undergone a thorough process of modernisation and digitalisation in mostly each sector, at the point where entirely new industries have emerged; the Silicon Valley has played a major role in such transformation, demonstrating how the concentration of several innovative companies in a single area facilitates the flow and contamination of ideas within different industries, leading to a flourishing economic sector and revolutionary innovations.

Such disruptive wave of innovation is now converging towards an historically bound to tradition and renovation-adverse industry: banking. This upcoming flow of innovation goes under the name of “fintech”, that is, financial technology, and has the goal to disrupt the currently dated and inefficient financial sector through the implementation of new technologies and processes.

Foreseeing what this phenomenon might imply on nowadays’ banking industry, a question spontaneously arises: how will fintech shape the future of banking?

This thesis has the ambitious objective to answer this research question, through an overlook over the current state of the fintech sector and a deep analysis of the market and its main players. Financial technologies are not a banks-only affair, indeed; many new actors are entering the market of financial services and products providers, such as bigtechs like Amazon and Google, or emerging neo-banks and startups like N26 and Monzo. Therefore, it is due to delineate an array of potential scenarios for the future of banking and more broadly the economy, while considering the important role that incumbent banks will have in this dispute: will they embrace this wave of innovation or try to maintain their current status by relying on their century-old legacy?

To fulfil the thesis’ objective, two chapters have been devised. The first one gives an overlook on fintech, in an attempt to better comprehend what fintech is and its potential implications on the banking sector. Moreover, the up-to-date size of this sector is assessed, along with its state of development and upcoming trends. Finally, experts’ opinions are brought upon to understand the different points of view concerning the topic, and the general sentiment about the possible disruption of the financial services industry as it is known today.

In the second chapter, five forward-looking scenarios are outlined and analysed, in order to comprehend how fintech companies could impact the financial system and which roles would

be played by incumbents in the newly emerged frameworks. Then, opportunities and risks embedded in the rise of financial technology are considered, leading to a presentation of the various initiatives taken by central banks and jurisdictions to facilitate financial innovation. Eventually, a focus on the fintech credit market is given: both the business models of fintech credit companies and the size of the sector are researched, with particular attention given to emerging countries which are the main beneficiaries of the development of such innovative channels of credit. To conclude, fintech's implications on the traditional credit market are discussed, so as to assess their potential benefits to the economy.

In conclusion, the rise of fintech seem to be beneficial to the global economic framework, as it improves financial services and the overall customer experience through the implementation of innovative technologies and disruptive methods. Moreover, fintech would facilitate access to financial services and products, boosting the economy of emerging countries by providing new forms of financing, and enhancing the overall efficiency of the banking industry in developed countries thanks to the increased competition and the application of innovative processes within the industry. On the other hand, additional risks attached to fintech must be taken in consideration; to this regard, jurisdictions and financial institutions should embrace a path of regulatory renovation through the implementation of regulatory technologies (RegTech) aimed at hedging these new forms of risk.

# Chapter 1. The rise of Fintech

## 1.1 What is Fintech

Giving a unique definition of fintech is a difficult task since several varieties of the concept coexist in academic papers and business journals. Fintech experts all agree that it refers to companies that develop financial services and products by relying on much more intense use of information technology (Varga, 2017).

Arner, Barberis, and Buckley (2015) stated that Fintech could refer to all incumbent and new financial companies, regardless of their size, product portfolio or business model. Hussain, Kim, et al. and McAuley (2015, 2016) affirm instead that Fintech refers to firms that not only use IT but which also focus on providing more efficient services and try to enter traditionally non-banking markets. On the other hand, Ernst & Young's definition (2016) implies that all firms can take part in the fintech revolution if they manage to build innovative business models and implement an adequate supporting technology.

Overall, there is still no agreement on where the boundaries of this arising sector lie. The definition that better suits this paper's author's idea is the one given by the Financial Stability Board (BCBS, 2018), which defines Fintech as:

“technologically enabled financial innovations in financial services that could result in new business models, applications, processes or products with an associated material effect on financial markets and institutions and the provision of financial services”.

Therefore, any company, be it a traditional bank, a start-up firm or a technology giant, can enter the fintech sector by implementing new technologies for improving or disrupting the financial services or products that are currently offered by competitors.

Currently, fintech companies operate a wide array of different services, building their business around each one's specifically developed technology; fintechs' activities include micro-financing platforms, credit provision, facilitated peer-to-peer lending business-related data analysis.

However, the reason that really makes a difference between traditional banks and emerging Fintech companies is the lack of regulation towards the latter, as there is still not a clear and

well-marked distinction of which services they are offering and if they should be regulated as heavily as it is currently done for incumbent financial institutions.

To better understand and distinguish such companies we will divide them into several different categories, according to the main features that characterize them and based on their level of innovation in developing more customer-centred services.

First of all, we may consider the traditional banks that still believe in bricks-and-mortar banking, maintaining a costly network of branches and with limited digital footprint; such banks might have accrued significant technology-related debt by running on obsolete IT systems that are extremely expensive to support and not updated for today's customers' needs. These traditional banks are the most threatened by the exponential growth of digitized and ever more efficient financial competitors in the market.

Banks that have already been experimenting new business models, but have not yet modernized their IT infrastructure or fully digitized their business processes will be referred to as transformational banks during the length of this paper. These are most of nowadays' banks, since there are no large financial institutions which have not yet reacted to the threat of emerging fintech firms; such banks play a significant role in the evolutionary process of the financial sector, thanks to their large client bases, copious funding opportunities and deep knowledge of the regulatory framework.

The most successful, technologically advanced transformational banks, which have already gone through the process of transformation and adopted an innovative way of doing business related to financial services may be called digital banks, or neo-banks (King, 2014).

Neo-banks usually adopt broadly digitized core banking systems that can quickly implement innovative services; such banks are also updated on digital channel management and compliant with regulations, having established solid and profitable new business models. Therefore, digital banks could be working transparently under the lenses of institutional regulators, while capturing the many benefits of Fintech innovation as well.

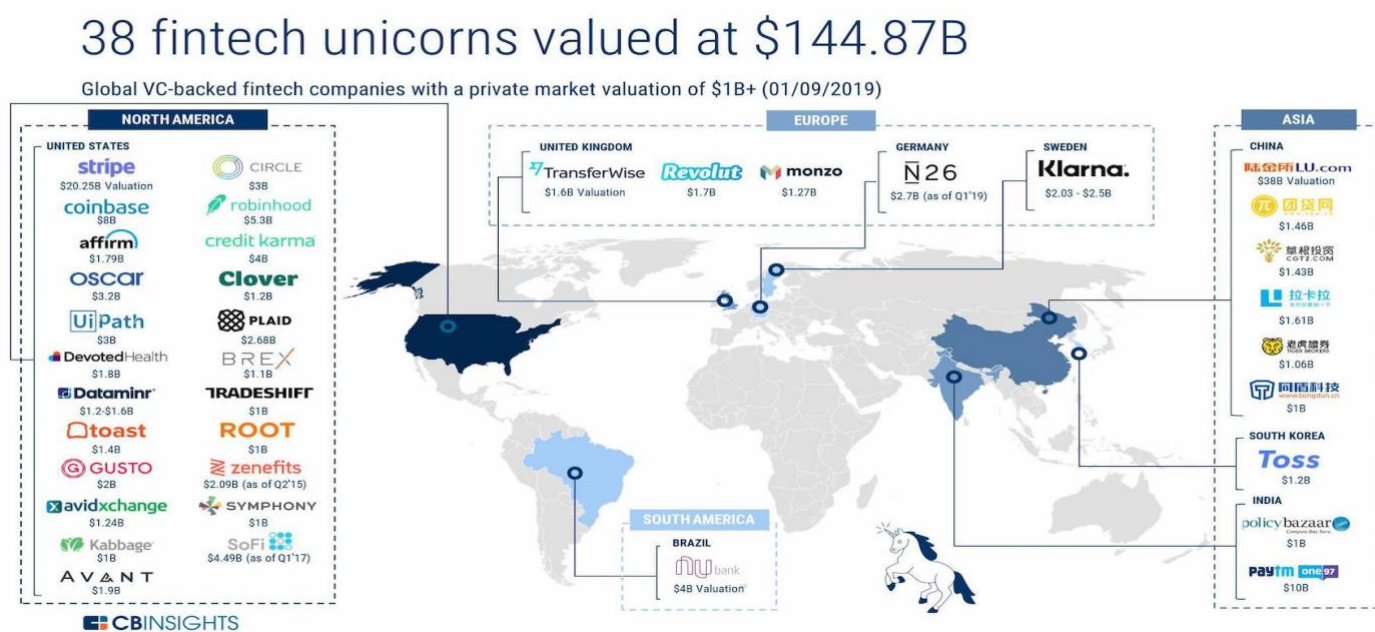
Distinguishing between traditional financial institutions and innovative, disruptive newcomers is needed as proof shows that financial technology firms are already affecting the digitization of the banking sector. It is also clear that each one of these categories of banks is going to face different opportunities, changes, and threats in order to cope with the newly emerging fintech companies.

Once defined the different types of banks within the current banking system, it is due to give an overview of the emerging global fintech sector in terms of number of firms that operate within the market and the various functions and applications that financial technology companies are offering on the market nowadays; moreover, the following paragraphs will also observe the amounts invested in fintech companies all around the world as they are a helpful tool to measure the growing interest in this not-yet fully exploited market. Although the exact number of fintech companies may vary depending on the definition of what a fintech company is, it is generally agreed that there are approximately 7,000 Fintech companies around the world (Forbes, 2015); some of them are recently founded startups, others are largely affirmed corporations.

Such firms are emerging in cities such as Hong Kong, London, New York, Beijing and Singapore, that are affirming themselves as financial technology centers where any Fintech-enthusiast should head for developing his ideas or better understand this global phenomenon. “Finovate” is one of the largest fintech conferences and an important source of up-to-date sector news and firm valuations; it aggregated all the major financial technology companies in the world and clusterized them by field of interest and company valuation. As a proof that fintech is a rapidly growing market, the number of “unicorn” companies (firms valued at more than one billion dollars) identified during Finovate meetings is increasing year by year, and it does not look like it will stop soon.

The following map shows each “unicorn” company along with its country of origin, giving an overlook on fintech most flourishing markets.

Figure 1: "Fintech unicorns around the globe".



Source: [www.cbinsights.com](http://www.cbinsights.com)

## 1.2 Banks' key activities and Fintech's potential

Before going deep into the functions and applications of fintech, it is due to give an overlook of what banks' main activities are and where Fintech companies could develop a competitive advantage.

"A bank is an institution whose current operations consist in granting loans and receiving deposits from the public", stated Freixas and Rochet in 2008; this requires the simultaneous performance of three distinct activities: transforming the characteristics of financial assets and liabilities, supplying payment services, gathering and processing information and data (Barba Navaretti et al., 2017).

The first activity is mainly achieved through maturity transformation, that is taking short-term sources of finance and turn them into long-term borrowings, such as mortgages. This process is fundamental to any economic system, as it allows the funding of long-term investments, and thus stimulate productivity, while simultaneously protecting depositors from non-systematic liquidity shocks.

Thanks to their ease in providing liquidity to their customers, banks are able to accomplish the second above-stated activity as well: offering payment services. Payment



services form a field of great interest for major Fintech firms, as they form a broad market with plenty of opportunities for growth, with a particular interest in emerging countries. Eventually, the third banks' key activity: information processing. It includes all the tasks related to the ex-ante assessing of potential borrowers, the ex-post tracking of their behavior, and the build-up and management of a well-diversified portfolio which maximizes the return with respect to risk.

The existence of these three services provides a rationale for banks existence as they can reasonably be bundled within one institution. Therefore, a deeper analysis of each of these activities should be drawn upon for understanding the potential effect of Fintech on the banking industry.

Transmuting the features of financial assets and liabilities is the first main task for banks, especially through maturity transformation. They can make use of diversified pools of small size depositors to deal with the effects of idiosyncratic liquidity shocks. Banks can put aside a limited cushion of liquid assets to concede longer-term loans, thanks to the unlikeliness that depositors could withdraw their funds all simultaneously. This is the core of banks' capability to deliver liquidity services. Such liquidity management services are unlikely to be provided by Fintech companies, as they would need specific authorization for granting illiquid loans or acquiring less liquid assets; in fact, providing such services would turn those companies in banks by definition, and as such, they would be regulated as traditional financial institutions.

Moreover, banks also detach any loan that they provide from the financing of each depositor thanks to maturity transformation, achieving a much wider portfolio diversification than what an individual depositor could obtain. On the contrary, peer-to-peer crowdfunding platforms cannot provide any diversification of risk to investors; if they would, then they would have to add part of that risk to their books or issue securities, falling under either banking regulation or security regulation. In fact, most of the P2P financial intermediaries currently apply the "agency model", profiting through commission fees paid by both sides of the transaction, but not retaining any risk from the loan that they generate nor interfering with its price. Therefore, such Fintech companies are likely to have higher liabilities and riskier asset portfolios than banks do, which means that as far as banks also implement innovative information management technologies and

regulatory arbitrage is excluded, Fintech threat to banks' activities in the credit and liquidity risks realm seems limited.

Moving on, the second key service provided by banks regards payments, which are strongly related to the banks' ability in providing liquidity and risk management; customers in need of liquidity are much better off if they can pay directly from their deposit accounts indeed (Barba Navaretti et al., 2017). For this reason, many non-bank financial intermediaries, as well as non-financial institutions such as IT companies, are recently emerging in the payment services market, taking advantage of their large client base; an example for this is M-Pesa, a mobile phone-based money transfer, financing and microfinancing service launched in 2007 by Vodafone in less developed countries such as Kenya and Tanzania.

Lighter regulatory requirements, better technologies and more effective economies of scope may be three reasons that allow Fintech companies to compete with banks in payment services by offering higher interest payments, despite their incapability to neither earn the interest margin provided by maturity transformation or exploit the fractional reserve requirements.

Also, the implementation of blockchain technology would boost the use of digital payments and virtual currencies, further expanding a market in which non-financial or non-banks institutions could flourish. Blockchain technologies register any kind of information permanently on a digital ledger which cannot be manipulated; this guarantees the actual legitimacy of the transaction with no need for the State or notaries to intermediate.

Lastly, banks are involved in a third major activity: information processing. The whole financial sector is set upon information and information management, where recent developments of related technologies affected IT under three different aspects: data storage and processing, data transfer and data availability.

In the information sector, Fintechs and banks take two diametrically opposed approaches; whereas the latter mostly exploit soft and relationship-based information, financial technology companies function on big data processing and on the standardization of information. Therefore, any significant advancement in IT leads Fintech operators to better production and distribution of financial services.

Regarding the production of financial services, a massive quantity of personal data is gathered and analyzed nowadays, thus large customer bases and their behavior allow companies to provide the financial products that better suit each client needs.

As of distribution of financial services, the driver of change is the possibility to match both the demand and supply sides of the market in an easier and more efficient way, thanks to big data processing and the assessment of customers' profiles. The ability to recognize patterns rapidly by processing and analyzing huge data set is what makes machine learning and AI so useful for financial applications; exploiting customers' information thanks to computers and algorithms help financial services providers in developing tailor-made services for their clientele.

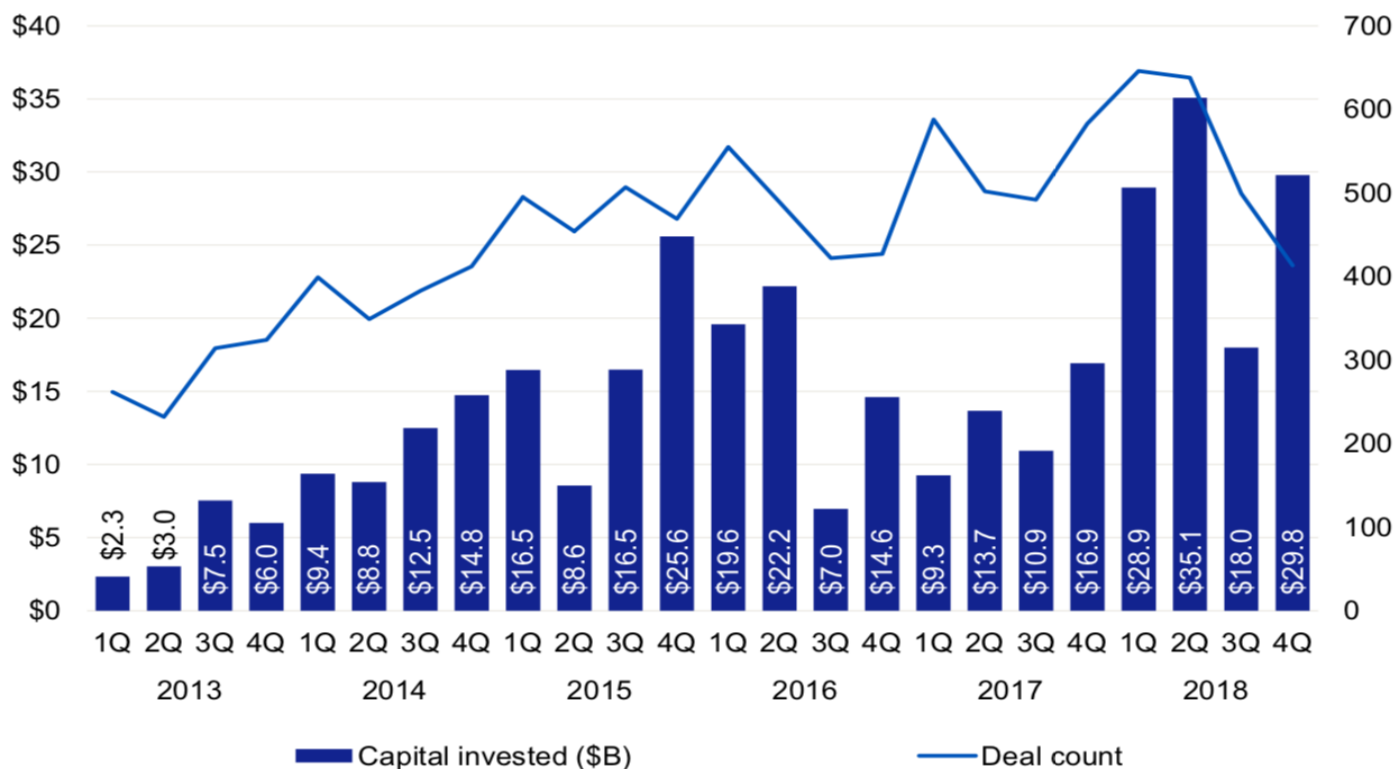
However, the collection and elaboration of private information have legal and ethical implications, both in terms of cyber risk and privacy concerns; it is likely that regular restraints will be set up in this regard, and legit holders of private data will have a significant competitive advantage on their competitors.

Overall, the 3 activities brought upon by banks that were analyzed in this segment are feasible for Fintech companies' expansion; it will be up to the financial technology companies to exploit these three areas of interests, whereas for banks it will be crucial the approach they will take: to either act and innovate, or wait for other non-financial companies to take their place.

### **1.3 How is the Fintech sector developing**

As interest around the fintech world keeps building up, investment into innovative financial technology companies are steadily increasing as well, reaching an astonishing \$111.8 billion with 2,196 deals worldwide in 2018 alone (KPMG, 2019). From 2013 to 2018 the sector has gone through a path of massive growth as the graph below shows.

*Figure 2: "Total investment activity (VC, PE and M&A) in fintech".*



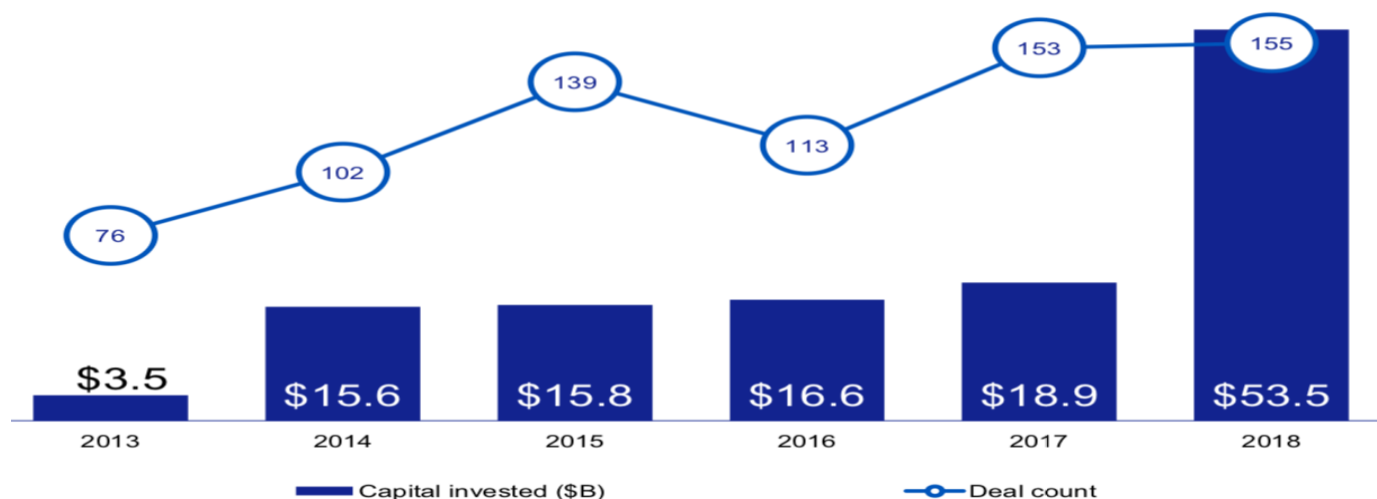
Source: *Pulse of Fintech 2018, Global Analysis of Investment in Fintech, KPMG International (data provided by PitchBook)*

To better comprehend the magnitude of such numbers, it should be noted that fintech investment globally more than doubled during 2018, a growth that has been driven partly by a small number of mega-deals, such as the acquisition of WorldPay by Vantiv and the \$14 billion venture capital funding round raised by Ant Financial in the first semester of 2018. The second half of the same year saw a significant number of large deals as well, including private equity firm Blackstone’s \$17 billion investment in Refinitiv and the \$3.5 billion acquisition of prepaid card company Blackhawk Network by Silver Lake jointly with P2 Capital Partners. While new startups sprang up across emerging Fintech subsectors, more mature areas like digital payments consolidated themselves. For instance, the Danish payments firm Nets merged with German-based Concardis in a multi-billion-dollar deal in 2018. At the same time, Nets also went through several other deals, including the acquisition of Poland-based payment firm Dotpay.

During 2018, growth was a hot topic for Fintech companies all around the globe, with numerous Fintechs of any kind closing large financing campaigns, agreeing international partnerships and carrying out their own acquisitions to propel global expansion activities. As a matter of fact, there were numerous cross-country deals, stemming from the reason

that companies are eager to find opportunities which could be helpful to better exploit their potential or to finesse their fintech branch; the following picture shows the global cross-border M&A activity in the last few years.

Figure 3: “Global cross-border M&A activity in fintech”.



Source: *Pulse of Fintech 2018, Global Analysis of Investment in Fintech, KPMG International.*

Such “expansionary” campaigns were particularly common among digital challenger banks, or neo-banks, which have historically focused on their domestic markets rather than on a global scale. In 2018, several challenger banks took strategic moves to spread beyond their borders, including Nubank in Brazil, N26 in Germany and numerous challenger banks based in the United Kingdom. The aimed growth level of these companies has been a strong factor of attraction for global investors. For example, Chinese technology giant Tencent joined insurance company Allianz in March of 2018 to invest \$160 million in the emerging neo-bank N26 to help boost the bank’s growth on an international scale. Several others Asian Fintech firms have also aimed the use of acquisitions as a mean for scaling globally.

Other than expanding globally, many of the above-stated digital banks also focused on developing their service offerings during 2018, moving from niche offerings into a wider range of services similar to those provided by traditional banks. To keep competing effectively both regionally and globally, such expansion of services should continue to

be a main priority for neo-banks, either through internal developments or with the help of strategic partnerships.

Along with digital banks, many big tech players, including Alibaba and Google, are thoroughly working to expand their cloud-services offerings. While some of these firms are looking to compete directly with financial institutions, others have mainly focused on developing cloud, AI and machine learning services to enable traditional banks and other financial institutions to launch their own Fintech solutions or enhance their internal efficiencies. In 2018, many Fintech companies also made their own Fintech investments. In September, the iZettle payments platform was acquired by PayPal for \$2.2 billion, while earlier in the year Workday purchased Adaptive Insights spending \$1.6 billion (KPMG, 2019).

Together with cloud-services development, numerous Fintech companies have spotted the opportunity to help enable banks to comply and get ready for open banking, that is offering financial services which are heavily reliant to data sharing, customer management and digital identity management. For instance, in the venture capital sector, Data Republic raised \$22 million in Series B funding during the last quarter of 2018, with the support of Innov8 and Singapore Airlines; also, the Irish firm Priviti helped Australian banks to comply with new open data regulations. Open banking will probably lead to more competition, as established Fintechs work to increase their competitiveness and new Fintech companies are trying to enter the market. However, growth will still be the main issue, with customer acquisition and scaling as key challenges. Therefore, it is likely that open banking will primarily be a cause for the development of partnerships that will allow Fintechs' growth.

A sector that keeps growing due to its enormous potential is Regtech, that is, regulatory technology; as the regulatory framework is going through a renovation process, the implementation of MiFID II, Payments Service Directive (PSD2), General Data Protection Regulation (GDPR), new IFRS standards and the EU Benchmark Regulation forced many organizations to adjust their operations in 2018. Moreover, the Fundamental

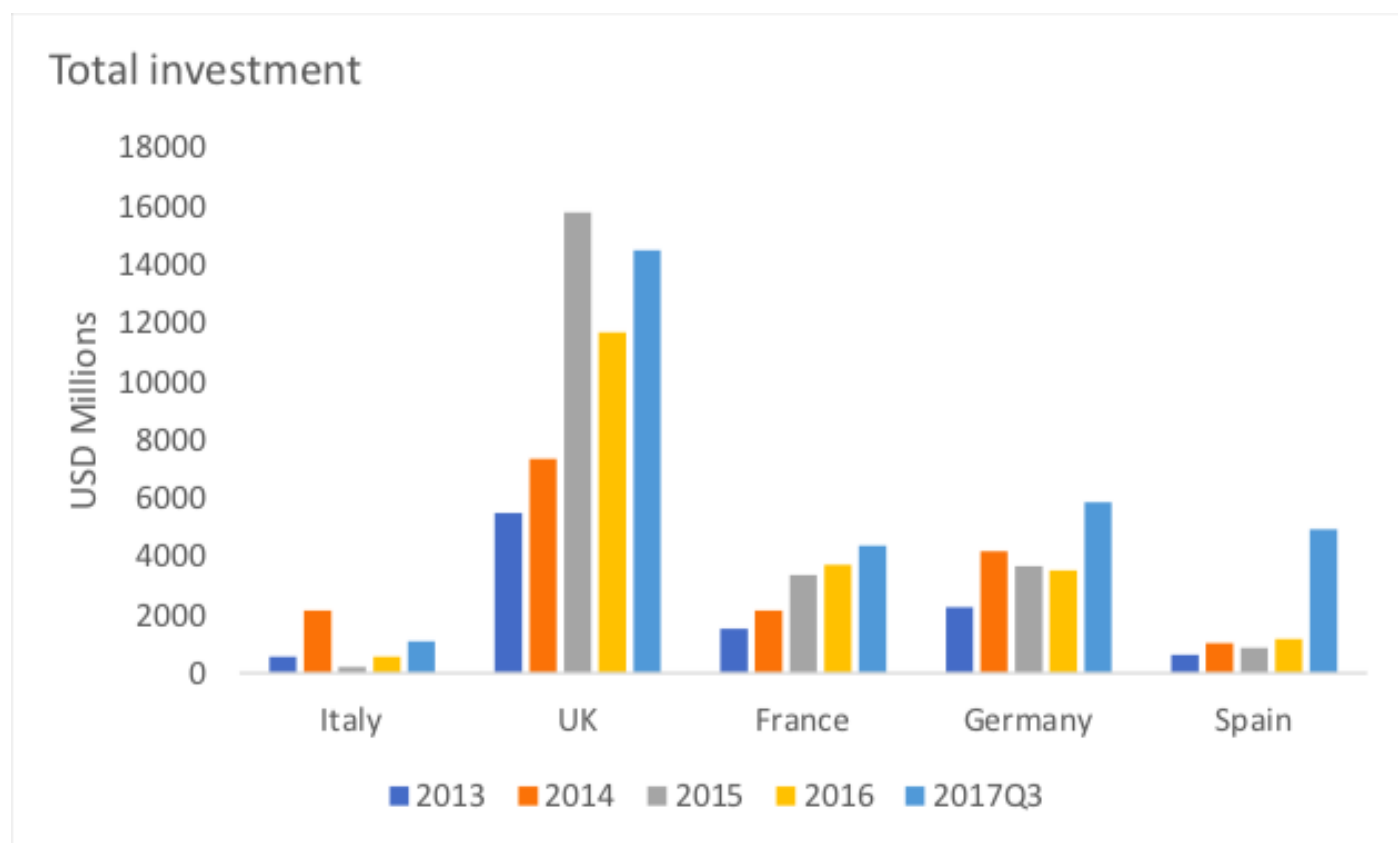
Review of the Trading Book (FRTB) and the Central Securities Depositories Regulation (CSDR) are expected to bring further change in 2019 and beyond.

The ongoing regulatory changes arised interest in Regtech during 2018, both from traditional corporates seeking better management of their compliance obligations and from other kind of investors. While Regtech investments primarily focused on compliance management and risk exposure reduction, there was also increasing interest in data and predictive analytics, as they are considered crucial for the future of financial services and products, as highlighted by the \$17 billion Refinitiv deal.

Also in 2018, \$23.1 billion corporate Venture Capital investment in Fintech nearly doubled the previous high of \$11.6 billion registered in 2016, with the quantity of corporate Fintech deals increasing for the eighth consecutive year. The growing corporate participation evidences that Fintech is becoming mainstream, as well as a competitive response to the emerging threat of Fintech companies that have scaled, with both traditional financial institutions and a broad range of companies outside of the financial services industry joining through investments and acquisitions. The growing maturity of the sector has also led some of the most developed Fintech companies to make their own investments as part of their drive to expand either geographically or on a product basis and in some cases, partnering with financial services incumbents. In fact, there is expanding interest in partnering with Fintechs to provide services, in addition to increasing interest from corporates with internal Fintech branches to provide business-to-business (B2B) services to corporate clients and other financial institutions.

To sum up, 2018 was a terrific year for Fintech: the sector keeps growing on a global scale, with deals outside of the core markets (USA, UK and China) accounting for 39% of the total, and 39 VentureCapital-backed Fintech unicorns worth a total of \$147.37 billion. The following graph depicts investments across 5 European countries from 2013 to Q3 of 2017, showing that the sector is growing outside of its core markets as well, although the disparity between countries is still quite strong.

Figure 4: “Investments in fintech companies across EU countries”.



Source: “FinTech and Banking. Friends or Foes?”, Barba Navaretti et. al, 2017)

Also, the US are still the top market for deals with 659 investments worth \$11.89 billion funding, both a new annual high (CB Insights, 2018). Will Fintechs keep the pace during this year as well? According to a CB Insights research in partnership with Mastercard Start Path, it is very likely so. In fact, key drivers of FinTech growth such as record levels of deals and financing, the emergence of new global tech hubs, and favorable regulatory tailwinds characterised 2018; the combination of these factors positions the FinTech sector to further digitize the customer journey, make inroads in new and adjacent markets, and collaborate across the industry in 2019. Moreover, the developments of 2018 have lowered the barriers for market entry and enabled established recent entrants to expand into new markets, while incumbent firms are feeling the pressure put on by Fintech startups on legacy infrastructure, customer acquisition, and business models. Then it is reasonable to try predicting 3 upcoming trends for the industry during 2019.



## **1.4 Fintech trends to watch for the near future**

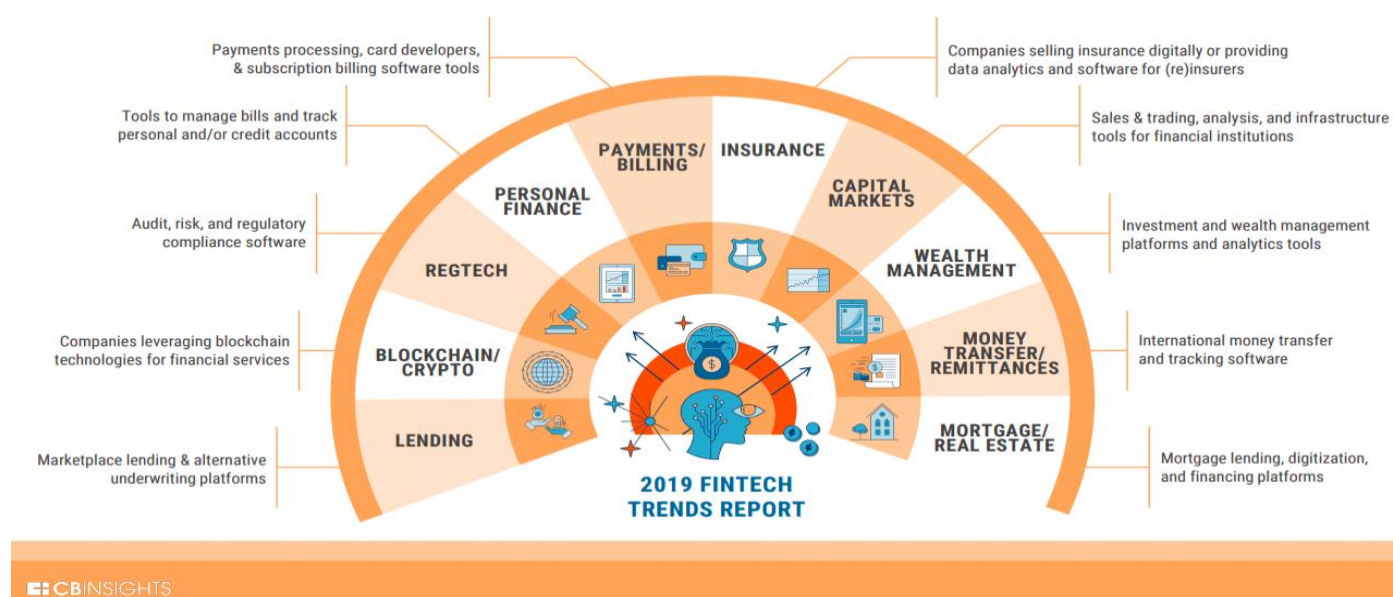
One magnet for fintech funding in 2018 that seems destined to continue in 2019 is artificial intelligence (AI). While there has been a lot of discussion around AI's potential, data support that investors are excited about the impact AI could have across the financial services industry. Fintech AI companies backed by Venture-Capital funds have raised approximately \$2.22B of capital across 106 investments in 2018. The funding growth is understandable, as AI applications are rapidly increasing in popularity, and AI has proliferated into virtually all aspects of financial services, from personal finance and chatbots to insurance, although with varying levels of maturity. Also, this year has seen a rise of AI deals going to regulatory technology startups (RegTech); although it is still early for many banks to embrace full automation, an expected overflow of regulatory changes in the future will further incentivize adoption of AI technologies. Another global trend to keep an eye on for 2019 is Open Banking: during 2018 a number of regulations were enacted in Europe, including GDPR, MiFid II, Open Banking, and the Revised Payment Services Directive (PSD2). Two of the most impactful are the UK's Open Banking and the EU's PSD2, which have a common goal: requiring banks to open APIs to customer data. Consumers are the biggest beneficiaries of Open Banking and PSD2 as the new regulations create choice through competition and establish consistency around security protocols to protect consumers (CB Insights, 2018). For instance, startups like TrueLayer, Token and Tink are using a B2B2C model. TrueLayer creates an access point for developers to build applications on top of the data and is authorized by the FCA for both access to data (AISP) and access to payments (PISP). An Account Information Service Provider can aggregate a wide range of account information, and a Payment Initiation Service Provider can facilitate remote payments for consumers. These services enable a range of FinTech solutions, such as alternative financing platforms like Clearbanc, personal finance tools like Plum, and digital banking startups like Monzo and Starling.

Globally, banks are actively looking for ways to engage with and provide better services to consumers; leveraging the model laid out in Open Banking is one way to achieve that.

The third upcoming trend is to be considered the growing implementation of financial technology for small and medium businesses (SMBs). SMBs are increasingly a critical component for deals across the fintech ecosystem, indeed. Firstly, SMBs remain underserved by established players that target bigger corporate customers, and additionally, the core of fintech has largely been focused on helping SMBs obtain loans and financing. Digital banking startups or neo-banks have seen funding surge globally. Consumers drove early-adoption in this category, which has quickly spread to SMBs who seek for the same on-demand experience, frictionless engagement, and low-cost services that digital banks can provide at scale. Revolut is a good example of a startup that entered the market focused on B2C services, but has responded to the demand from SMBs by offering them tailored bank accounts. Therefore, it is clear that consumers and SMBs will enormously benefit by this newly emerging focus in the fintech industry.

The following figure sums up what has been discussed during this sub-chapter, displaying each major area of fintech and highlighting the potential trends that will shape 2019 for financial technologies; therefore, the picture is useful to comprehend the still unexploited functions that these areas could serve to the financial sector.

Figure 5: “Fintech trends to watch for 2019”.



Source: [www.cbinsights.com](http://www.cbinsights.com)

## **1.5 Experts' opinions on Fintech**

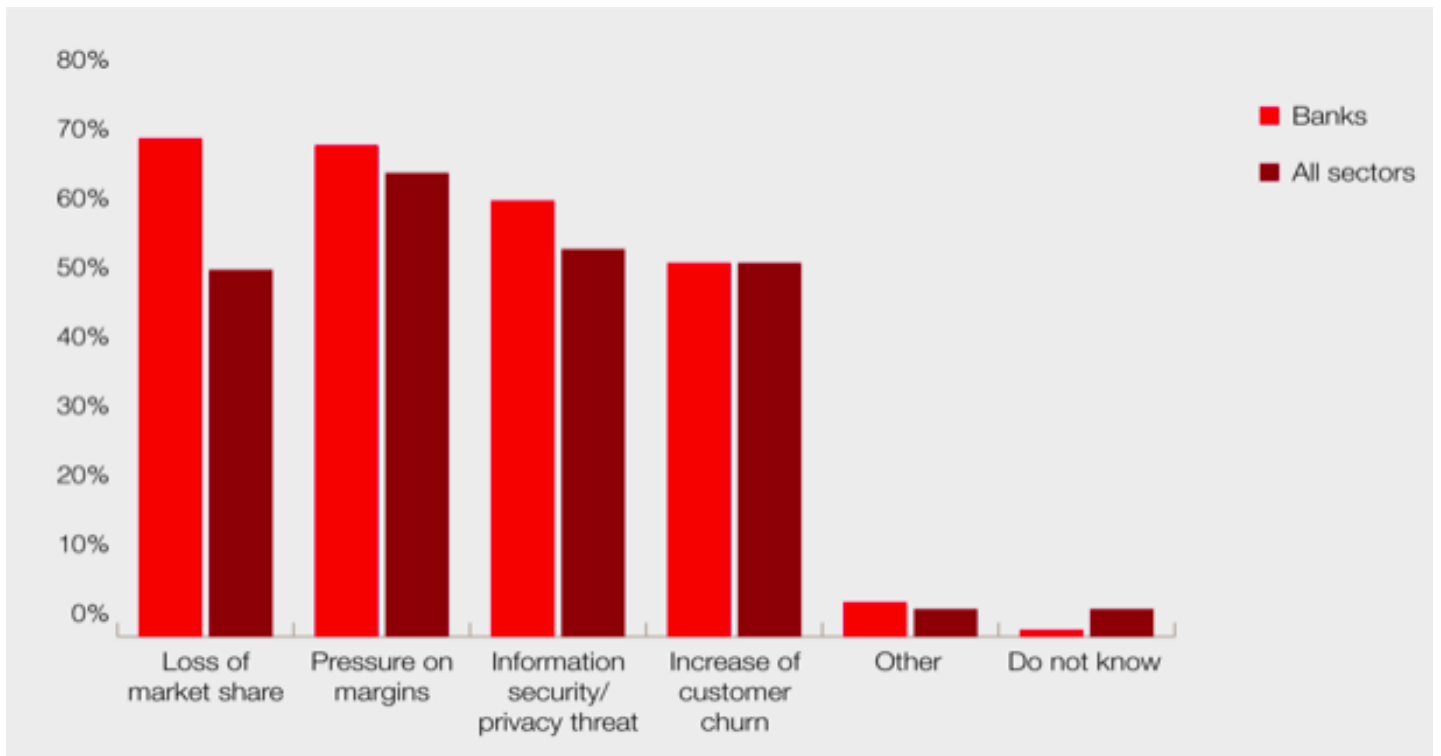
Due to its status of potential disruptor of the traditional banking system as we know it, opinions on Fintech are still vastly heterogeneous, since many cannot imagine yet the magnitude of its impact on the banking industry and others think it is just a new trend or speculative bubble that will burst out very soon. According to Christine Lagarde, Managing Director and Chairwoman of the International Monetary Fund (IMF), “we, as individuals and communities, have the capacity to shape a technological and economic future that works for all. More importantly, we have a responsibility to make this happen”. Such statement is proof of Lagarde’s ability to see beyond present, while keeping in mind what the past taught us; in fact, many people in the past thought that process and innovation would have been the endgame for human beings and society as we know it, while it is only up to us- the human race- to make a good use of such new technologies and implement them to our advantage. Therefore, Fintech should be considered as an opportunity to improve our current system instead of considering it as a threat to our job places.

Ian Pollari, Global Co-Leader of Fintech for KPMG International, has a common opinion on the topic, recognizing its possible applications and functions, as he states: “The growing complexity, costs and risks in managing regulatory and legal obligations on a global basis is a persistent challenge for the financial services industry. Through the application of AI and machine learning, global and regional banks are able to now gain access to emerging Regtech solutions that can help them to more accurately assess and monitor their compliance obligations across multiple markets in real time and with greater confidence”. Backing the paper’s assumption that Fintech is going through a process of steady growth and is a sector that keeps drawing the investors’ interest, Anton Ruddenklau, Global Co-Leader of Fintech for KPMG International, said: “The Fintech industry is particularly resilient, partly because of the very strong participation of corporates. In 2018, we saw corporate VC investment more than double, while corporates also drove a large degree of the M&A activity. And it’s not just the traditional financial institutions getting involved in Fintech deals. Even when other investors might be more cautious heading into 2019, corporate participation will likely remain strong as they are primarily investing for strategic reasons”.

An assessment of what the Fintech industry currently look like was given in the World Fintech Report 2018 from CapGemini and LinkedIn, in collaboration with the European Financial Management Association (EFMA), which states: “Most successful fintech firms have focused on narrow functions or segments with high friction levels or those underserved by traditional financial institutions, but have struggled to profitably scale on their own. Traditional financial institutions have a vast customer base and deep pockets, but with legacy systems holding them back”. Therefore, it suggests that traditional banks and fintech companies partner up to take advantage of each one’s strengths and achieve better outcomes. Also, many parties involved in the Fintech industry are sure that tech giants will play a fundamental role in this race towards financial innovation; according to Bain & Company indeed, “Many of the tech giants possess the ingredients of success: digital prowess, large customer bases, organizations well versed in improving the customer experience, and ample leeway to extend their corporate brands into banking”. Alibaba Group’s co-founder and executive chairman Jack Ma, instead, makes a clear analysis of what the future of Fintech looks like and distinguishing the two major opportunities it offers, saying (2016), “there are two big opportunities in the future financial industry. One is online banking, where all the financial institutions go online; the other is internet finance, which is purely led by outsiders”. As shown by these various opinions, there is not a single view on Fintech, still what everyone agrees on is that technology will eventually deeply affect the banking and financial system as a whole, thus it is up to us to make it a change for the better.

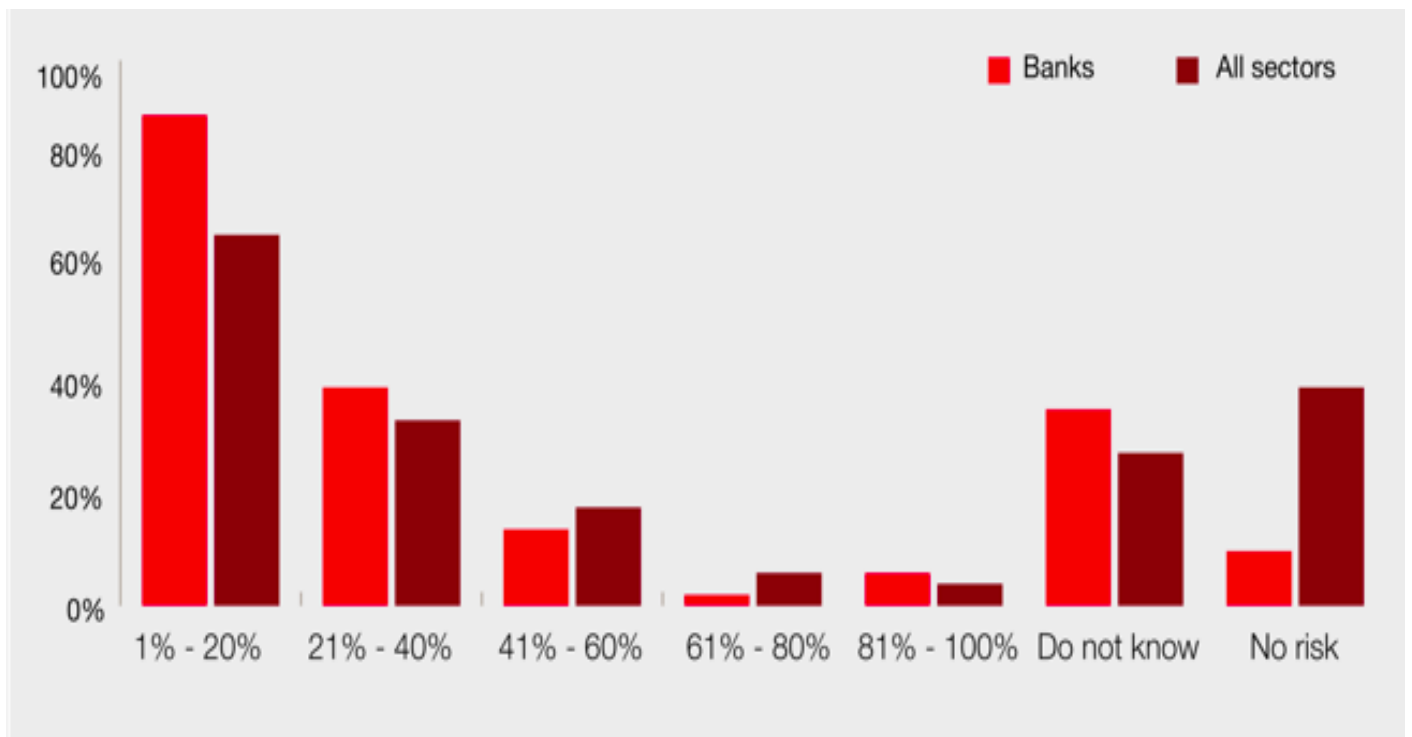
In 2016, professional services firm PwC conducted an interesting global survey addressed to executives from any sector, questioning the threats related to the rise of fintech: the results are displayed in the following graphs.

*Figure 6: “What are the threats related to the rise of FinTech within your industry?”*



Source: PwC Global FinTech Survey 2016

Figure 7: “What percentage of your business is at risk of being lost to standalone FinTech companies within 5 years?”



Source: PwC Global FinTech Survey 2016

As the last graph shows, bank related businesses are the most exposed to the incoming Fintech threat, therefore it is reasonable to think that they will be more prone to arrange

partnerships with fintech companies in order to maintain their current positions in the market.

## **Chapter 2. The impact of fintech on traditional banking**

### **2.1 Forward looking scenarios**

The Basel Committee on Banking Supervision within the Bank for International Settlements depicted five different scenarios describing the potential effect of the rise of fintech on banks, in an effort to assess what kind of impact would fintech products and services have on the banking industry (BCBS, 2018). Such scenarios would obviously differ depending on the size or geography of the various actors. Also, they are not to be considered mutually exclusive and comprehensive, as it is likely that the evolution of the banking industry may proceed to be a combination of the various scenarios, namely: the “better bank” scenario, the “new bank” scenario, the “distributed bank” scenario, the “relegated bank” scenario, and the “disintermediated bank” scenario (BCBS, 2018).

The main questions addressed to develop such forward-looking scenarios were (i) which player leads the customer relationship, that is the user experience and interface, and (ii) which player eventually provides the services and bears the risk. As for the former point, the advance of fintech innovation has ended up being a kind of battle for customer relationship and customer data; its outcome will define the actual future role of banks. Another main consideration relates to potential changes in banks’ business models and the various roles traditional banks and other fintech companies may play in either owning the customer relationship or supporting banking activities as service providers. The latter question instead, involves who will ultimately be responsible for the traditional core banking services, such as lending, managing risk and offering payment and investment services. However, the Basel Committee on Banking Supervision is conscious that future regulation provisions will both shape and result from the depicted scenarios and the manner in which they interact. In the following, each different scenario will be described and analysed, so as to better comprehend where fintech innovation could lead the banking industry in the near future.

Also, examples of how the innovative technologies and processes could be implemented in the banking industry will be given.

The first scenario analysed is the “better bank” one, where the modernisation and digitisation of incumbent financial institutions is brought upon; in this case the traditional

banks innovate to keep the core banking services and customer relationship, implementing enabling technologies to transform their current business models.

Traditional banks are usually under pressure to both improve cost efficiency and customer relationship at the same time. However, thanks to their market knowledge and better investment capacities, a potential result is that incumbent financial institutions improve at offering services and products by exploiting new technologies or upgrading existing ones. Banks adopt new technologies to provide value propositions that could not be effectively offered with their current infrastructure. The same technologies adopted by non-financial innovators can also be put into action by incumbent banks; for instance, biometry, chatbots or artificial intelligence might help banks to develop sophisticated ways for sustaining a value-added remote customer relationship, while keeping transactions safe and reducing fraud risks (BCBS, 2018). As many incumbent banks have already introduced mobile payments services or employed payment services offered by third parties, innovative payment services would support the better bank scenario; in fact, customers could believe that a traditional bank would provide safer payment transactions than non-banks alternatives would. However, although there are early signs suggesting that incumbent players have increased investments in digitisation and modernisation to their strategy plans, it is still to be seen to what magnitude this scenario will actually be dominant.

The second scenario considered is the one of a new bank, where incumbent financial institutions have been replaced by challenger banks. According to this scenario, traditional banks will not be able to adapt to the incoming technology-enabled disruption and thus will be supplanted by neo-banks, or banks established by bigtechs, with fully digitalized banking platforms. The new banks will provide cost-effective and innovative banking services through the implementation of advanced technologies, and may receive banking licenses under existing regulatory systems or may have traditional financial institutions as partners. Neo-banks such as the German N26 or the Chinese WeBank moved away from the branch-centred customer relationship model thanks to their technology-based relationship model, and may be able to exploit innovative processes and instruments at lower cost, more quickly and in an up-to-date manner compared to incumbent players, due to the fact that neo-banks are not constrained by legacy infrastructure. That said,



there are no evidence suggesting that the current agglomerate of challenger banks has reached such a market power for the new bank scenario to be the predominant one.

Then, the distributed bank scenario is described; in this situation there is a fragmentation of financial services among specialised fintech firms and incumbent financial institutions. As financial services become progressively modularised, incumbent banks can still capture enough market share to survive. Several new businesses rise to provide specialised services focusing on specific niches, without attempting to become universal retail banks; such businesses may decide not to compete for ownership of the whole customer relationship, while incumbent banks challenge each other to both provide core banking services and own the customer relationship.

In the distributed bank scenario, the delivery of financial services is shared across various parties, with banks and fintech firms operating as joint ventures, partners or other structures. Therefore, banks are more prone to offer services and products from third-party suppliers in order to satisfy the customer, whose expectations in terms of transparency and quality have soared. Also, consumers may use various financial services providers instead of using only one financial partner (BCBS, 2018).

The increasing adoption of open APIs (Application Programming Interfaces) is evidence that this scenario is already playing out in some markets. Other elements signalling the likeliness of this scenario are the increasing partnerships between online lending platforms and traditional banks, the growth of innovative digital payment systems emerging from joint ventures between banks and fintech firms, and the steadily increasing presence of robo-advisors or automated investment advisory services that are provided by fintech companies through banks.

Described next is the relegated bank scenario, in which incumbent banks are considered as commodities that provide services while the direct customer relationship is owned by other financial services providers, that is fintech companies or bigtechs. Both fintech and bigtech companies operate front-end customer platforms to perform various financial services from an heterogeneous group of suppliers; they also take advantage of incumbent banks' banking licenses to offer core banking services. It is uncertain if the relegated bank would bear the risks attached to these activities, as it may depend on the contract stipulated along with the fintech or bigtech firm.

In this specific scenario, front-end customer platforms fully exploit cloud computing, artificial intelligence and big data through various configurations, making heavy use of both connectivity and data gathering to improve the customer experience in innovative ways; at this point, the entities managing such platforms have enough resources to compete with incumbents for owning the customer relationship. Therefore, banks are relegated to mere commoditised functions providers, carrying out basic services such as risk management and operational processes, playing the role of service providers to the above-stated platforms that operate customer relationships.

Currently, the relegated bank scenario seem unlikely due to its extreme assumptions; however, there are few examples of modularised financial services that may arise in the near future. For instance, alternative payment platforms have experienced a steady growth lately, leading banks to provide back office operations aid in fundamental areas such as compliance and treasury functions, while fintech companies will directly interact with the customer. Also, arising online lending platforms could extend their array of services offered beyond lending to become intermediaries between traditional financial institutions and customers, in which case incumbent banks would keep on existing just to provide operational and funding mechanisms required by other parties. Another example sustaining the likeliness of the relegated bank scenario is given by the instant messaging application WeChat in China; it exploits customer data to provide their customers the financial products and services that better suit them. Moreover, WeChat is linked to the licensed banking platform WeBank, eventually relegating banks to product and risk management only.

Last of the five scenarios to be analysed is the disintermediated bank one. In this case, incumbent banks are no longer playing a significant role in the financial industry, as customers interact directly with financial services providers with no need for any intermediary. Banks are therefore replaced by leaner and more agile platforms, based on state-of-the-art technologies which effectively secure a direct matching of end users depending on their financial requirements, be it borrowing, raising funds or making payments.

Customers have a more direct approach when choosing financial services and their provider in this scenario, justifying the inutility of an intermediary bank. However, they

also may be exposed to higher risks when performing transactions, bearing the whole responsibility for them on their own. For instance, in the peer-to-peer (P2P) lending industry, common customers would be the lenders or borrowers depending on their needs, therefore exposing themselves to either credit risk for the former or conduct risk for the latter.

This extreme scenario seems far to be reality in the near future, however some examples of components of the disintermediated bank scenario are already happening. Such examples include cryptocurrencies, which ensure value transfer and payments without the need of involving incumbent banks as intermediaries, just by using public distributed ledger technology (DLT). Their adoption on a daily use base however, struggles to become reality, as cryptocurrencies have been constrained by several factors such as price volatility, anti-money-laundering issues (AML) due to the anonymity of the transactions, and scarcity of scalability. Another example sustaining the likeliness of this scenario is given by P2P lending platforms, which have employed extremely innovative and trustworthy credit scoring processes; nonetheless, P2P lenders' market share is currently relatively small in most countries, and many peer-to-peer platforms have adopted a different business model which relies on the involvement of incumbent banks and investment funds rather than on retail investors as it was in origin.

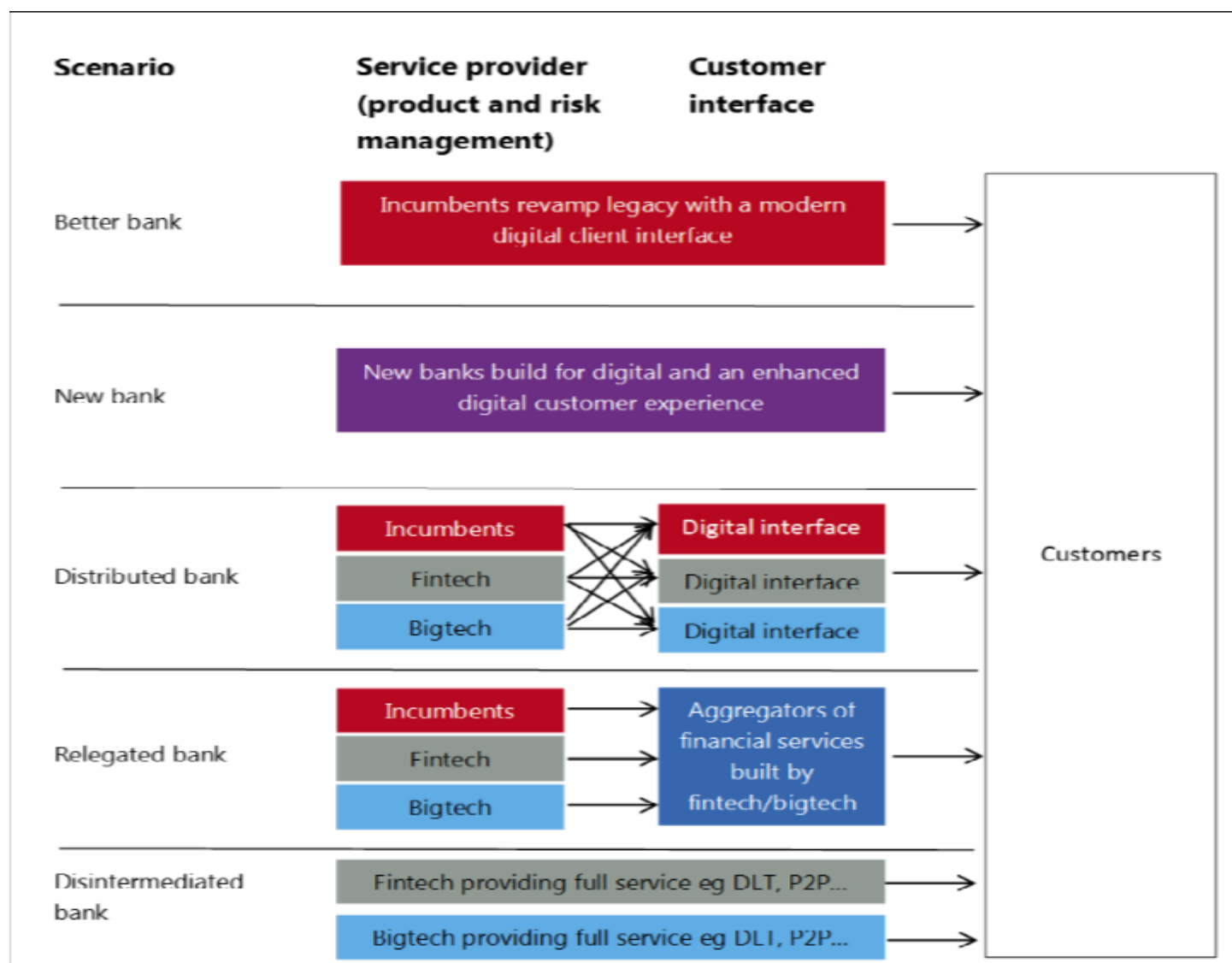
Overall, each of the five forward-looking scenarios hereby described and analysed is extreme, while it is very likely that the future will provide a mix of these scenarios; both fintech firms and banks will own different parts of the customer relationship, while simultaneously offering modularised financial services and products for back office operations. Giving foundations to this assumption is the case of Lending Club, a US marketplace lending company, which displays three of the five scenarios taken into consideration. In fact, an incumbent bank that exploits Lending Club's platform to issue and price consumer loans for its own balance sheet could be considered as a "distributed bank", since the incumbent keeps owning the customer relationship but allocates the revenues and processes with the fintech company (BCBS, 2018). Lending Club matches customer loans with retail or traditional investors as well, thanks to the support of a regulated traditional bank which is included in the transaction in order to make the loan issuing easier: in such operations, the incumbent bank's role could be characterised as a

“relegated bank” scenario. Various marketplace lenders instead display the “disintermediated bank” scenario due to the fact that they enable direct peer-to-peer lending without involving any bank during its process.

To recapitulate, it is close to impossible that a single scenario will reflect the whole banking industry situation, as markets differ significantly for size, needs and jurisdiction; therefore, a blend of the five scenarios is the most likely to emerge in the future.

Following, a graph that summarizes the five scenarios and its key players, where red represents incumbent banks, purple indicates new players, grey fintech companies and blue bigtechs, such as Google or Amazon. As shown in the first scenario, traditional banks would retain their current role both as service providers and owners of the customer relationship by undergoing a modernisation process. In the next case depicted, new banks are characterized by a solid digital user experience and overall digitization of their services. Then, the “distributed bank” scenario is presented, where both incumbents, fintech companies and bigtechs are involved in providing financial services and offering a digital customer interface; the “relegated bank” scenario only differs in the customer interface, which is built and managed solely by fintech companies or bigtechs. Lastly, the “disintermediated bank” scenario is displayed: both services and interfaces are provided by fintechs or bigtechs, with focus on both peer-to-peer lending and digital ledger technology.

Figure 8: “The five forward-looking scenarios”



Source: BCBS, “Implications of fintech developments for banks and bank supervisors”, February 2018.

## 2.2 Opportunities and risks emerging from fintech

As stated in the previous section, the banking industry might undergo a period of radical innovation and disruption in the upcoming future due to the rise of financial technologies companies and to the increasing number of bigtechs approaching the financial services industry. Such development will entail the presence of both new opportunities and risks for the whole banking sector.

Therefore, bank supervisors should lookout for opportunities to improve both safety, well-being and financial stability while surveilling over ongoing practices which might excessively or unintendedly hamper enhancing innovations in the financial sector, meanwhile remaining alert on ensuring the safety and health of the banking system (BCBS, 2018).

The potential benefits embedded in financial technologies implementation are several, and they would improve the financial services experience of all users. Such benefits include better financial inclusion, as under-served consumers would be easier to be reached; the reduction of transaction costs; more transparency in the cost of products and services, and increased efficiency in both spending and budgeting processes. Altogether, these benefits could lead to an improved customer experience by supplying an easier comprehension of products and terms. Such opportunities will heavily depend on the development of the technologies which would empower them; examples of considerable opportunities might include:

- *Enhanced banking services:* With the inclusion of fintech companies in the financial services industry, banks could be helped to improve their range of traditional services and products provided; for instance, they may supply banks with robo-advisors to improve the customer experience related to investing. Also, partnerships with fintech could result in more efficiency for the incumbent banks.
- *Financial inclusion:* Thanks to the implementation of innovative technologies, financial services are now available in remote locations as well, helping the growth of small economies through micro-financing plans and enhanced access to credit. Moreover, mobile devices could be the tool to help digital finance in broadening its use, scaling up, and reducing costs; thus, financial services could be offered to a wider array of people with greater reliability, speed, and efficiency.
- *Improved banking processes:* The use of cryptography and more interoperable systems would decrease the likeliness of errors and may grant to run operations in a more secure environment.
- *Inferior transaction costs and high-speed banking services:* Fintech companies could accelerate transfers and payments while lowering their costs thanks to their innovative technologies.
- *Potential improvement of financial stability due to intensified competition:* The banking services market could eventually be disrupted by the incoming new players challenging incumbent banks, lowering the systemic risk attached to actors of systemic size (FSB, 2017).
- *Regulation technologies (Regtech):* As financial regulation is increasing worldwide, the

employment of regtech could significantly ease compliance at financial institutions; for instance, its application could automatize regulatory and compliance processes, other than smoothing cooperation between different sectors and jurisdictions, significantly enhancing the compliance and regulatory frameworks.

Despite the many benefits stemming from fintech, safety and soundness of the financial system should keep being a priority for both banks and bank supervisors; therefore, they should continue focusing on risk management, monitoring and supervision over the newly unfolding innovations in the financial services market. It is fundamental, however, that such supervision and regulation must not hamper the implementation of innovative, beneficial technologies.

Along with the benefits of applying innovations to the banking industry, however, come new risks; fintech embeds various cross-sectoral risks, indeed. Most of these threats are featured in almost each of the five scenarios previously described, and are illustrated beneath:

- *Strategic risk:* Profitability of individual banks is put at risk by the swift transition of bank services to fintech companies; if new players are capable of applying innovations efficiently and provide customers with cheaper and more tailored services, than incumbent financial institutions could lose a considerable slice of their market share along with part of their profit margin.
- *Growing difficulties in reaching compliance requirements:* The increasing interaction between banks and fintech companies through the exchange of products and services may result in a lack of transparency in the transactions processing and who holds compliance responsibilities. Such situation could lead to an increased conduct risk for incumbent players, since they could be held liable for the fintech partners misconducts if consumers encounter losses or regulatory requirements are not reached.
- *Compliance risk related to data privacy:* The surging use of big data to provide better financial services and products could lead to compliance risk concerning data privacy rules, as the fierce contention for owning the customer relationship may lead to inappropriate exploitation of personal data.
- *Outsourcing risk:* As more parties are included in the supplying of financial services and products, ambiguities related to the accountability of the players involved could spread out, increasing the probability of operational mishaps. Therefore, financial

institutions will face the challenge of monitoring and managing outsourced activities conducted by third parties. Moreover, incumbents will have to adjust their operational control processes in order to assure the safety of both the bank and its customers.

- *Higher operational risk*: The growth of fintech heighten operational risk both on a systemic and idiosyncratic level; as the financial market players become more interdependent on an IT level, a failure of the information technologies infrastructures could easily lead to a systemic crisis. Moreover, the increasing presence of fintech companies in the banking industry results in a more complex system composed of novel actors which may have little expertise in IT risks management. As for the idiosyncratic dimension, IT systems inherited by traditional banks may not be adjustable enough, or simply obsolete with respect to the ones owned by fintech firms. Thus, incumbents would increase their use of third parties to provide up-to-date services, which may lead to higher risks related to data protection, money laundering, cyber-crime, privacy issues and customer tutelage. Additionally, banks may have to sustain fintech partners in financial distress due to their common involvement in the supply chain of financial services.
- *Cyber-risk*: The wide adoption of technologies to ease interconnection between different players and sectors require the banking system to increase controls and innovate its regulatory system, as it may be more exposed to cyber-threats, putting to risk huge quantities of sensitive data. Such threats highlight the urgency for financial institutions, fintech companies and supervisors to update their monitoring processes and stress the importance of withstanding cyber-risk.
- *Liquidity and volatility risk*: Customers are facilitated in changing saving accounts for the sake of greater returns thanks to new technologies and neo-banks, which are rapidly lowering fees with the objective of enlarging their customer base. While the increased competitiveness could improve efficiency, it could also worsen customer loyalty and raise deposits' volatility, resulting in notable liquidity risk for banks.

Eventually, the following table provided by the Basil Committee on Banking Supervision, shows the main risks for each of the five scenarios analysed in the previous subchapter, assessing their likelihood and impact on the whole society.



Figure 9: “Description of main risks per each scenario”

Better bank	<p>The key risks under the better bank scenario focus on the execution risk related to the implementation of the new strategy (banks’ ability to manage and effectively implement both the technology and business process changes) and the strategic and profitability risks. Even in the better bank scenario, there is likely to be tough competition among incumbent players to select the winning strategy and the right time to market. While some aspects of operational risk management may benefit from improved and more efficient banking processes, operational risk may increase because of the further development of cyber-risks and increased reliance on outsourcing. Indeed, the incumbent banks, which still carry legacy technologies and premises, are likely to accelerate the transition from legacy environments to new digital platforms. The new digitised environment may carry cyber-security risk in its various forms. This scenario also raises issues about the supervisory authorities’ ability to effectively supervise the new technologies and products (see Part IV).</p>
New bank	<p>The size and scale of many incumbent banks may make it difficult to effectively modernise and digitise their current processes to achieve cost-effective operations as well as to provide innovative products for customers within an acceptable timeframe. If neo-banks were to gain significant scale, the combination of customer drain to challenger banks, lower profitability on reduced revenues, and investors moving funds to more profitable challenger banks could raise safety and soundness issues for incumbent banks.</p>
Distributed bank	<p>The key risks highlighted in most of the case studies for the distributed bank scenario focus on banks’ and bank supervisors’ ability to monitor and manage end-to-end transactions across one or multiple third parties. Effective third-party risk management processes would be essential for banks. Whether fintech companies are service providers, business partners or provide the primary customer interface, banks will need processes in place to conduct appropriate due diligence, contract management and ongoing control assurance and monitoring of outsourced services operations in order to safeguard themselves and their customers.</p> <p>Also, questions on ownership of the customer relationship and the use of customer data with regard to consumer protection and data protection regulations were raised as part of the distributed bank scenario. Finally, there might be questions about risk management functions as a consequence of weaker, less stable and more fragmented customer relationships. The loss of the customer relationship can result in loss of revenue and cross-selling opportunities. Also, on the compliance side, banks will need to have appropriate AML/CFT monitoring processes in place if they process transactions on behalf of fintech companies’ customers. From a financial stability perspective, the distributed bank scenario may reduce the “too big to fail” issue, since increased competition and a sharing of the value chain is likely to lead to a more fragmented banking sector. On the other hand, the distributed bank scenario is associated with increased interconnectedness between financial institutions and the dilution of accountability.</p>
Relegated bank	<p>In this scenario, banks become a back office service provider for front office customer-facing platforms, with banks providing the necessary licences, access to payment networks and maintaining deposits and access to funding. There is a risk that banks and bank supervisors will have limited ability to monitor end-to-end transactions and systemic risk. As in the distributed bank scenario, the</p>

	<p>loss of the customer relationship and the dependence on these new platforms that channel financial products may have adverse consequences for risk management functions and revenue streams (revenues would need to be shared with the new intermediaries). Front office customer platforms are also expected to accentuate competition between banks, which may further accelerate customer mobility, deposit transfer speeds and aggressive pricing on loan offers.</p> <p>This scenario raises also significant issues for consumer protection, since the customer relationship will be handled by new platforms, which would be based on automated processes and extensive and innovative uses of consumer data. In addition to data privacy and data security issues, inappropriate marketing practices could emerge under this scenario. If the number of new platforms is low, concentration risk will increase, especially if bigtech firms gain a large market share. This would also lead to “too-big-to-fail” issues.</p>
Disintermediated bank	<p>The disintermediated bank scenario is considered unlikely to gain significant scale in the short to medium term. Indeed, large-scale use of public distributed ledgers for processing payments is still impeded by many technological and legal factors. P2P lending platforms also face difficulties in matching lending and borrowing, which underlines the continuing economic need for balance sheet intermediation. Moreover, P2P lending platforms are currently pivoting to a business model where institutional investors such as banks, pension funds or insurance companies progressively replace retail investors in the investor base.</p> <p>However, these scenarios were covered as there is a potential risk that banks could be disintermediated from certain aspects of financial services. The key risk in these scenarios would be that financial activities taking place outside regulatory environments would be subject to looser standards and oversight, and as a result be inherently less controlled and secure. Bank supervisors could potentially find that their ability to monitor systemic areas of risk in the financial industry is eroded.</p>

*Source: BCBS, “Implications of fintech developments for banks and bank supervisors”, February 2018.*

### **2.3 Central banks’ initiatives to facilitate financial innovation**

With the objective of facilitating the flourishing of innovative technologies and business models for financial services providers, many jurisdictions worldwide have established several innovation assistance systems in the forms of start-up accelerators, regulatory sandboxes, and innovation hubs. The Financial Stability Board (FSB) partnered up with the Basel Committee on Banking Supervision (BCBS) to conduct a survey on this matter, aiming at better assess each jurisdiction’s approach to support fintech innovations. The initiatives brought forward by each jurisdiction have the objective of smoothing companies navigation through supervisory regulations, providing regulatory guidance to both newly emerging start-ups and incumbent companies. Such interactions enhance the authorities’ understanding of these innovative technologies as well, aiding regulatory institutions in identifying innovations which may be useful for supervisory reasons, that is helping the supotech sector to develop in a more rapid manner. Obviously, each

programme’s scope depends on the authority’s objective and its regulatory framework; therefore, the implementation of such initiatives is specific to the jurisdiction’s mandate. The following table summarizes what the joint-survey conducted by the BCBS and the FSB found, giving an overlook on the major countries’ range of facilities for financial innovation.

Figure 10: “Authorities’ initiatives to facilitate financial innovation”

Innovation facilitators			
	Innovation hub	Accelerator	Regulatory sandbox
	A place to meet and exchange ideas	"Boot-camp" for start-ups, culminating in a pitch presentation	Testing in a controlled environment, with tailored policy options
Australia	ASIC	ASIC	ASIC
Belgium	NBB/FSMA		
ECB	SSM <sup>33</sup>		
France	ACPR/AMF	BDF	
Germany	BaFin		
Italy	BOI		
Hong Kong SAR	HKMA	HKMA	HKMA/SFC/IA
Japan	BoJ/FSA		
Korea	FSC		FSC
Luxembourg	CSSF		
Netherlands	DNB/AFM		DNB/AFM
Poland	FSA		
Singapore	MAS	MAS	MAS
Switzerland	Finma		Finma
United Kingdom	BoE/FCA	BOE	FCA <sup>34</sup>

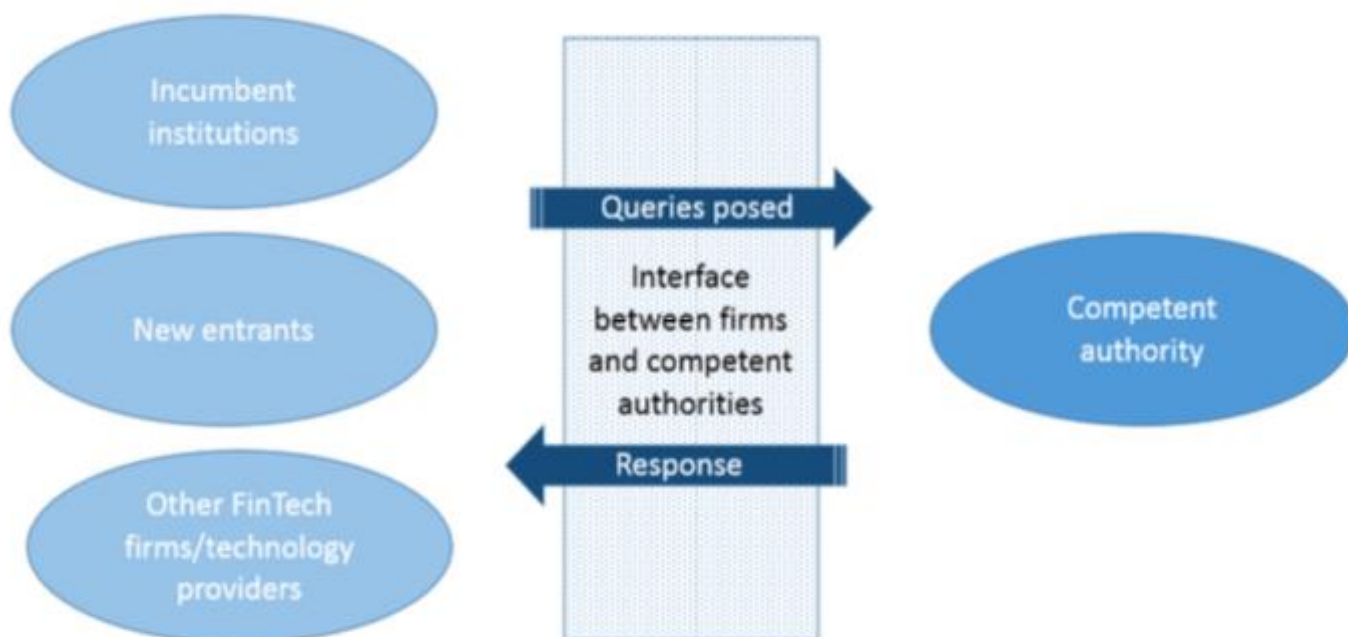
Source: BCBS, “Implications of fintech developments for banks and bank supervisors”, February 2018.

The above reported innovation hubs are open to most firms employing, or considering the employment of, innovative products, services, business models or delivery systems (European Banking Authority et al, 2018).

In the following diagram is represented the process involved in innovation hubs, where firms first submit enquiries to the competent authorities, then receive adequate preliminary guidance

related to the above-stated enquiries.

Figure 11: “Diagrammatic representation of innovation hubs’ process”



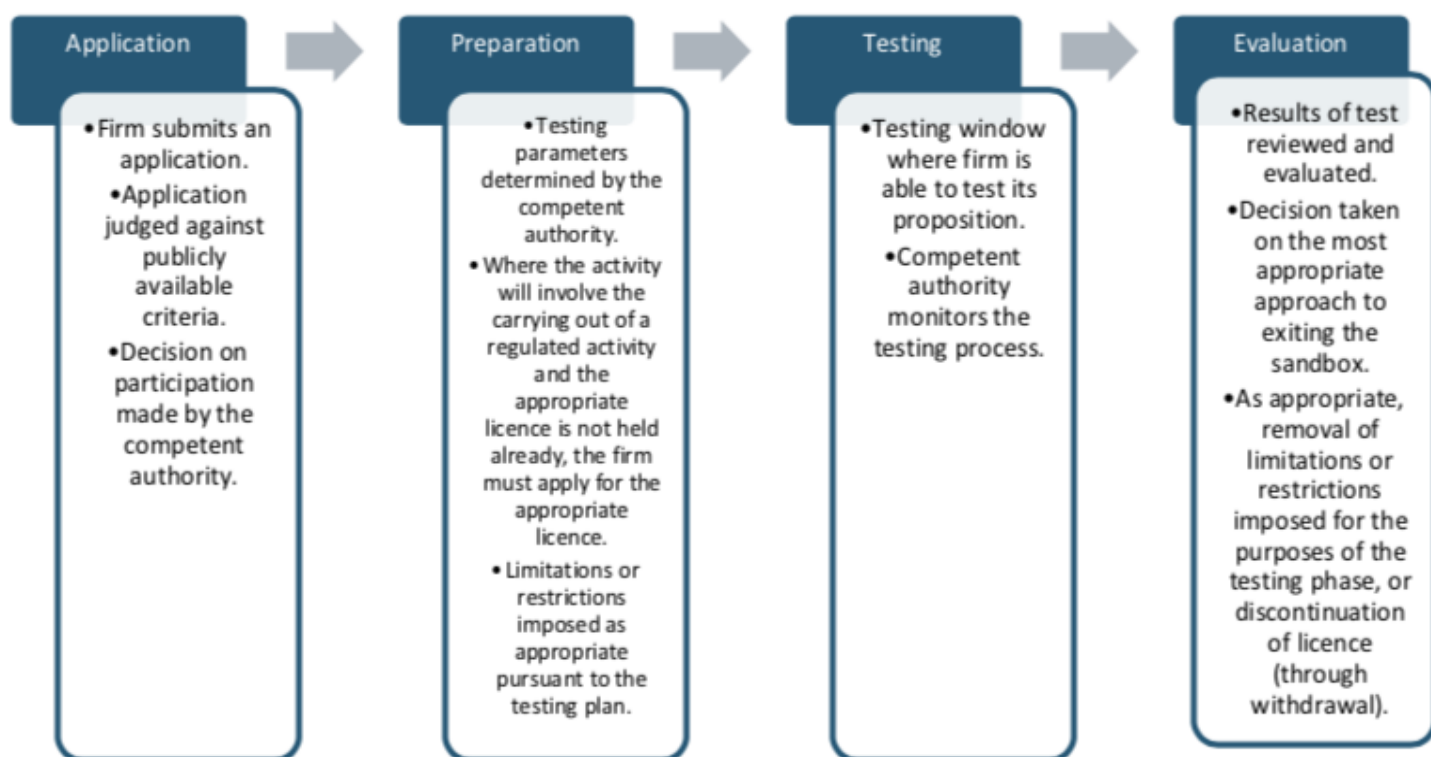
Source: European Banking Authority, “FinTech: Regulatory sandboxes and innovation hubs”, 2018.

In regard of fintech accelerators, facilities where emerging start-ups are given the resources and tools to grow up in an institutional environment, the Bank of England is a virtuous example for the banking industry; it is in fact taking a systematic look at emerging technologies, seeking a proper way for them to be employed on a market-wide scale. Fintech companies applying to be part of the accelerator programme are selected through an open competition based on a well-defined central banking use case, so as to preliminary assess their usefulness to the central bank ([www.centralbanking.com](http://www.centralbanking.com), January 2018).

For what concerns regulatory sandboxes instead, the process may be divided in 4 distinct phases: first there is an application phase, then a preparation phase followed by a testing phase and to conclude an exit or evaluation phase where the competent authority decides how the firm should approach the exit from the regulatory sandbox, which may be either continuing or terminating the company’s activities.

Following, a graphic representation of such process is given, including a brief description for each of the phases involved.

Figure 12: “Diagrammatic representation of regulatory sandbox phases”



Source: European Banking Authority, “FinTech: Regulatory sandboxes and innovation hubs”, 2018.

## 2.4 Focus on the fintech credit market

After having discussed the effects that fintech would have on the banking system, and having described what the future of financial services may look like, it is due to focus on the fintech sector which can already be considered a reality, both for its current size and its pace of growth: the fintech credit market.

Fintech credit may be defined as credit activity supported by electronic platforms that are not controlled by commercial banks (Claessens et al, 2018). Such definition includes all credit activity enabled through platforms which couple borrowers with lenders, that is, investors. A peculiarity which differs fintech credit companies from other credit providers is the implementation of emerging technologies and digital innovations to interrelate with customers online and manage huge volumes of customer data; commercial banks, instead, do not run

digitised credit processes at the same level and mostly employ offline processes and staff. Moreover, traditional banks also intake demand deposits: this is the main reason for which they undergo the lenses of prudential regulations and supervision; on the opposite, fintech credit providers are currently not subject such regulation framework, and therefore they are still considered as belonging to part of the alternative credit market.

Fintech credit is supported by online platforms; such platforms can differ significantly in design, but are all heavily dependent on digital and innovative technologies to deliver proper customer services and to effectively process large volumes of information. However, incumbent players of the traditional credit market are increasingly employing these technologies to varying degrees.

Most fintech credit companies belong to the category of marketplace lenders, that is nonbank loan providers focusing on lending to individual consumers or small-medium enterprises (SMEs); their activities are mostly operated online, the underwriting is brought forward by automated systems and algorithms, and they are funded by issuing equity or selling loans to investors (Perkins, 2018).

In the case of a peer-to-peer (P2P) business model, a low-cost standard loan application process is given out by the digital platform, facilitating the match between borrowers and lenders. Potential borrowers dispense private information about their finances' status and the operation for which they are seeking funds; after the platform has overlooked it, investors may review it. Once both parties are matched, they start contracting the loan directly between each other; such phase assures that the lender takes on the risks promptly, without the lending platform being involved. Loans are mostly duration-matched, thus lenders are unable to dissolve their investments before the expiration date unless they find a new investor who is willing to buyout the investment. Such process is supported by some peer-to-peer platforms that offer a secondary market where loans or credit's rights are traded among investors.

As the loan is originated, the credit platform provides services related to the loan such as record-keeping, collection of the borrowers' instalments, distribution of cash flows, and recovery of unmet obligations; this agent-like behaviour is repaid through ongoing fees by the investor.

Many lending platforms also provide loan pricing and borrower screening as extra services in order to facilitate the investors' selection of individual loans to take over. A valuation of borrowers' credit quality is reflected in the credit grade, which is assessed through the analysis of various parameters depending on the platform's policy; such credit grade is then used to fix a loan interest rate. However, other platforms employ market-determined pricing mechanisms such as auctions, and many others apply fixed prices.

Fintech credit firms usually suggest lenders to spread risks; they can decide to spread their investment over multiple loans, or be exposed to a portfolio of loans which is automatically tailored with respect to their selection in term of risk category. Around 95% of US peer-to-peer lending platforms use an auto-selection system to offer such portfolios, while the percentage is at 75% for Europe; such wide-spread service resulted in an increasing structuring of investments as units in a diversified loan pool.

Other than facilitating credit, fintech companies can offer monitoring and servicing duties just as traditional banks do; the key difference stands in the absence of a balance sheet accounting for credit and other risks. Moreover, fintech firms do not rely on the brick-and-mortar model of distribution, having no physical branches available and a total digitalisation of the loan origination processes; such processes include the assessment of customers' credit through the implementation of algorithms, machine learning technologies, and the use of a wide range of personal data from non-traditional sources which is used to better evaluate the credit grade of each customer by following his digital footprints. Surely, traditional banks have access to exclusive information from customers' deposits and credit history, but they are still not as innovative in data gathering.

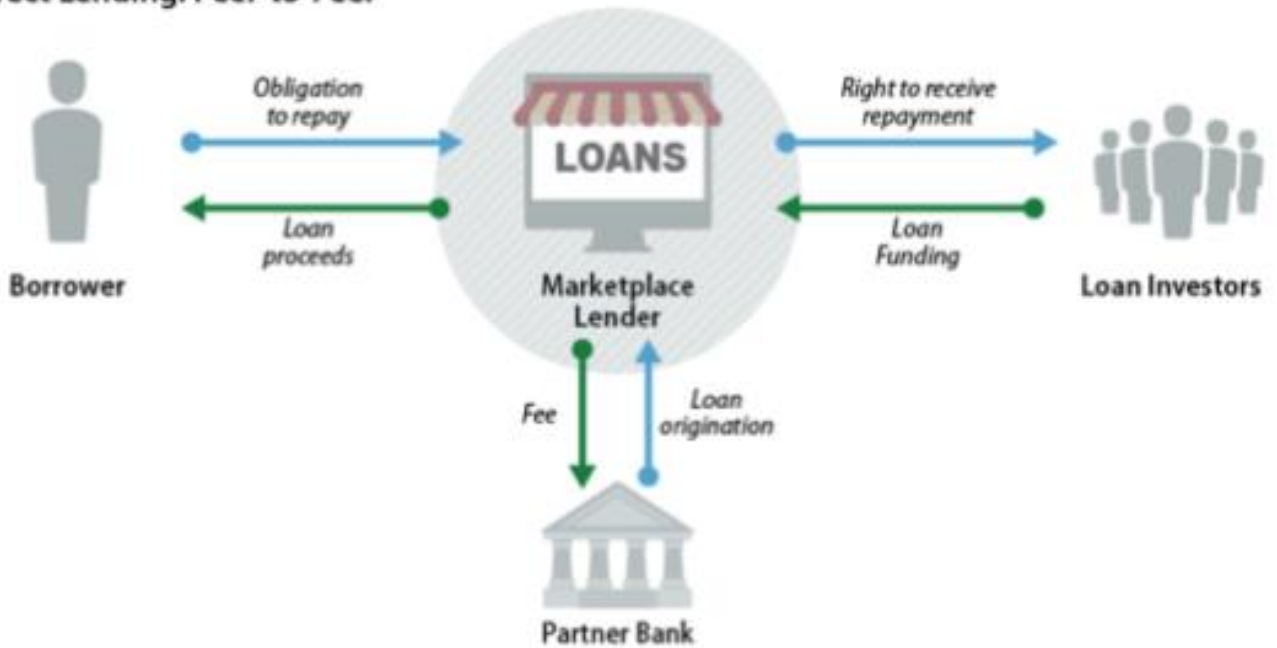
In the next figure are summarized three different fintech lenders' business models to better comprehend each one's functions in the facilitation of credit, and the way of profiting which sustain their platforms.

Figure 13: “Examples of different fintech lender business models”

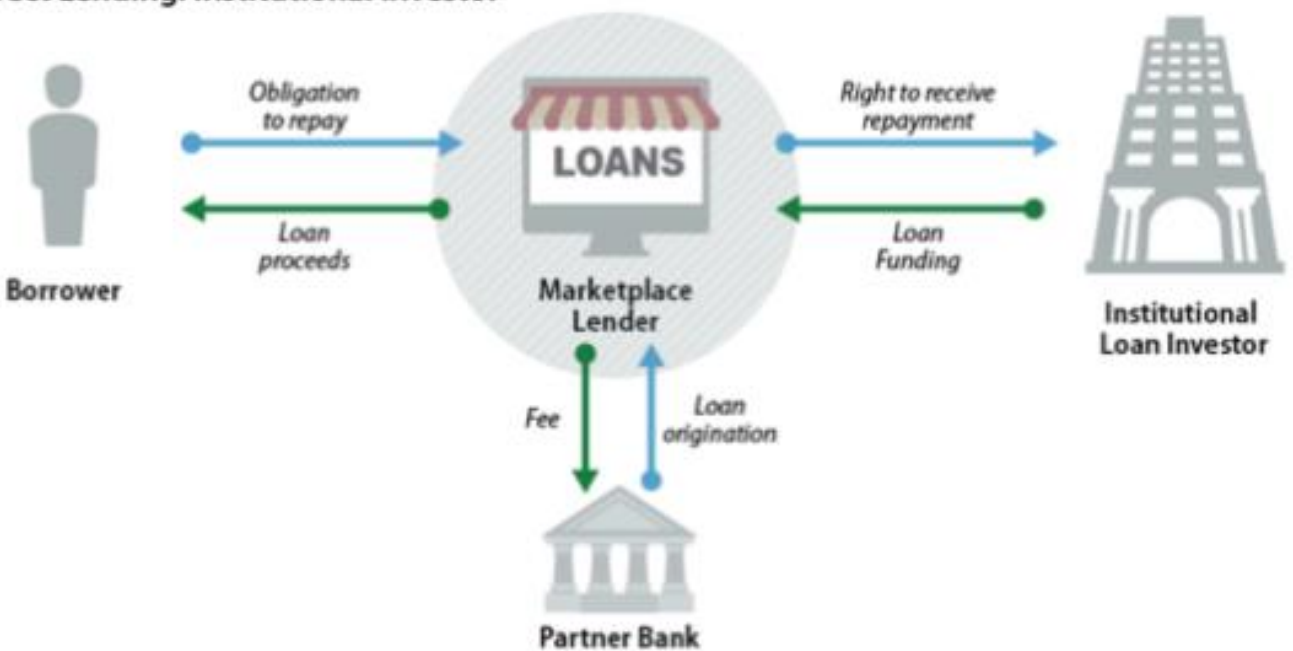
**Direct Lending**



**Indirect Lending: Peer-to-Peer**



**Indirect Lending: Institutional Investor**



Source: Congressional Research Service Report, September 2018



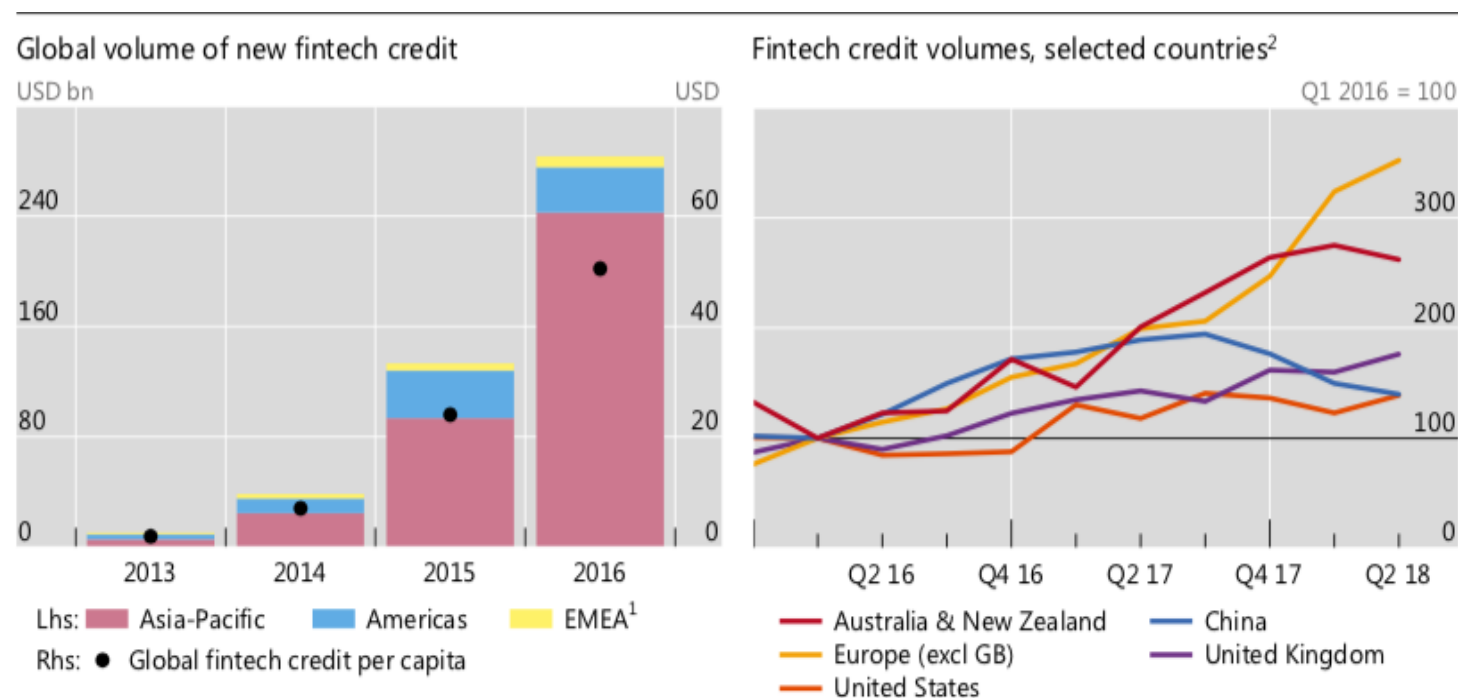
Finally, from the perspective of a retail investor, fintech credit is a newly emerging investment category which differs from the classic lower-yielding bank deposits; also, this type of credit to businesses is easily diversifiable and tailored to the investors' preferences regarding risk and maturity (Claessens et al, 2018).

## 2.5 The fintech credit market development

Available data evidence that the fintech credit industry has grown rapidly through many countries over the last years. The Cambridge Centre for Alternative Finance (CCAF) estimates that the sector provided credit globally for the amount of \$284 billion in 2016, with respect to \$11 billion in 2013.

Global volume of new fintech credit is represented in the following graph (left-hand panel), along with the volumes of a few selected countries, in order to better assess the magnitude of this emerging sector.

Figure 14: "The rapid growth of the fintech credit market"



Source: BIS Quarterly Review, September 2018.

As shown by the right-hand panel, fintech credit has developed quite unevenly across countries; China was the largest market by far in 2016, followed by the United States and the United Kingdom. However, fintech credit per capita was relatively high in many smaller

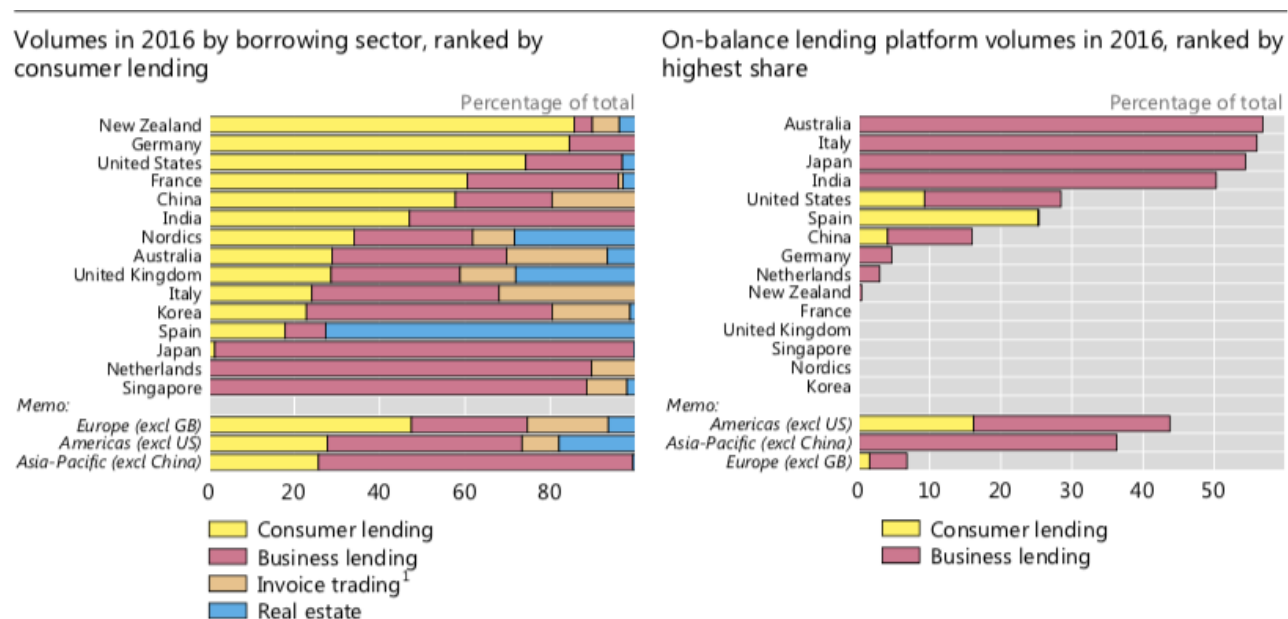
economies, such as New Zealand and Estonia.

Recent data evidenced a slowdown of growth in several major countries following the rapid development between 2013 and 2016; China’s lending volumes have decreased in the past few quarters indeed. Despite the rapid growth, fintech credit still constitute only a small share of the worldwide credit flows; WDJ.com estimates that it represented 13% of Chinese new lending market in the first half of 2018, and amounted to only 4% of US’ credit volume in 2016 according to the CCAF.

Fintech credit seems to prevail in specific market sectors. For example, it amounted to 15% of the lending volumes to consumers and SMEs in the United Kingdom in 2016; also, it constituted about 36% of unsecured personal loans originated in the United States in 2017. Fintech originated mortgages accounted for approximately 8-12% of the total US’ amount in 2018, as the fintech lending firm Quicken Loans was the largest mortgage originator in 2017 (Claessens et al, 2018).

The following graphs display these differences across countries, comparing fintech credit compositions among various jurisdictions.

Figure 15: “Different fintech credit characteristics”



<sup>1</sup> Includes a small amount of debt securities for some countries.

Source: BIS Quarterly Review, September 2018.

The majority of consumers join fintech providers to refinance or securing already existing debts, while others use them to fund major purchases. Fintech credit is also playing an important role in the student loans market, with increased borrowing from students both in the US and in China. In concern with businesses, SMEs usually look for fundings addressed to working capital and investment projects; moreover, investors are buying discounted claims on a firm's receivables, giving form to the "invoice trading" phenomenon.

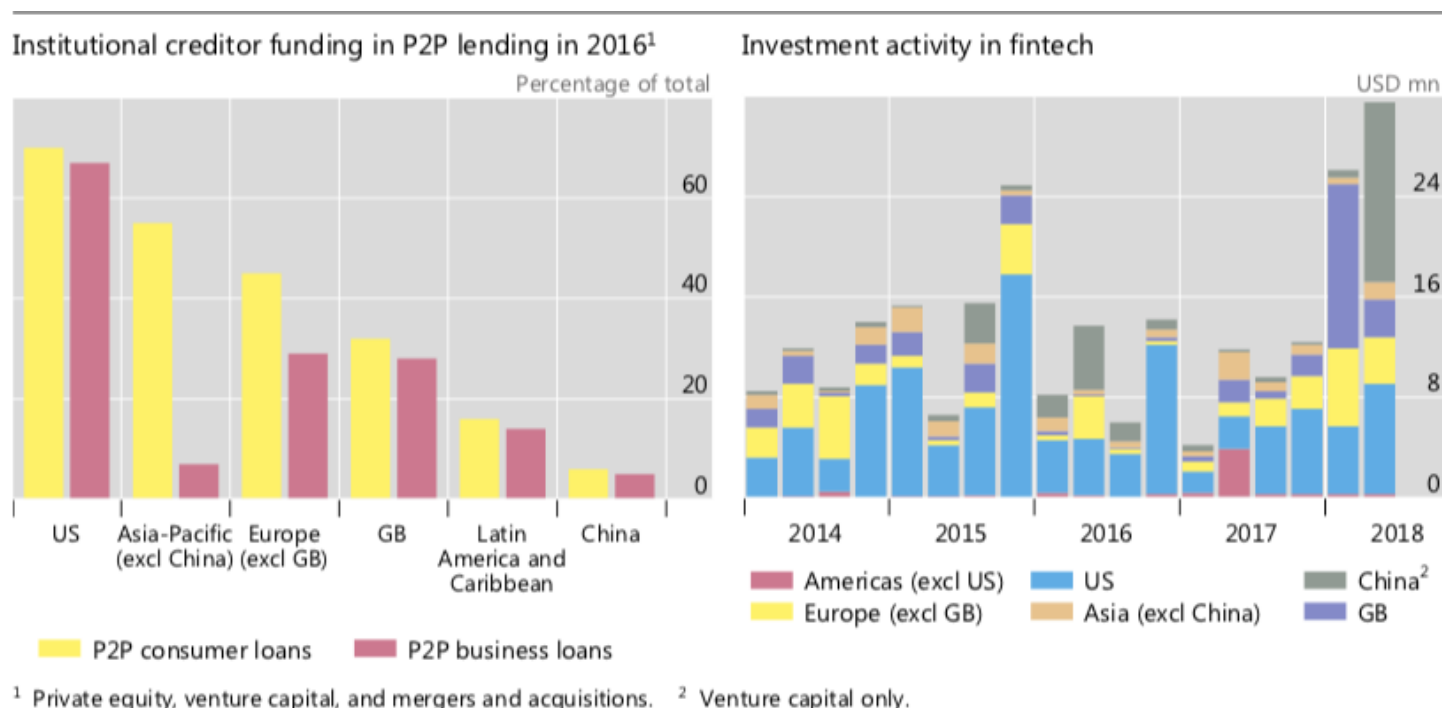
How credit activity is composed of borrower segments differ radically between countries. Consumers are the largest borrowers in the US, Germany, and New Zealand, as showed in the left-hand panel in Figure 15. On the other hand, business lending is prevalent in Japan, Singapore and the Netherlands, while invoice trading takes on an important share of both Australian and Italian credit markets. The right-hand panel in the previous figure instead, shows that business lending is the most popular type of credit for fintech credit platforms that keep loans on their own balance sheets (Claessens et al, 2018).

Several countries present a majority of individual investors in the fintech market, as the peer-to-peer branding of most platforms suggests; this is the case especially for China. However, many countries have experienced an increase in the activity of institutional investors. For instance, available data evidence that in 2016 most of the new loans in the US and parts of Europe were funded by institutional investors. Notably, the United States now usually refer to fintech lending as "marketplace lending" instead of P2P lending given their significant involvement.

The next graphs display these dynamics, showing investment activity in the fintech credit markets. The left panel presents institutional creditor funding in peer-to-peer lending across various macro-areas during 2016, whereas the right-hand panel shows a more general investment activity in fintech, comparing a few major countries to other continents.

It is interesting to notice how Chinese institutions are heavily investing in venture capital activities related to fintech: this evidences the country's high expectations on this emerging sector, and highlights its strong dedication to innovate.

Figure 17: “Institutional funding and fintech investment across economies”



Source: BIS Quarterly Review, September 2018.

It is also worth noticing how US’ institutional investors are funding both P2P consumer and business loans on the same scale; this suggests an incoming wave of growth in both the market segments.

## 2.6 Implications on the credit market

Due to the youth of the industry, it is hard to properly assess its effect on end users, such as lenders and users, nor on financial health or the economic stability. Also, such assessment is hard because of the various frameworks characterizing each country. Given these premises, it is possible to recognize some benefits and risks that the fintech credit market would embed.

Relatively to the impact on users, the implementation of innovative digital technologies and more precise customer data guarantee greater efficiency, lower transaction costs and a better evaluation of credit risk. There are few evidence sustaining this notion; Fuster et al (2018) found that US’ fintech lending platforms process mortgages 15-30% faster than traditional lenders, enhancing the borrowers’ experience. Also, there is no evidence of increased default rates.

LendingClub, one of the most virtuous US platforms in the market, was found to have a high-

performing grade assessment method; the platform would assign ratings relying on non-traditional data, predicting loan performance accurately and often allowing borrowers to agree more favourable terms. Similarly, a German P2P platform would outperform traditional lenders, relying solely on credit history data alone, by incorporating the customers' digital footprints and data with the purpose of better assessing their default risk.

It is also proven that fintech platforms have eased access to credit; in the US, P2P lending has become a substitute for bank lending, since it serves infra-marginal borrowers, while supplementing traditional bank lending for small-scale loans. As for China, these new platforms would support the growth of small firms and less wealthy consumers, which due to their restrained access to traditional credit channels would be forced to resort to informal private lenders. Alibaba is playing a significant role in this process of development, granting easy access to credit for firms with low credit score (BCBS, 2018).

However, a full economic cycle involving these new fintech firms has yet to be finished; thus, it is hard to foresee how fintech credit will react in deteriorated economic conditions.

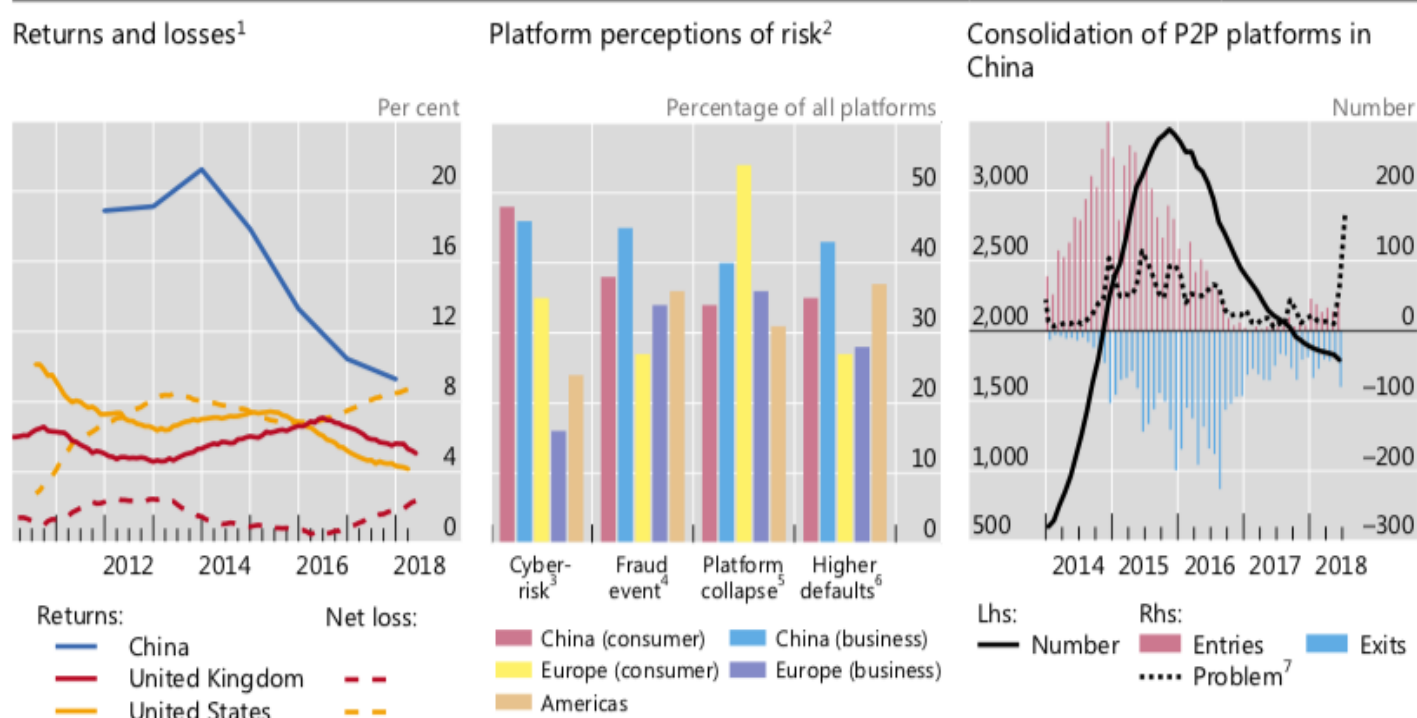
There are admonishing indicators in a few countries; for example, increased default rates have lowered investor returns in the US, China and UK. Default rates have also rose more recently in Australia and Korea. Such phenomena have occurred in a period when non-performing loans in the banking industry are historically low for the majority of these countries; therefore, it is likely that with the purpose of a rapid expansion, some platforms have targeted low-quality borrowers, bearing higher risks.

In addition to lower returns, investor trust has also been affected by some business misdemeanours and failures. For instance, demand for fintech credit plummeted in 2016 because of LendingClub misbehaviour, as it had to buy back loans which did not comply with buyers' requirements. Also, many Chinese lending platforms had problems during recent years, as P2P industry players promised unfeasible returns; instances of fraud took place as well. Such issues, along with more stringent regulation and institutions' intervention to dismiss non-qualified lending platforms, led to a significant decrease in entrants and a peak of P2P companies' exits in 2015-2016.

The next figure displays three graphs highlighting the weakened performance of fintech credit

firms in the major markets.

Figure 18: “Weakened fintech credit performance in key markets”



<sup>1</sup> Data based on all platforms covered by WDJ.com for China, four large platforms for the United Kingdom and two large platforms for the United States. <sup>2</sup> Share of platforms that perceive a very high or high risk for that risk category. <sup>3</sup> Cyber-security breach. <sup>4</sup> Fraud involving high-profile loans/deals. <sup>5</sup> Collapse of a well known platform due to malpractice. <sup>6</sup> Notable increase in default rates. <sup>7</sup> Those that face difficulties in coping with cash withdrawals by lenders, are under investigation or have “runaway bosses”.

Source: BIS Quarterly Review, September 2018.

Regarding the systemic impact of fintech credit, currently the small size of the industry in many countries constrain its impact on the financial stability; however, as the sector grows bigger, it will present an array of various benefits and risks.

The increased financial inclusion and alternative financing and investment options would be important sources of growth for the global economy, affecting on a wider scale the emerging economies which are currently constrained by their limited access to credit. Moreover, the presence of various actors in the credit market would lower the systemic risks caused by the current oligopoly of few traditional banks in the credit market.

Commercial banks could also be better off thanks to fintech credit, thanks to the implementation of innovative credit-related technologies to enhance efficiency; some banks already count on fintech firms’ credit rating processes. Others, are employing machine learning

techniques in the origination of retail credit portfolios.

On the other hand, the rise of fintech credit could bring additional risks. Lending standards could be weakened by the fiercer competition in the industry and the wider access to credit channels; this risk would be amplified in the case of quick credit growth. Also, the impossibility to access the safety nets provided by various jurisdictions make fintech credit more exposed to contractions in case of recession.

Overall, the risks are limited with respect to the broad potential benefits offered by fintech lending platforms; their growth would optimize the credit market, making it more efficient, while also supporting the development of emergent countries through micro-financing and improved access to lines of credit.

## CONCLUSIONS

The thesis firstly defined what “financial technology” is, tracing its boundaries with the banking sector and its potential applications; then, fintech’s state of development and upcoming trends have been analysed through a detailed study of investments’ flows toward the fintech sector. In conclusion of the first chapter, the paper presents a wide range of different experts’ opinions on the topic, focusing on the experts’ expectations on the impact of such disruptive technologies on the traditional banking industry. In the second chapter are presented five forward-looking scenarios illustrating the future of the financial industry, attempting to foresee what banking will look like in the future, and including a thorough assessment of risks and benefits provided by fintech innovation. Next, the focus of the research is moved on the fintech credit market, and how financial technologies might boost the development of emerging countries through the implementation of innovative lending platforms and new forms of financing.

Answering the research question “how will fintech shape the future of banking?” is a hard task, as many matters regarding the topic are still to be dealt with by jurisdictions and financial regulations. However, by conducting this research, several potential benefits brought upon by fintech have emerged. First of all, the implementation of financial technologies in the banking industry is inevitable, as the economy moves closer to a total digitalisation on a daily basis; thus, banking must undergo such process of modernisation as well to maintain their current position in the market. Of the five scenarios described during the second chapter, the “distributed bank” scenario seems the most likely to happen, as bigtechs will certainly enter the market of financial services thanks to their state-of-the-art technologies aimed at enhancing both the customer service and the financial industry; however, it is odd to imagine banks losing their role to tech companies like Google. Therefore, a financial market where banks, fintech firms and bigtechs all compete between each other could result in a healthier economic framework and an eased access to credit on global scale.

To assure the success of such renovation, regulators of each jurisdiction should work together to tackle the new risks attached to the increased presence of technology in the financial system; nonetheless, the benefits arising from fintech as described in this research largely outweigh the risks, leading to an improved and wider provision of financial services and products.



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