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CHAPTER I – INTRODUCTION

In daily life, individuals have started to become aware of the terms like financial technology ("fintech"), big-tech and digital finance. While these terms cover an essential part of our live today, the question which should be answered is how and when the awareness came up to this point. While technological growth was been exponential, the millennial or generation Y shaped emergence of new technologies (multimedia PCs and fast data communications) and the openness of social interaction. With this new generation and new category of customers came new consumption habits that were matched with what these new technologies offered.[1] At first, technological improvements were used to ease the daily life, however, over time they started to change it changed the way we live over time. Some existing business models thereby ceased to exist, new business models occurred were introduced and it became more convenient to establish a business.

In business, the utilization of innovations such as loud computing, machine learning, predictive analytics, and business intelligence tools, Artificial Intelligence (AI) now creating new methods to conduct and manage the business.[2] In addition, these entrepreneurs had several difficulties due to the fact that either traditional financial services providers are reluctant to take on risk or it was not possible to deliver the service. All these reasons have created a fertilise ground for the new alternative finance and financial technology (Fintech) services, as well as they helped traditional players to deliver better products. It is worth noting to explain few definitions. Even though there is not a widely common definition for fintech, it can be defined as "*computer programs and other technology used to support or enable banking and financial services*". [3] Big Tech refers to "*the major technology companies such as Apple, Google, Amazon and Facebook, which have an inordinate influence*".[4]

Today, it is an undeniable fact that Fintech exists in almost every part of financial products, both in the products of incumbents and new entrants. This dissertation is mainly going to focus on the non-traditional financial services due to the fact that they are relatively new in the sector and have gained

[1] Tom McGee, "How Millennials Are Changing Retail Patterns" https://www.forbes.com/sites/tommcgee/2017/01/23/the-rise-of-the-millennial/#1b6175015f74
[2] Ibid
[3] https://www.lexico.com/en/definition/fintech
[4] https://www.nytimes.com/2019/09/08/technology/antitrust-amazon-apple-facebook-google.html

unprecedented level of prominence. These mentioned services are increasingly affecting customers, financial institutions and the financial system as a whole. Whilst the range of fintech products are extremely broad, for the purposes of this dissertation certain types of fintech products (digital payment services, peer to peer lending & crowdfunding, cryptocurrency and robo-advisors) will be studied. There are two reasons why these products are chosen: they are the ones that mostly attract individuals and entrepreneurs; thus, customer protection and financial stability concerns are at stake.

While fintech products boost innovation and present unique opportunities, they do not evolve in a vacuum and as such there will be new risks and challenges. Especially after the Global Financial Crisis ("the Crisis") in 2008, developments in the financial sector have been under the spotlight. The legal issue is that fintech is still not sufficiently regulated (or in some countries not regulated at all). Regulators are now challenged with the need to address a wide range of regulatory objectives and policy priorities in order to enable a healthy environment for the development of fintech ecosystem.[5]

Therefore, the purpose of this dissertation is to come up with the most appropriate regulatory approach for fintech services, wherever their activities are not fully regulated or not regulated at all. In other words, the aim is to determine what type of regulatory framework could foster innovation whilst not threatening consumer interests and financial stability. The reason why this dissertation is not going to specifically focus on a certain region or country is that fintech platforms are based on online operation, rather than in a particular place of operation, and because customers of these products can conveniently access them from all around the world. Therefore, regulators should come up with a sequential reform process. The potential global regulatory approach must exhibit an understanding of the underlying conceptual framework of the particular service type(s) it aims to regulate. This dissertation provides a roadmap for this process and in the end, it aims to provide the best approach that should be built on shared principles from a variety of jurisdictions.

[5] Chris Brummer discusses the new objectives faced by regulators following the GFC. See Chris Brummer, 'Disruptive Technology and Securities Regulation' (2015) 84 Fordham Law Review 977, 1037.

This dissertation will have four main bodies which will help to reach the intended outcome. First, Chapter II, the historical development of fintech will be summarized/set out to provide comprehensive background information. For this purpose, the Crisis will be considered as a turning point, particularly with regard to how the regulatory approach towards financial products was at that time and how the financial sector was affected by the Crisis. By doing so, past experiences will be reminded/absorbed, which will be of great benefit to the shaping of today's regulatory approach. Further in this chapter, as mentioned above, some of the fintech products will be explained in order to understand how they function and understand what the underlying reasoning behind their innovation is.

In Chapter III, the advantages and risks of these financial products will be analyzed. This will answer/address the question of whether the benefits outweigh the risks or vice versa, which in turn, will shape the regulatory approach. In other words, some of the risk identified in this chapter may be overlooked considering the anticipated benefits; yet some others impose high risks that have to be coddled. In Chapter IV, possible approaches to the regulation of these products, which vary from not regulating to specific regulations. It will be argued which regulatory approach will be best suited to these products as well as which of them would suppress the speed of innovation or would be detrimental for financial stability and consumer protection. Chapter V will provide an analysis of the regulatory approach for the most invested two countries, which are China and the UK. Each country has a different regulatory attitude towards fintech and so this will enable to analyze whether the theoretical justifications for regulations coherent with practice. Further in this chapter, a tailored regulatory regime will be defined.

Chapter II – New Term for An Old Relationship

2.1. Evolution of Fintech

The relationship of the financial sector and technology, in this chapter, will be historically analysed and the underlying reasons for the development of fintech will be explained. It will not be wrong to assess the Crisis as a milestone for the development of digital financial products. Therefore, there is a great benefit to divide the development of the financial sector as before and after the Crisis, which will provide

a comprehensive understanding of the underlying reason for the shift in the sector. Further, in this chapter, the main fintech services will be briefly studied.

1. Before 2008 Global Finance Crisis

Even though the participation of technology in finance deemed like a new feature, their relationship goes date back a long time.[6] The technology that has widely used in today's finance industry has begun in the late *1960s* with the advances in automated clearing services.[7] For instance, the Society of Worldwide Interbank Financial Telecommunications (SWIFT) constituted in 1973, which is "*used for provides a network that enables financial institutions worldwide to send and receive information about financial transactions in a secure, standardized and reliable environment."*[8]

The appearance of the internet has led to profound changes in the finance industry in the *90s*, after which rapid developments created the divergence of services through traditional and new channels.[9] The online banking activities dramatically increased after the '*90s*, which hit a peak by 90% of the commercial banks had online banking in *2011*.[10] It is emphasized that the promotion of Automatic Teller Machines (ATM's) in *1967* have a significant impact on today's fintech as well as in the financial crisis, by which money withdrawals become convenient.[11] The new entrants from outside of traditional banking, such as PayPal, have become a significant player in the industry, especially growth in Peer to Peer (P2P) payment methods.[12]

While the trace of the innovation can be seen in banks, there is a perception that technological development by banks is not accepted as Financial Technologies and the reason for this explained by

[6] Tom Standage, The Victorian Internet: The Remarkable Story of the Telegraph and the Nineteenth Century's On-line Pioneers (New York: Bloomsbury, 1998).
[7] Douglas Arner and others, "The Evolution of FinTech: A New Post-Crisis Paradigm." (2015) 4 47 Geo. J. Int'l L. 1271 pg.1271
[8] Ibid
[9] Ibid
[10] David Lee Kuo Chuen and Robert H. Deng "Handbook of Blockchain, digital finance and inclusion Vol.1 (Academic Press 2018)
[11] Thomas Lerner - Mobile Payment Springer (Vieweg 2013)
[12] Lee (n.10)

that the purpose of the innovation in finance to get rid of agents or banks.[13] The financial services had transformed into the digital industry for all purposes in the late '90s.[14] For instance, by *2000*s, eight banks in the US has already had a million customers who benefit online services and as well as the first online bank branches, without physical branches, launched in the UK.[15]

While the technological developments have accelerated the growth of financial services, the risks have been accompanied with it. The establishment of the first international committee regarding financial matters arose due to the bankruptcy of Herstatt Bank, which was a significant participant in the foreign exchange matters.[16] The purpose of the committee is "*to enhance financial stability by improving the quality of banking supervision worldwide"*.[17] It can be said that from the beginning of the utilization of technology in finance has always entailed a risk. By the time technology has become interlinked with financial services, the market risks have tended to be at stake such as: "Black Monday" in 1987, the computer technology widely used which led program-based trading popular until the market crash in that.[18]

Even though there was a minimum level of regulations, the exponential growth in the finance sector and capital mobility has enabled financial innovation and market deregulation.[19] Financial deregulation is comprised with ease on the quantity controls and other prohibitions on banks, and as a result, the limits on the facilitate activities other than traditional lending diminished.[20]

2. After the 2008 Global Finance Crisis

[13] Jame DiBiasio, ICBC chairman welcomes fintech regs, FINANCE ASIA (Aug. 17, 2015), http://www.financeasia.com/News/400732,icbc-chairman-welcomes-fintech-regs.aspx.
[14] Arner "The Evolution of FinTech: A New Post-Crisis Paradigm." (n.7)
[15] Ibid
[16]History of the Basel Committee and Its Membership (BIS, 2016) https://www.bis.org/bcbs/history.htm accessed 10 July 2019
[17] Ibid
[18]Michaela Otýpková. Financial Crisis and Its Impacts on the Stock Market. Acta Oeconomica Pragensia (2010), (4)3 http://0-search.ebscohost.com.serlib0.essex.ac.uk/login.aspx?direct=true&db=edsrep&AN=edsrep.a.prg.jnlaop.v2010y2010i4id309p3.11&site=eds-live.
[19] United Nations,"Financial Regulatory Reform After The Crisis Trade And Development Report, (2015) https://unctad.org/en/PublicationChapters/tdr2015ch4_en.pdf
[20] Ibid

Whilst online banking takes place since the *1980s*, considerations on the new regulatory framework commenced after *ten* years of its adoption.[21] The time lag was considered as a natural process, which enables the development of innovation without stifling it by the unnecessary regulatory process.[22] Meanwhile, the technology is also used for risk management purpose and legal and compliance activities. The excessive trust and reliance on information technology ("IT") and quantitate finance, which are used for the assessment of financial products through mathematical models, lead regulators and financers to feel overconfidence with these methodologies.[23]

It is argued that a false sense of security and dependency on these constitutes the origins of the Crisis. The light-handed regulatory framework, mostly based on a commitment to free markets and self-regulation, was not capable of preventing widespread turmoil in late 2008.[24] The blasting point of the financial sector is occurred by a bloom in the sub-prime mortgages and securitized products and which became a global financial crisis.[25] In the end, millions of people lost their jobs, and several banks and financial institutions either declared bankruptcy or governments took control over.[26]

As indicated above, the history of finance and technology dates back to years. Nevertheless, the concept of today's fintech has emerged mostly after the Crisis. As a result of Crisis, the rapid innovation in financial technologies, the growth of non-traditional financial services has reached their peak. In other words, the regulatory framework tightened after the Crisis, in order to provide an adequate level of protection, which in turn, restricted the scope of activity of banks and increased compliance costs.[27]

Following that, the rapid development in technology-enabled the emergence of new players in the industry and the growth of which accelerated due to lack of trust on the incumbents. Specifically, big techs have interested in serving financial products, with the help of their massive data pool. In detail,

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[21] Arner "The Evolution of FinTech: A New Post-Crisis Paradigm." (n.7)
[22] Ibid
[23] Jànos Barberis and others, "FinTech, RegTech, and the Reconceptualization of Financial Regulation", (2017).
37 Nw. J. Int'l L. & Bus. 371.
[24] Ibid
[25] Victoria Ivashina and David Scharfstein, "Bank Lending During the Financial Crisis of 2008" (2010) 97(3) Journal of Financial Economics:319-338.
[26] Ibid
[27] U.N. Report

using data and the analysis network structure in their platform enabled them to conduct financial services. It is emphasized by a recent report that the confidence and trust in banks are replaced by technology firms in the US, such as the level of reliance on Amazon almost doubles that in City Bank, with 71% and 37% respectively.[28]

All of these reasons have created a fertile environment for the growth of new entrant's fintech services. The recent numbers illustrated that global investment in fintech companies reached *$111.8B* billion in *2018*.[29] The growth of fintech can also be revealed with the number of companies as *168* companies established in *2008* and the figure reached to *668* in *2015*.[30]

Today's non-banking services comprise in five major areas*: "1) finance and investment, (2) operations and risk management, (3) payments and infrastructure, (4) data security and monetization, and (5) customer interface".* Over the last few years, alternative financing mechanism such as crowdfunding and P2P lending are getting attraction from investors and regulators. Operation and risk management have crucial importance for financial institutions, especially if one considers the regulatory change since the crisis, and therefore, IT spending by them are at stake. It can be said that payment and infrastructure services are the most significant aspect of the fintech landscape**.** Particularly, developing countries, which tend to have limited access to banking, mostly benefit from payment services. For instance, a recent study revealed that *2.2* billion of individual remains unbanked in Africa, Asia, Latin America and the Middle East.[31]

There are several breaking point in the digital finance sector. To begin with, in the *2010s*, telecom companies commenced payment services which used the Visa, Mastercard and American Express networks, and as well as major smartphone manufacturers have also begun to provide contactless

[28] Survey Shows Americans Trust Technology Firms More Than Banks and Retailers, LET'S TALK PAYMENTS (Jun. 25, 2015), http://letstalkpayments.com/survey-shows-americans-trust-technology-firms- more-than-banks-and-retailers/.
[29] KPMG, "The Pulse of Fintech 2018 Biannual global analysis of investment in fintech" https://assets.kpmg/content/dam/kpmg/xx/pdf/2019/02/the-pulse-of-fintech-2018.pdf
[30] Deloitte, "Fintech by the numbers Incumbents, startups, investors adapt to maturing ecosystem" https://www2.deloitte.com/content/dam/Deloitte/tr/Documents/financial-services/dcfs-fintech-by-the-numbers.pdf
[31] Anikina I.D. and others, "Methodological Aspects of Prioritization of Financial Tools for Stimulation of Innovative Activities" (2016) 19(2), European Research Studies Journal 100-112

payments through their phones.[32] Moreover, digital wallet services such as Google Wallet and Apple Pay are provided by Google and Apple, which practically transformed mobile phones into open-loop prepaid cards.[33]

2.2. Types of Fintech Services

It is emphasized that fintech companies are providing wide range of services. Technology enabled innovation in financial services has resulted in development of new business models, applications, processes and products. The main sectors that fintech is providing services can be divided into three categories[34]:

<table>
<tr><th colspan="4">Sectoral Innovations</th></tr>
<tr><td>Credit, Deposit and Capital-Raising Services</td><td colspan="2">Payments, Clearing and Settlement Services</td><td>Investment Management Services</td></tr>
<tr><td>Crowdfunding</td><td>Mobile Wallets</td><td>Value Transfer Networks</td><td>High-frequency trading</td></tr>
<tr><td>Lending Marketplaces</td><td>Peer-to-Peer Transfers</td><td>FX Wholesale</td><td>Copy Trading</td></tr>
<tr><td>Mobile Banks</td><td rowspan="2">Digital Currencies</td><td rowspan="2">Digital Exchange Platforms</td><td>E-trading</td></tr>
<tr><td>Credit Scoring</td><td>Robo- Advice</td></tr>
</table>

As can be seen, there are several sectors in which there are different wide range of products. Due to the variety of the fintech services, this part of the chapter is going to study the specific products, which have a changed the concept of the sector.

1. Mobile Payment Services

[32] David Lee (n.10)
[33] Mark E. Burge, “Apple Pay, Bitcoin, and Consumers: The ABCs of Future Public Payments Law” (2016) 67 Hastings L.J. 1493, pg.1493
[34] Basel Committee on Banking Supervision, “Implications of fintech developments for banks and bank supervisors” https://www.bis.org/bcbs/publ/d431.pdf

Mobile financial services are probably the first activities that have benefited from Information and Communication Technologies within the financial industry.[35] It should be emphasized that the phrase "mobile financial services" is used to cover a wide range of financial services from money services (including transfers and payments) to banking-type services (including deposit and borrowing).[36] The mobile payment services are delivered by two groups of players: the incumbents (banks and card companies) and new entrants (telecoms operators, big-tech firms and technology innovators).[37] These payment services are facilitated through mobile or digital wallets. A mobile wallet is an application that secures transaction like an updated version of a traditional payment card.[38]

A recent report in the UK illustrated that, in 2018, the cash payments have down from six out of ten to three out of ten payments, which is estimated to fall as low as possible in 15 years.[39] Following that, the debit card transactions officially surpassed the number of cash payments for the first in the year 2017 and 3.4 million people claimed that they are not using cash in their transactions.

The payment services are one of the most attracted services of financial technologies. Even though both incumbents and new entrants are benefiting from technological innovation, differentiation should be made between traditional banking institutions' services and new entrants' facilities. In traditional payment systems, where banks play a central authority role that authenticates transactions, which does not fall into the definition of fintech in a modern sense.

The big-tech companies have mostly been active in payment services; indeed, the payment services are the first branch of financial services that these companies are serving.[40] It can be said that there

[35] Julia S. Cheney, "An Examination Of Mobile Banking And Mobile Payments: Building Adoption As Experience Goods?", FRB of Philadelphia - Payment Cards Center Discussion Paper No. 08-07, 2008, p.6.
[36] Ibid
[37] N. Delic and A. Vukasinovic, "Mobile payment solution - symbiosis between banks, application service providers and mobile network operators," 3rd International Conference on Information Technology: New Generation, Proceedings. Third International Conference on Information Technology: New Generation, IEEE Computer Society, 2006, pp. 346-350.
[38] Yonghee Kim and others, "The Adoption of Mobile Payment Services for "Fintech", International Journal of Applied Engineering Research Vol. 11, No 2
[39] UK Payment Markets Summary, https://www.ukfinance.org.uk/system/files/Summary-UK-Payment-Markets-2018.pdf
[40] Peter Goldfinch, "A global guide to fintech and future payment trends" (Routledge, 2019) pg.

are two main big-tech companies, Alipay and PayPal, that provides guaranteed settlement at delivery as well as reclaims by buyers are also settled through e-commerce platforms.[41] While in some countries which has less developed payment systems telecom companies such as M-Pesa are facilitating payment services.[42] A recent survey illustrates that 90% of the total payments and deposits are conducted in Kenya by these telecom companies.[43] It should be emphasized that companies like PayPal are depended on third-party infrastructure to process and settle payments; on the other hand, companies like M-Pesa can process and settle payments in their system.[44] Nevertheless, it is a fact that both big-tech and mobile network companies are depended on banks. For instance, even the companies that do not outsource infrastructure, still need a bank due to enable money inflow and outflow.[45]

2. CrowdFunding

Crowdfunding has become one of the most attracted financial technology services among others. To begin with, crowdfunding can be defined as a method of raising capital by asking a large number of people.[46] Traditionally, there would have a limited number of options to borrow money such as banks or private individuals and these lenders would require collaterals or assess other variables in order to minimize the risk. These obstacles in the market have aggregated the growth of digital fund-raising or loan services.[47] Crowdfunding is a win-win situation for both investors and individuals/entrepreneurs; the latter will not be remained under or unbanked; former will earn a profit while the risk is divided into others.[48] It can be said that the power of the internet has crucial importance as the big data will help to receive attention from large masses.[49]

[41] BIS, “Big tech in finance: Opportunities and Risks BIS Annual Economic Report 2019” (2019) https://www.bis.org/publ/arpdf/ar2019e3.pdf
[42] Ibid
[43] Lesley Stahl, “The Future of Money” https://www.cbsnews.com/news/future-of-money-kenya-m-pesa-60-minutes/ (2015)
[44] N Kshetri,. and S. Acharya, “Mobile payments in emerging markets.” (2012) 14(4), IT Professional, 9-13.
[45] Ibid.
[46] FCA, What Is Crowdfunding? https://www.ukcfa.org.uk/what-is-crowdfunding/
[47] Kevin Berg Grell and Others, “Crowdfunding The Corporate Era” (Elliot and Thompson 2015)
[48] Ibid
[49] Ibid

Even though the term of crowdfunding is relatively new, fundraising from a large mass is not. For instance, in *1885*, the editor of a newspaper initiated fundraising for the repairment of basement of Statue of Liberty was funded through the newspaper and in return the name of the contributors were published.[50] It can be said that the campaign was a crowdfunding pioneer when the speed with money raised and the number of donators are taken into consideration.[51]

There are several types of raising money depending on the type of return to the investor; donation, reward, equity and debt crowdfunding. With regard to *donation-based crowdfunding*, investors will not profit from their investments, and even, most of the time, there will not be the return of the principal capital.[52] *Reward-based crowdfunding*, contributions are given in the form of pre-purchase of a product or service.[53] *Loan-based Crowdfunding (P2P lending)* is a synonym for peer to peer lending. Basically, the debt/investment will be paid back to investor with or without a certain interest rate.[54] In the *Equity-Based (Investment) crowdfunding*, an investor receives shares of a company in exchange for their investment. It shares the same risks as traditional equity investment: if the invested company does not a make profit, investors will face losing their money.[55] For the purpose of this dissertation the focus will be on investment-based crowdfunding; specifically, P2P lending cases. The reason for this is that they are the most common and risk-bearing types of crowdfunding. It should be stressed that "P2P is more for consumption; crowdfunding is more for value creation"

There are three core business models depending on the services provided by both loan-based and investment-based crowdfunding platforms: first, conduit platforms which only promoting investment opportunities to investors without being participated in fixing the price of these investments or loans; second, "the pricing platforms that itself sets the price, but the investor picks underlying loans";

[50] Gary Dushnitsky, "Crowded Room" (2013) 24(3) Business Strategy Review 28-31
[51] Andrea S. Funk, Crowdfunding in China A New Institutional Economics Approach.(2th edt. Springer 2019)
[52] Ibid
[53] ASBA, "An Overview of FinTechs: Their Benefits and Risks Association of Supervisors of Banks of the Americas 2017" http://www.asbasupervision.com/es/bibl/i-publicaciones-asba/i-2-otros-reportes/1603-orep24-1/file
[54] Funk (n. 51)
[55] ASBA (n.53)

discretionary platforms that itself sets the price and the investor does not involve to the process of choosing lender.[56]

One of the most successful crowdfunding platforms is Kickstarter, which is established in *2009*. Just in May *2019*, the platform received more than "*$4 billion in pledges from 16.3 million backers to fund 445,000".* A project called Coolest Cooler, which is a portable cooling box with other features has attracted 62,642 investors, who invested sum of *13,285,226* $ in total.[57]

In a modern aspect, the first examples of capital raising under crowdfunding platforms were for amusement industry – for movies or music – and then SMS companies have benefited.[58] The original crowdfunding concept involves three or four players: Project İnitiator, Investor and crowdfunding platform. In general, a platform lists PI's projects on its platform and thereby it functions as an intermediary which matches PIs with potential investors.[59]

3. Peer to Peer Lending

P2P lending (loan-based crowdfunding) platforms enable *people lend money to individuals or businesses in the hope of a financial return in the form of interest payments and a repayment of capital over time.*[60] P2P is the most analogue to banking lending.[61] As indicated above, borrowers (especially individuals and SME's) that have difficulties to obtain credit through traditional channels use this alternative way of getting money**.**[62] These platforms also manage credit scoring process through the accumulated customer data that they poses.[63]

[56] FCA, Loan-based ('peer-to-peer') and investment-based crowdfunding platforms: Feedback on our post-implementation review and proposed changes to the regulatory framework (CP No.18/20, 2018)
[57] David Mashburn, "The Anti-Crowd Pleaser: Fixing the Crowdfund Act's Hidden Risks and Inadequate Remedies".(2013) 63(1) Emory Law Journal, 127-174
[58] Grell (n.47)
[59] Funk (n.51)
[60] Alex Brill, 'Peer-to-Peer Lending: Innovative Access to Credit and The Consequences Of Dodd-Frank' (2010) 25 Wash L Found L Backgrounder 1, 1.
[61] Pavlo Rubanov and others, 'analysis of development of alternative finance models depending on the regional affiliation of countries', Business & Economic Horizons. 2019;15(1):90-106
[62] Ibid
[63] Basel Committee (n.34)

Lending Club and Zopa are successful examples of lending platforms. It is predicted that the marketplace lending will reach $490 billion in 2020.[64] While, these platforms increase efficiency, provide transparency and reduce costs, there are new risks arose especially fraud risk are mainly associated with it.[65] The advantages and the disadvantages of peer to peer lending will be discussed in the next chapter.

Generally, there may be a significant difference among P2P lending platforms: some platforms do not take any credit risk nor hold loans on their balance sheet; others, on the other hand, perform these functions, which make their function closer to traditional banking. [66]

4. Cryptocurrency

It will not be wrong to categorize blockchain based technologies, especially cryptocurrencies, as the most attracted innovation. Blockchain technology basically can be defined as a *distributed and decentralized public ledger*.[67] It is worth noting that cryptocurrencies (also referred as "exchange tokens") are sub-class of crypto assets. Cryptoassests can be divided into three sections; exchange tokens (cryptocurrencies), security tokens and utility tokens.[68] In general, security and utility tokens are means of capital raising, which in exchange, give the right to access to the product or service offered by the company or value from an external asset, respectively. Although, this dissertation will focus on cryptocurrencies.

Cryptocurrencies can be explained as a transaction is transparently recorded synchronically across an automated peer to peer computer network.[69] Every transaction is authenticated through a distributed process that locks the time, account number and amount for the transaction. Traditionally, a central authority is responsible for the safety and security of the transaction, means ensuring that no double

[64] Morgan Stanley, "Can P2P Lending Reinvent Banking?", www.morganstanley.com, 2015
[65] Fabio Caldieraro and others, "Strategic Information Transmission in Peer-to-Peer Lending Markets" (2018) 82(2) Journal of Marketing 42-63
[66] David Lee (n.10) pg.393
[67] Blockchain Explained https://www.investopedia.com/terms/b/blockchain.asp
[68] Chris Burniske and Jack Tatar, "Cryptoassets : the innovative investor's guide to bitcoin and beyond" (McGraw-Hill Education 2018)
[69] Rosario Girasa, "Regulation of Cryptocurrencies and blockchain technologies National and International Perspectives", (Palgrave Macmillan, 2018) pg. 36

spending occurs; whereas, validation of cryptocurrencies can be done by every individual, referred as "miners", who wants to participate to the process.[70]

In general, every user has a public key and private key: public key can be accessed by anyone which procure transparency; private key on the other hand, is a private code which should only be known by the holder of it.[71] Basically, both payee and payor have a public and private key.[72] The payee embeds the transactions detail into payor's public key and then the document is sent to payor who can access it with his/her own private key.[73] When the transaction is completed among parties, then it waits to be confirmed by the minors.[74]

There is a great benefit to discuss the legal status of cryptocurrencies, which has been a controversial issue among scholars.[75] There are several possible ways to classify them such as currency, commodity, commodity money, or security.[76] For instance, in Germany, they are recognized as "unit of account" and, therefore, referred to as private money.[77] Another example, in Canada, they are treated as "commodity" for taxing purposes.[78] In the UK, initially cryptocurrencies are classified as "tradable voucher," with which authorities were allowed to impose Value Added Tax (VAT).[79] However, the Court of Justice of the European Union ruled that they are exempted from VAT.[80] After that cryptocurrencies are reclassified as "private currency."

5. Smart Contracts

[70] Ibid
[71] Paul Vigna and Michael J. Casey, "Cryptocurrency : the future of money" (Vintage, 2016)
[72] Ibid
[73] Mark Andreessen, Why Bitcoin Matters, N.Y. TIMES http://dealbook.nytimes.com/2014/01/21/why-bitcoin-matters.
[74] Ibid
[75] David Lee Kuo Chuen Lee, Linda Low, "Inclusive fintech : blockchain, cryptocurrency and ICO" (World Scientific Publishing Co., 2018)
[76] Gareth Pyburn, "Bitcoin Legal: Taxonomy of Regulatory Reactions, APAC's Outlook and Potential for BTC-Linked Derivatives", Lexology (2014), http://www.lexology.com/library/detail.aspx?g=0eb2ec8e-d7a5-43ab-b177- 617fd0c981f9.
[77] Girasa (n.66) pg.216
[78] Adam Bata, The Brief on Bitcoins, STEWART MCKELVEY LAW. (Feb. 26, 2014), http://stewartmckelveyblogs.com/themedium/2014/02/26/the-brief-on- bitcoins/.
[79] Sam Maxson, Stuart Davis and Rob Moulton "UK Cryptoassets Taskforce publishes its final report". Journal of Investment Compliance. 2019
[80] HMRC v University of Cambridge (Case C-316/18), EU:C:2019:559

While the attention has been on the cryptocurrencies, another blockchain-based innovation is smart contracts, which will have a significant impact on the contract law. Smart Contracts are an actual contract, just transformed into code.[81] The execution of a contract does not require a human interference: the computer system itself will execute the terms of the contract.[82] An example of successful platform, which implementing smart contracts successfully, is Ethereum, an open-source, public platform.[83]

Briefly, the parties of a smart contract, draft the contract based on what they agree on and then, they will sign the contract "cryptographically" and upload it on the blockchain.[84] Following that, the execution of the contract will be under control of the system itself.[85] In other words, whenever the conditions of the code of the contract are fulfilled, the relevant action to that condition will be triggered.[86]

An example for practice of smart contracts and cryptocurrency can be given: where two parties have agreed on a renting of the apartment and the details of the contract executed virtually.[87] The payment can be done by a virtual currency and the receipt of it will be transmitted to the blockchain; in return the other part will share a digital key for the house by a specified date.[88] Until the payment is done, smart contract will not release the key or if the key has not shared at that day, smart contract will not release the payment.[89]

6. Robo Advisor

Technological improvement has also changed the investment products and services. The innovation called robo-advisors can be explained as digital platforms which use IT to guide their customers through an automated investment advisory which comprised of interactive and intelligent user assistance

[81] Quinn DuPont, "Cryptocurrencies and Blockchains". (Medford, MA: Polity, 2019) pg.173
[82] Andy Robinson and Tom Hingley, 'Smart Contracts: The Next Frontier?' (Oxford Law Faculty, 2016) <https://www.law.ox.ac.uk/business-law-blog/blog/2016/05/smart-contracts-next-frontier>
[83] Girasa (n.66) pg. 39
[84] Institute of International Finance
[85] Fenwick, Mark and Vermeulen, Erik P.M., A Primer on Blockchain, Smart Contracts & Crypto-Assets Lex Research Topics in Corporate Law & Economics Working Paper No. 2019-3.
[86] Ibid
[87] Girasa (n.66) pg. 40
[88] Ibid
[89] Ibid

components.[90] In other words, the role of human financial advisors is about to cease to exist. In 2019, robo-advisors have 1.5 trillion US dollars in asset under management, which is expected to double itself in 2020.[91]

Traditionally, regard to customer assessment, investor profiling requires in-person interview and bilateral relations; however these are replaced by online questionnaires as well as customer's investment aims, or their risk limits are identified through algorithms.[92]

It is emphasized that the target audience of robo-advisor platforms are mostly retail customers or non-professionals segment due to reduced costs of management expenses.[93] Nevertheless, the innovation is relatively new, and its risks and benefits are still controversial, which will be discussed in the next chapter.

Chapter III. – Upsides, Downsides and Issues for Consideration

It is an apparent fact that financial technology services are reflecting fundamental changes in the finance sector, which is very exciting. While the innovations are breath-taking, the point must be analysed whether they are pragmatic for the finance industry. In other words, whether the benefits of innovation in finance outweigh the risks that it imposes on the sector. In this chapter, both the advantages and disadvantages as well as some pinpoints will be analysed.

3.1 Fintech Advantages

[90] P. Sironi, "FinTech innovation: from robo-advisors to goal based investing and gamification" (Wiley 2016) pg.8
[91] KPMG, "Robo advising Catching up and getting ahead" https://home.kpmg/content/dam/kpmg/pdf/2016/07/Robo-Advising-Catching-Up-And-Getting-Ahead.pdf
[92] Dominik Jung and others, "Robo-Advisory" (2018) 60(1) Business & Information Systems Engineering 2018, pp 81–86
[93] Melanie L. Fein, "Robo-Advisors: A Closer Look" (2015) SSRN Working Paper : https://doi.org/10.2139/ssrn.2658701.

There are several advantages, in general, that these fintech services will improve the sector: the potential of raising efficiency; decreasing fees; advanced access to financial services; diminishing the need for a central authority.[94]

1. Financial Inclusion

One of the most important features of financial technologies is that it provides greater financial inclusion. Financial inclusion means that ensuring access to financial products and services by who are under or unbanked groups. [95] All of the above mention fintech services will enhance the financial inclusion, nevertheless Crowdfunding, P2P lending and mobile payment services will have the biggest impact. It is a fact that financial products have not become useable by large masses. In some circumstances, the reason for this is that banks are not well developed and thus, their activity is very limited.[96] In other cases, some individuals are unbanked due to failing to meet the minimum requirements of banks.[97] Even the ones who can benefit from banks, they have to bear with excessive transaction fees.[98] As will be explained below, financial technologies will enhance the financial inclusion due to the fact that they abolish boundaries and have to comply with fewer regulations, and their operation does not cost prohibitive amounts.

Moreover, banks tend to not serve some customers due to information costs as they may lack basic documentation. For instance, in developing countries, small and medium enterprises (SME's) do not encounter minimum requirements of banks. Figures are indicating that globally, 38% of adults do not have bank accounts and only 40% of them have access to a financial product.[99] The P2P lending platforms will provide services to these unbanked borrowers by collecting different but necessary information through their systems. Two credit provider companies, Ant Financial and Mercado Libre,

[94] Working Papers No 655 The FinTech Opportunity by Thomas Philippon 2017
[95]Marek Hudon, Marc Labie and Ariane Szafarz, "A research agenda for financial inclusion and microfinance" (Edward Elgar Publishing, 2019) pg.20
[96] Evans, D. and A. Pirchio (2015) 'An Empirical Examination of Why Mobile Money Schemes Ignite in Some Developing Countries but Flounder in Most', Coase-Sandor Institute for Law and Economics Working Paper no 723.
[97] GDDFI Discussion paper
[98] Ibid
[99]The Economist Corporate Network The Future of Digital Finance https://www.corporatenetwork.com/media/1617/the-future-of-digital-finance_web.pdf

claimed that their assessment involve more than a thousand data series per loan applicant.[100] In general, fintech companies will enhance the financial inclusion and help developments of firms.

A similar issue to lending is funding capital for projects or start-ups. Traditionally, fund-raising activity is carried out by banks or private investors (angel investment), which requires several risk managements and they face regulatory obstacles even they are willing to invest.[101] However financial technology can ease the accessibility with several aspects: First, the unfunded projects or start-ups can easily raise money from various investors through crowdfunding platforms; second, the risk is mitigated among wide range of customers under these platforms.[102] In traditional sense, risk is undertaken mostly by single entity or individual; yet online platforms attract multiple investors for a single project or investors can divide their investments into more than one projects.[103]

The financial inclusion will also improve traditional banking.[104] Individuals or companies used to have fewer options regarding to financial services; which in turn, cause over permissiveness in the banking system wherein the quality of services is inattentive, or transaction fees are excessive. However, new entrants to the system will push banks to provide better service or they will lose customers.

Moreover, digital finance services have a potential to boost the gross domestic product ("GDP") by enabling to easy access to wide range of financial products and services for individuals and small and medium enterprises.[105] In other words, increased financial inclusion will increase average expenditure, which will correlatively effect GDP.

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[100] BIS Report (n.41)
[101] HM Treasury, "Financial inclusion report 2018-19" (2019) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/789070/financial_inclusion_report_2018-19_web.pdf
[102] Julapa Jagtian and Catharine Lemieux, "Fintech Lending: Financial Inclusion, Risk Pricing, and Alternative Information" , Working paper, Federal Reserve Bank of Philadelphia. https://www.fdic.gov/bank/analytical/cfr/bank-research-conference/annual-17th/papers/14-jagtiani.pdf
[103] Ibid
[104] Zorica Golic, "Advantages of Crowdfunding as an Alternative Source of Financing of Small and Medium-Sized Enterprises"(2014) (8) Proceedings of the Faculty of Economics in East Sarajevo,:39-48 pg. 42 pg. 42
[105] Peterson Kitakogelu Ozili, "Impact of Digital Finance on Financial Inclusion and Stability" (2018) MPRA Paper 84771, https://mpra.ub.uni-muenchen.de/84771/ pg.5

2. Reducing Costs and Increasing Efficiency

Traditional business structures are depended on a close relationship with customers, which requires excessive time and labour force.[106] These structures are now facing a challenge by inexpensive services of new fintech companies, which are based upon the collective intelligence of crowd through sophisticated data analytics. [107]

Fintech has a direct effect on traditional banking services. The competition between banks and fintech companies are getting exacerbated every year because of the rapid growth of the innovation.[108] Banks, therefore, compelled to facilitate technology backed modern service and to reduce the unreasonable transaction costs in order to maintain and strengthen their role in the financial sector.[109] It is argued by some that there is not a considerable cost difference between them, means that non-traditional financial services are slightly lower costs than the traditional one.[110] Nevertheless, the combination of this feature with the deduced lengthy process of waiting to obtain service is making new entrants appealing from customers.[111] For instance, getting a loan in the traditional system will take weeks or month, by saying that it is not possible to go to a bank and receive a loan at the very same day.[112]

One of the innovations fintech brought to finance industry is that it benefits from big data, which can be used to anticipate customer behaviour, as well as creating strategies and protection policies.[113] In detail, big data will improve the risk management and operational efficiency. The behaviour of customers can be observed easily with the help of big data, which in turn, will enhance the service quality.[114] The products launched to the market will be more tailored to customer's need.[115]

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[106] Marko Jakšič and Matej Marinc, "Relationship Banking and Information Technology: The Role of Artificial Intelligence and Fintech" Risk Management,1-18. DOI:10.1057/s41283-018-0039-y pg.12
[107] Ibid
[108] Ibid
[109] Pizalla Webster, Fintech: Are banks responding appropriately? 2015 http://www.ey.com/Publication/vwLUAssets/EY-fintech-are-banks-responding-appropriately/$FILE/EY-fintech-are-banks-responding-appropriately.pdf.
[110] Ozili (n.105)
[111] Ibid
[112] Ibid
[113] Andriy Feschyn, "The Impact Of Big Data On Banking And Financial Systems" https://dataconomy.com/2017/07/big-data-banking-financial-systems/ 2017
[114] Ibid
[115] Ibid

Utilization of smart contracts will increase efficiency and reduce costs.[116] For instance, in trade, the execution of letters of credits are intermediated by banks and that is why execution of it requires human-driven processing and verification, which amount to excessive time consumption and excessive costs.[117] However, smart contracts function automatically based on pre-arranged terms which in turn will increase speed in execution of contracts and reduce costs. Nevertheless, it is argued that in practice the costs will not diminish; there will be other expenses inherent in smart contacts. *(infra pp. 30)*

With regard to crowdfunding services, big tech companies have considerable advantages compared to banks. In the conventional banking system, to price loans, banks have to evaluate the riskiness of their customers by collecting information from several sources.[118] It is underlined that the cost of enforcing loan payments covers a significant place in total financial intermediation cost.[119] The way that banks secure the reimbursement of the loan is to monitor customers constantly or require collateral from customers.[120] This conventional method is expensive and time-consuming, and banks compensate these expenses through their customers in the form of fees or interest rates. On the other hand, the usage of big data, by digital finance companies, for monitoring activities of customers reduce the mentioned costs and develop efficiency. Furthermore, it is possible to pair high risk borrowers with profit seeking investors or low risk borrowers with a risk-averse investor, with the help of algorithms.[121]

A significant advantage of fintech services compared to traditional banking is that they diminish the geographic barriers. In general, all fintech products provide service regardless the distance between customers and entrepreneurs. With regard to payment services, transaction across boundaries or the necessity to be in a bank, have been eliminated through e-wallets.[122] As well as regarding to crowdfunding platforms, it is illustrated that the average distance between investor and borrower is almost *5,000* km in SellaBand platform.[123]

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[116] Dupont (n.81)
[117] Luiz A. P. da Silva, "Fintech in EMEs: blessing or curse?"BIS https://www.bis.org/speeches/sp180620.pdf pg. 6
[118] BIS Report 2019, (n.41)
[119] Ibid
[120] Ibid
[121] ASBA(n.53)
[122] Ibid
[123] Paul Belleflamme and others. Crowdfunding: Tapping the Right Crowd". Journal of Business Venturing. Forthcoming; CORE Discussion Paper No. 2011/32.

3. Greater Transparency

Traditional banking facilities provide transparency to a certain level, most of the time they reveal a minimum amount of information. [124] On the contrary, fintech services provide greater transparency; which, in turn, improve the work of regulators as they have a clear perspective about financial stability. [125] Besides, transparency may induce a regulatory advantage for the fintech companies: where regulators able to monitor activities, by which they can assess whether the activities of fintech companies poses a risk to the financial system, and regulators will not be under the strain of regulating as long as the risk is not at stake.[126]

Another innovation that provides greater transparency is blockchain technologies, especially in cryptocurrencies that provide transparent ledger of transaction information.[127] First of all, it is possible to track every single transaction concluded in a blockchain service.[128] For instance, the transparency of blockchain technology may have a crucial impact on our daily life by providing supply chain transparency.[129] In detail, what we eat is a significant concern for us: it is not explicit at the moment that under which conditions the food we eat is produced.[130] Interacting blockchain into supply chain circle will enable trackability.[131] However, in practice it is argued that authorities had difficulties to track illicit activities, which will be studied under theft.[132] *(Infra pp. 34)*

3.2. Fintech Disadvantages

[124] Broll, Udo; Eckwert, Bernhard; Eickhoff, Andreas, Transparency in the banking sector, Dresden discussion paper series in economics, (2011) No. 05/11, Techn. Univ., Fac. of Business and Economics, Dresden
[125] Ibid
[126] Ibid
[127] Kristoffer Francisco and David Swanson, The Supply Chain Has No Clothes: Technology Adoption of Blockchain for Supply Chain Transparency Logistics 2018, 2, 2. Pg.1
[128] Ibid
[129] Fabian Sander and others, "The acceptance of blockchain technology in meat traceability and transparency" (2018) 2,2 Logistics
[130] Ibid
[131] Ibid
[132] Hiroki Kuzuno and Christian Karam, "Blockchain explorer: An analytical process and investigation environment for bitcoin." APWG Symposium on Electronic Crime Research, Scottsdale, AZ, 2017, pp. 9-16.

Financial technologies, as explained above, are of benefit to the sector as reducing cost, greater transparency, reduced error. However, these appealing advantages come with a cost as they are accompanied by new risks and issues to be solved before it imposes exponential harm on the finance sector and individuals. It may be argued that the volume of fintech services does not cover a significant proportion in all finance market, which is a deceptive opinion. Especially, if one considers that it has not been much 2008 global financial crisis. The point of the matter is that the finance sector is a highly connected sector and default in one aspect could affect the integrity of all system. [133] The fintech services, which is rapidly developing, are connecting with the rest of the sector day by day.

Thus, the risks or disadvantages of fintech should be analysed carefully. There are several issues that fintech may impose a significant risk in the finance sector. This chapter will study the main risks of the fintech, such as legal concerns, data security, theft, cybercrime, third-party reliance, macro financial exposure. Identification of these risks has a crucial when considering whether the benefits of fintech outweighs the risks. This chapter is going to analyse these risks and will try to deliver a solution.

1) Legal Risks

One of the main concerns has been arising with the rapid growth of the digital financial services is that the position of them in the legal framework. The utilization rate of the technological innovations in the finance sector is at an unprecedented scale and thus, the financial sector is more under risk with more individuals and businesses benefit from it. As explained above, the 2008 financial crisis unfolded the fact that development in unmonitored or unregulated environments can have destructive consequences.[134]

[133] Wenjie Chen, and others, "The Global Economic Recovery 10 Years After the 2008 Financial Crisis", IMF Working Paper No. 19/83 pg. 5
[134] Ibid

With regard to crowdfunding, P2P lending and mobile payment services, regulatory uncertainty, in general, may affect consumer protection, financial stability and financial integrity.[135] There is a potential risk that incumbents and new entrants will want to turn regulatory uncertainty into an opportunity by seeking large profits in the short term, which can affect financial stability.[136] How fintech should be regulated is going to be analysed in the next chapter.

Even if the national authorities are come up with a tailored regulatory framework for their country, the regulatory arbitrage risk is at stake.[137] It can be defined as taking advantage of the lack of standardization of regulations around the world. In other words, digital finance companies can be incorporated in a region, where the requirements for these services are minimum, and then, they provide services in the highly regulated regions.[138] Therefore, there is a greater potential that financial stability is at hazard. The solution is lies behind the harmonization and unification of regulation of fintech in a global sense, which can be achieved through international agreements.

With regard to smart contracts, the issue is the uncertainty of the applicable law of the contract.[139] The blockchain technology renders possible a contract to be concluded under a large number of jurisdictions.[140] In the case of a dispute due to the interpretation of a smart contract, the issue is which law is applicable to the contract in order to determine the legality of the contract.[141] The classic contract law approach may be taken to resolve this issue: the first consideration is the party autonomy, whether there is an explicit choice of law; if not then the closest connection and characteristic performance can be taken into account; protection of weaker party can be prioritised.[142]

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[135] UNSGSA FinTech Working Group and CCAF. (2019). Early Lessons on Regulatory Innovations to Enable Inclusive FinTech: Innovation Offices, Regulatory Sandboxes, and RegTech. Office of the UNSGSA and CCAF: New York, NY and Cambridge, UK. Pg.15
[136] Ibid
[137] Amit Seru and others "Fintech, Regulatory Arbitrage, and the Rise of Shadow Banks," NBER Working Papers No 23288. (2017)
[138] Ibid
[139] Institute of International Finance ' Getting Smart: Contracts on the Blockchain 2016
[140] Giesela Rühl, "The Law Applicable to Smart Contracts, or Much Ado About Nothing?" https://www.law.ox.ac.uk/business-law-blog/blog/2019/01/law-applicable-smart-contracts-or-much-ado-about-nothing
[141] Reggie O'Shields, 'Smart Contracts: Legal Arrangements Fort he Blockchain', 21 North Carolina Banking Institute 179
[142] G Rühl., "The Law Applicable to Smart Contracts, or Much Ado About Nothing?" https://www.law.ox.ac.uk/business-law-blog/blog/2019/01/law-applicable-smart-contracts-or-much-ado-about-nothing

Besides, smart contracts are drafted in the form of codes, which constitutes another problem.[143] At the moment, most of the lawyers do not know how to code, in turn, these contracts are going to be prepared by computer programmers. In this sense there two legal issues: first, to what extent it is wise to let non-law graduates allow draft a contract; second, where there is a conflict with the algorithms, whether programmers will be responsible. [144] Furthermore, it is emphasized that smart contracts will reduce expenses like lawyer fees. However, this expense, in reality, will be shifted to the drafting process.[145]

2) Data Security

Technology-driven innovation in the banking sector and the emergence of new fintech companies enabled more data to be digitalised. With the help of digitalisation, it is possible to track and collect every bit of datum, and the accumulated data (which is often referred as "big data") are used to anticipate customer behaviours.[146] Data has become the most important commodity, as its value exceeds the value of money.[147] It plays a key role in the financial sector as it has a direct effect on the profitability of services like lending, insurance and payment services.[148] In detail, the complex algorithms are being used to process or analyse details requested by the customer and transform them into tailored products.[149]

Furthermore, the bigtech companies have become "data-opolies" or "digital monopolies".[150] The concept of "digital monopolies" can be explained as "too big, anti-competitive, addictive and destructive to democracy".[151] Automated data process could lead to discrimination as algorithms are used to find

[143] LLM (Glas), Khalid Almeleg The Legal Nature of Bitcoin and Altcoins The FinTech Edition 2018 Published by FinTecHub London, 2018
[144] Ibid
[145] Ibid
[146] Fei Hu Print, "Big data : storage, sharing and security" (CRC Press, 2016)
[147] David Nersessian "The law and ethics of big data analytics: A new role for international human rights in the search for global standards" 2018, 61(6):Business Horizons. 845-854.
[148] GDDFI Discussion paper, Digital Financial Services: Regulating For Financial Inclusion An Ict Perspective https://www.itu.int/en/ITU-D/Conferences/GSR/Documents/GSR2016/Digital_financial_inclusion_GDDFI.pdf
[149] Kuhn (n.135)
[150] Matthew Hindman, "The internet trap : how the digital economy builds monopolies and undermines democracy / Hindman, (Princeton University Press 2018)
[151] BIS Report (n.41)

pattern in large datasets and a biased algorithm would create unfair results.[152] For instance big data can help to identify low credit individuals and these groups may be prevented to from seeing loan advertisements.[153]

A relevant example which can be given is data collection on the Facebook.[154] The tech giant, which also owns Instagram and WhatApp, forces its users to give consent to the unrestricted collection of personal data by third parties or its subsidiaries.[155] These accumulated data are either sold to the others or are used to sell ads.[156] Following that, there were more serious allegations about the misuse of personal data, the Cambridge Analytica scandal.[157] It was alleged that Facebook sold its customers' personal data to this company, by whom the data was used to influence voters among nations. [158] In detail, the company had access to 50 million users of Facebook and their data was used against their selves by simply imposing on them political ads in order to confuse them or even change their political opinions.[159]

Nevertheless, the authorities have become aware of the risks and regulations have been enacted such as General Data Protection Regulation (GDPR) which secures data privacy in the UK.[160] Personal data is defined as "any information related to an identified or identifiable (living) natural person ('data subject')".[161] Under this regulation, in order to collect and process personal data, the data subject has to be clearly informed about the purpose of the process and has given consent to the processing of his or her personal.[162] It is underlined that all kind of loud computing providers are required to provide technical and organisational measures.[163] As well as there are foreseen measurements regarding to automated data processing.

[152] Kate Crawford & Jason Schultz, "Big Data and Due Process: Toward a Framework to Redress Predictive Privacy Harms", (2014) 55 B.C.L. Rev. 93
[153] Ibid
[154] Ibid
[155] Ibid
[156] Ibid
[157]Kuhn Mckenzie, "147 Million Social Security Numbers for Sale: Developing Data Protection Legislation After Mass Cybersecurity Breaches", 104 IOWA L. REV. 417, 421-435 (2018) pg.417
[158] Ibid
[159] Ibid
[160] EU General Data Protection Regulation (GDPR): Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016
[161] Ibid
[162] Ibid
[163] Maria Kutar and Maria Addis, "The General Data Protection Regulation (GDPR), Emerging Technologies and UK Organisations: Awareness, Implementation and Readiness" (2018). UK Academy for Information Systems Conference Proceedings. 29.

If fintech and bigtech are not comply with these requirements and measurements, they will be fined. For instance, European Commission fined Google by €4.34 billion.[164] As well as, Facebook[165] has been fined several times by different authorities; however, the question which must be answered is whether these monetary sanctions are deterrent enough to discourage these companies. In other words, the question is whether the companies are willing continue the desired activity (and take the risk of being fined) due to the fact that what they gain with misuse of individual's data may be a big amount compared to the fine they will have to pay, if caught.

3) Theft and Fraud

. Online thefts, can be achieved much more conveniently by hackers, without the need to be physically there. Financial technologies are one of the main areas of fraudulence activities, which can be broadly defined as deception to obtain unfair and unlawful gains through these channels.[166] Ponzi schemes, advanced-fee frauds, identity theft, and phishing schemes are common ways to defraud individuals.

A recent report illustrated that fraudsters are able to open bank accounts under innocent people's name.[167] For instance, the fraudsters create fake websites which are identical to regular job application websites, and when a job applicant is filling an ordinary "applicant form" and providing personal data, they actually may find themselves in the middle of the bank account opening process.[168] With this method, even if an unlawful transaction can be detected by authorities, the possibility of finding the real identity of the fraudsters decreases.

[164] European Commision, Press Relase (2017) https://europa.eu/rapid/press-release_IP-17-1369_en.htm
[165] Kuhn (n.135)
[166] Se-Hak Chun, "E-Commerce Liability and Security Breaches in Mobile Payment for e-Business Sustainability" (2019) Sustainability MDPI
[167] FCA, Money transfer scams https://www.fca.org.uk/consumers/money-transfer-scams
[168] Ibid

Specifically, concerns have arisen about the new entrants, since their cybersecurity system are not as developed as banks.[169] An example that justifies these concerns is on cryptocurrency models.[170] According to a recent report, just in the first half of 2019, 1.2 billions of dollars' worth cryptocurrency was stolen. [171] This figure is almost equivalent to the total amount of other thefts that happened in 2018, which amounted to 1.7 billion dollars.[172] Cryptocurrency risks are mostly arising in areas due to where private keys of cryptocurrencies are stored such as wallets or the platforms where exchange transactions occur.[173] One of the most prompted features of cryptocurrencies is that the public ledger technology known as blockchain, which enables greater transparency.[174] However, the authorities or individuals have not been able to track these thefts, which creates confusion with so-called greater transparency feature.[175]

The recent fraud scandals mostly happened in lending platforms such as crowdfunding online platforms.[176] There are two potential risks which may arise from both lending platform itself and borrowers. [177] With regard to former one, platform administrators may embezzle the raised money.[178] On the other hand, borrowers may conceal their identity. Most of the lending platforms are dealing sensitively with verifying borrowers' identities, occupations and incomes; yet this process is mostly human driven and thus, the process is widely open to errors.[179] There is a great benefit to mention Enzubao's, a rogue P2P lending platform.[180] The platform attracted investors through advertising fake projects and managed to draw US $7.6 billion from about 900,000 investors.[181]

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[169] S. Singh and N. Singh, ''Blockchain: Future of financial and cyber security,'' in Proc. 2nd Int. Conf. Contemp. Comput. Inform. (IC3I), Dec. 2016, pp. 463–467.
[170] Ibid
[171] Q1 2019 Cryptocurrency Anti-Money Laundering Report https://ciphertrace.com/articles/q1-2019-cryptocurrency-anti-money-laundering-report/
[172] Cryptocurrency thefts, scams hit $1.7 billion in 2018: report https://www.reuters.com/article/us-crypto-currency-crime/cryptocurrency-thefts-scams-hit-1-7-billion-in-2018-report-idUSKCN1PN1SQ
[173] David Lee (n.7)
[174] Fangfang Dai and others, "From Bitcoin to Cybersecurity: a Comparative Study of Blockchain Application and Security Issues, Proceedings of the 2017 4th International Conference on Systems and Informatics (ICSAI 2017).
[175] Kuzuno (n.132)
[176] Fraud in FinTech https://www.taylorwessing.com/download/article-fraud-in-fintech.html
[177] Jennifer J. Xu, . "Lending Fraud Detection : A Big Data Approach." Hazleton, P., & Usa (2015) pg. 71.
[178] Ibid
[179] Ibid
[180] P2P Lending: A rising market with growth opportunities outweighing existing challenges https://medium.com/novum-global-ventures/p2p-lending-a-rising-market-with-growth-opportunities-outweighing-existing-challenges-2e73c83aa74d
[181] Ibid

4) Anti-Money Laundering

The positive impacts of financial technologies on finance sector have been accompanied with new risks. Especially, the risk of money laundering (AML) and Counter Terrorist Financing (CTF) activities have been enhanced through these products.[182] The main reason for this is that monitoring fintech activities has become more exhausting due to the fact that innovation rapidly and with acceleration increased the number of people who can access financial products, which made it harder to track every single transaction. Transactions can be conducted through anonymous channels.[183] Following that some of the services of digital finance platforms may fall outside the scope of the current scheme of Anti-Money Laundering (AML) and Counter-Terrorist Financing (CTF) regulations.[184] This vulnerability arises mainly from blockchain-based cryptocurrencies.[185] As mentioned above, it is challenging to track money flow and even if he suspicious accounts are determinable by authorities, the risk of constant newly opened accounts are remains.[186]

5) Third-Party Reliance

Both incumbents and new entrants' financial products do not cover an end-to-end service: service of a single product is conveyed through involvement of multiple parties. The activity of key operations such as data provision, cloud storage and analytics, and physical connectivity are dependent on third-party providers.[187] It is estimated that the reliance of incumbents or fintech companies on them will increase with the development of technology, which in turn will create new risks.[188] The process of collaboration of banks with new entrants or with the outsourcing services of third parties tends to expose the

[182] Rebecca L Stanley And Ross P Buckley, "Protecting The West, Excluding The Rest: The Impact Of The Aml/Ctf Regime On Financial Inclusion In The Pacific And Potential Responses" Melb. J. Int'l L. 17:83. Swan, M. 2015. Blockchain: Blueprint For A New Economy
[183] Ibid
[184] Ibid
[185] Basel Committee (n.34)
[186] Izabella Kaminska, Why money laundering risk is very real with crypto cardshttps://ftalphaville.ft.com/2019/05/31/1559275247000/Why-money-laundering-risk-is-very-real-with-crypto-cards/
[187] FSB, "FinTech and market structure in financial services: Market developments and potential financial stability implications" (2019) https://www.fsb.org/wp-content/uploads/P140219.pdf
[188] Ibid

customers' data. [189] Another main concerns in this scenario is that the increasing number of incumbents and new entrants are currently benefiting from a small number of service providers, which imposes an operational risk. In other words, third-party services play a very centralized role in the operation of financial products. In the case of a failure of these services, financial industry will be paralyzed. A relevant example to this is the crash of Amazon cloud services.[190] There are several companies and institutions such as Apple which are using the Amazon Cloud service and the technical disruption, which lasted more than three hours, have affected not only Amazon but also these other players.[191] Another example can be given is for lending platforms or robo-advisors, which are operating through assessment of data.[192] Where third-party data providers are highly concentrated, the misuse of data would not only affect a single platform but also would have an accumulating effect on the financial sector in general.[193]

With regard to fintech payment providers, utilities such as Apple Pay or Google Pay, have brought new potential fraud risks.[194] It is argued that these payment providers provide "front to end" business operations.[195] This operation method means that fintech payment platforms only deals directly with the customers, while the rest of the procedure is handled by the other service providers which also work with third parties.[196] When a customer benefits from a fintech service, actually, their data is actually directed to multiple platforms, which increases the possibility of fraud.[197] Moreover, it is emphasized that increasing the number of participants to the service is also it makes difficult to track the ex-ante investment, when a fraud occurs.[198]

6) Liquidity and Mismatch Risk

[189] Stephanie Sebring Ss. Third-Party and Cybersecurity Risk Management. Credit Union Management. 2018;41(3):40. Pg.40
[190] Jeffrey Dastin, Disruption in Amazon's cloud service ripples through internethttps://www.reuters.com/article/us-amazon-com-aws-outages-idUSKBN1672E2
[191] Ibid
[192] Regulation and supervision of fintech KPMG https://assets.kpmg/content/dam/kpmg/xx/pdf/2019/03/regulation-and-supervision-of-fintech.pdf
[193] Ibid
[194] Kyoung-Soon Yoon And Jooyong Jun "Liability And Antifraud Investment In Fintech Retail Payment Services" (Contemporary Economy Policy Vol. 37, No. 1 2019)
[195] Ibid
[196] Peter A. Koen, "The Fuzzy Front End For Incremental, Platform And Breakthrough Products And Services" Wiley, 81-91.
[197] Yoon (n.192)
[198] Ibid

The rapid development in the technology and increasing number of platforms enables customers to change between different saving accounts to obtain better returns.[199] This can improve efficiency; yet there may adverse effects, which may have a impact on the financial stability.[200] Easy access to various services can affect customer loyalty and increase the volatility of deposits which, in turn, may create liquidity risk.[201] Furthermore, equity investments are illiquid, which means that the investments cannot be monetized until the fintech company makes profit.[202] With regard to cryptocurrencies, their acceptance is limited to a few platforms and thus, liquidation issues may arise. For instance, Ethereum, a cryptocurrency, incident unrolled the liquidity concerns.[203] What happened is that a single high volume sell and the following transactions created liquidity problem in the market, and as a result, Ethereum's market price hit the bottom.[204] Nevertheless, it is emphasized that most of the current fintech services such as lending platforms or payment services do not involve holding customer deposits.[205]

Maturity mismatch risk can typically be seen in lending services.[206] Basically, where an investor invests money on three years and that investment may be matched with a five years loan or pre-maturity sell out options may create a future maturity mismatch which will affect financial stability.[207]

7) Macro Financial Risks

On the other hand, macro-financial risks can be described as the risks which can have an impact on the wider financial system, and thus, financial stability may be affected more than micro financial risks. Following that, even though macro financial risks are not at stake, certain innovations have potential to

[199] Basel Committee (n.34) pg.28
[200] Ibid
[201] Ibid
[202] ASBA (n.53)
[203] Arjun Kharpal , "Ethereum briefly crashed from $319 to 10 cents in seconds on one exchange after 'multimillion dollar' trade" https://www.cnbc.com/2017/06/22/ethereum-price-crash-10-cents-gdax-exchange-after-multimillion-dollar-trade.html 2017
[204] Ibid
[205] FSB, Financial Stability Implications from FinTech Supervisory and Regulatory Issues that Merit Authorities' Attention (2017) https://www.fsb.org/wp-content/uploads/R270617.pdf
[206] Transparency in P2P Lending
[207] Ibid

create these risks. Macro-financial risks can be listed as contagion, pro-cyclicality, excess volatility and systematic importance.

Contagion

Contagion is defined as a distress experienced by a single institution or a sector, which may be inflected to the others due to the relationship between them.[208] As in 2008 Crisis reputational contagion, which is, for instance, an unexpected loss in one lending platform may be interpreted possible losses across the sector.[209] Likewise, if a significant and uncalculated loss occurs in a single highly repudated fintech platform, this may trigger all sectoral effect.

Pro-Cyclicality

Likewise, fintech activities could cause procyclical dynamics as the algorithms of robo-advisers can be similar and this could lead herding behaviour, which would cause larger swings in sentiment.[210]

Chapter IV. – How Fintech Services should be regulated

In the previous chapter the opportunities and the risks of digital financial services were discussed along with it's the legal issues. A significant question to consider is whether these services should be regulated and if yes, the next step is determining how they should be regulated. *10* years ago, this question would not be a crucial consideration for financiers and lawmakers, nevertheless, the key players of industry have erred on the side of caution due to the Crisis. Before the Crisis in 2008, the attitude of lawmakers towards financial innovations by law-makers was mostly constructive as the regulations were not strict.[211] After the crisis, the affirmative approach to innovation in finance has been changed with the adoption of stricter regulations.[212] Although law makers must accept this rapid development in the

[208] Dawn Illing
[209] Thea Kuppens, and others, "Banking Supervision at the Crossroads (Edward Elgar Publishing 2003) pg. 220
[210] FCB (n.205)
[211] Gerard Caprio, Jr. Financial Regulation After the Crisis: How Did We Get Here, and How Do We Get Out? Lse Fınancıal Markets Group Specıal Paper Serıes
[212] John C. Coffee Jr., The Political Economy of Dodd-Frank: Why Financial Reform Tends to be Frustrated and Systemic Risk Perpetuated, 97 Cornell L. Rev. 1019, 1029 (2012)

fintech industry and take into account the urge to re-start economic expansion and to foster financial inclusion.[213] These factors put pressure on regulators to promote innovation in digital finance services.[214]

4.1. Possible Approaches to regulate

As indicated so far, the question regarding the most convenient regulatory approach to development of digital finance revolve around the issue of whether regulate it in advance or let innovation progress and then, if appropriate, regulate.[215] There are possible ways to regulate activities of digital financial services; laissez-faire (doing nothing), case by case basis, structured experimentalism and adoption of new regulatory frameworks.

1. Regulating by doing nothing

It is not a coincidence that innovation occurs under supportive authorities.[216] The adoption of specific regulations can be a deterring factor for innovation even under less strict rules.[217] For this reason, it is argued that fintech activities should not be regulated to provide opportunity its growth. This approach is also called as “laissez-faire”.

The purpose of the laissez-faire approach is to give space to fintech development, however, to which extent the activities of fintech companies fall into the current regulatory framework has crucial importance. The reason for this is that if the strict rules of the current banking industry apply to fintech services, then, it will not make sense not to regulate their activity. For instance, it is argued that the strict rules regarding to personal data protection may put back or slow the development of fintech business development.[218] In this sense, not regulating approach will constitute a barrier towards development. It

[213] Soon (n.194)
[214] Dirk A. Zetzsche, Ross P. Buckley, Douglas W. Arner Janos Nathan Barberis “Regulating a Revolution: From Regulatory Sandboxes to Smart Regulation” (2017) 23 Fordham Journal of Corporate and Financial Law 31-103
[215] Ross P. Buckley, “Financial Innovation in East Asia” 2014, 37 Seattle L. Rev. pg. 307
[216] GSMA regulatory and policy trends impacting digital identity and the role of mobile 4,10,16 (2016)
[217] Barberis “Regulating a Revolution: From Regulatory Sandboxes to Smart Regulation” (n.214)
[218] Ibid

is expected that the Financial Stability Board and the national regulatory authorities will ease the regulatory obstacles and to improve data harmonization. [219]

A relevant example can be given in the EU: according to a survey *18%* of the current payment services companies are subjected to the Payment Services Directive (PSD Directive); *11%* of the investment firms are subjected to Markets in Financial Instruments Directive (MiFID); *6.5%* of the electronic money institutions are subjected to E-Money Directive *(EMD)*[220]*.* As can be seen, a small proportion of fintech companies are subjected to the current EU regulatory frame and as a result, the fintech sector has been developing rapidly. The global value of Fintech investment was *less than a billion dollars* in *2010,* then which reached *26 billion US dollars* in *2018.*[221] It is underlined that there are no risks at stake due to fintech activities that would affect financial stability.[222] The figures are indicating that there is no reason regulators to take action.

Furthermore, imposing strict rules amounts to increased expenses on regulatory compliance.[223] For example, Basel Rules adopted after the Crisis, which imposed multiple requirements on the sector and as a result of these, the costs of bank facilities have increased.[224] Therefore, imposing strict regulations, will cause these services to lose the attraction, which, in turn will decrease the rapid innovation and cause less threat to the conventional system.[225] According to the recent survey in which 18 variables are considered, there is an inverse correlation between the amount of investment on fintech companies and stringent regulations.[226]

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[219] Ibid
[220] EBA, “Discussion Paper on the EBA’s approach to financial technology (FinTech)” (EBA/DP/2017/02) pg.21 https://eba.europa.eu/documents/10180/1919160/EBA+Discussion+Paper+on+Fintech+%28EBA-DP-2017-02%29.pdf
[221] KPMG, (n.20)
[222] FSB, (n.203)
[223] Franco Pozzolo “Fıntech And Bankıng. Frıends Or Foes?” (2017) http://european-economy.eu/wp-content/uploads/2017/07/EE_2.2017.pdf
[224] Ibid
[225] Dirk A. Zetzche and others,”From Fintech to TechFin: The Regulatory Challenges of Data Driven Finance” University of Hong Kong Faculty of Law Research Paper No. 2017/007 (2017)
[226] CBInsights and the World Bank, “Bank Regulation and Supervision Survey https://datacatalog.worldbank.org/

Another rational reason why the laissez-faire approach can be well-suited is that it may be unnecessary to regulate financial technologies for now. That is to say, these services have not a significant effect on the industry at the moment, so it may be forgotten in years and thus the efforts that have been shown now can be a waste of time.[227] For example, in both the United States and the United Kingdom, the e-banking services were commenced in the '80s but stopped shortly after.[228] If the regulators in these countries have bustled with regulations, they would have spent time for a thing that ceased to exist in the medium term. Moreover, the precautions that are taken now can miss out on the outcomes of these services. In other words, allowing innovations to develop and then, to find its final use would be more logical. The regulators, at that future time, will have a clearer perspective regarding the risks, benefits, application area.[229] Thus, it is suggested that the regulators should remain technology natural and concentrate on the outcomes.[230]

Many countries pursue laissez-faire approach.[231] One of the successful examples of this approach can be seen in China.[232] Chinese companies have reached to "too big to fail" from too-small to care" within months.[233] Whereas, this approach is not advisable where the fintech activities have reached a remarkable amount of funds or number of customers. That is why China has changed its line of conduct when they realised that the market volume has reached 225 billion dollars.[234] In other words, while regulators are staying technology-neutral towards innovation the fintech industry could cause a financial crisis and it may impose irreversible risks on the finance sector. [235]

2. Case by Case Approach

[227] Mario Bertolotti the History of the Laser 263-95 (2004)
[228] Banking And Finance On The Internet (Maryj. Cronin Ed., 2001).
[229] Arner "The Evolution of FinTech: A New Post-Crisis Paradigm." (n.7)
[230] Ibid
[231] Dirk Zesche and others "FinTech and RegTech: Enabling Innovation While Preserving Financial Stability" (2017) 18(3) Georgetown Journal of International Affairs 47 [2018] pg. 7
[232] Weihuan Zhou and others China's Regulation of Digital Financial Services: Some Recent Developments, Australian Law Journal 90(5) (2016): 297-300
[233] Zhou Weihuan, Douglas W. Arner, Ross P. Buckley, "Regulation of Digital Financial Services in China Last Mover Advantage Tsinghua China Law Review" Vol 8:25 pg. 27
[234] Cf. Tjun Tang et al., Bos. Consulting Grp., The Rise of Digital Finance in China: New Drivers, New Game, New Strategy 4 (2014) http://image-src.bcg.com/Images/BCG_The_Rise_of_Digital_Finance_in_China_Oct_2014_tcm52- 129223.pdf [https://perma.cc/DLL8-77AN]
[235] Douglas W. Arner &Janos Barberis, Remarks at Regulating FinTech Innovation: A Balancing Act, 2015),

It can be said that it is not always practical and rational to do nothing or impose strict regulations. The principle of case by case approach can be explained as; newly established fintech companies will enjoy gradual growth through tailored regulations as they carefully peruse customers' financial position, objectives and risk appetites.[236] In this sense, if Fintech companies fulfil the required minimum obligations, it would be unreasonable to impose rigorous measures as imposed on banks. In order to create a balanced growth in financial technologies, *subjective regulations* or specific permits can be used. This balanced growth can be enabled by regulatory forbearance (such as no-action letters), restricted licences or special charters.[237] The fintech companies, with these incentives, will conduct activities without being subject to some rules which are considered as unnecessary to impose on them.[238] The outcome of no-action letters, restricted licensing or special charters can be ensured by partial exemptions or dispensation.

A relevant example that would illustrate the benefit of the case by case approach can be given through crowdfunding. In a case called Zopa, Italian supervisory authority held that "transferring the same from lenders to borrowers, gave rise to the receipt of repayable funds from the public, as such prohibited to undertakings other than banks under Italian banking law".[239] The decision raised some concerns: first, loan-based crowdfunding platforms do not lend money directly, they only provide loans amongst their customers; secondly, such regulations are formed for banking firms, which undertake the risk of using public funds in their loans and they have a significant impact on liquidity formation and monetary policy.[240] In this sense extending the banking regulations to these platforms would be unreasonable. Instead, law-makers should come up with specific measures tailored to its peculiar features and risks. With the restricted licences, P2P online platforms can operate in these areas under certain rules.

[236] Authority for the Fin. Mkt. & De Nederlandsche Bank, More Room for Innovation in the Financial Sector 4 (Dec. 2016), https://www.afm.n1/~/profme dia/files/onderwerpen/innovation-hub/publicaties/2016/room-for-innovation-in- financial-sector.ashx [https://perma.cc/CT94-B9F3].
[237] Barberis "Regulating a Revolution: From Regulatory Sandboxes to Smart Regulation" (n.214)
[238] Ibid
[239] Ibid
[240] Ibid

With regard to no-action letter, an example can be given in the United States, which was issued by the Securities and Exchange Commission (SEC).[241] No-action letters enable fintech companies to operate in the areas where are highly regulated, provided that the requirements outlined in the no-action letters are fulfilled. A company called TurnKey, which sells blockchain-based digital assets in the form of "tokenized" jet cards, is qualified for a no-action letter.[242] Briefly, this practice of the company would be falling into the category of securities (without the issuance of the no-action letter) which is highly regulated in the States. Some of the restrictions imposed by the letter can be summarised: token-generated funds cannot be used to develop the company's platform technology; the tokens can only be used for air charter services.[243]

Following that also in the US, the Office of the Comptroller of the Currency (OCC) announced that non-depository fintech companies can apply for national bank charters, which allows them to facilitate banking services.[244] It is stated that every application will be evaluated on its unique facts and circumstances.[245] In detail, this will allow non-depository fintech companies, which will become a special charter bank, to engage core banking activities with similar rules as banks. [246] They do not, however, have to abide by stricter regulations of deposit banking and also they would not have to be insured by the Federal Deposit Insurance Corporation (FDIC).[247] Nevertheless, there are a considerable amount of individuals and institutions who are opposed to this exception, especially due to the insurance exemption. For that matter, there is a lawsuit filed in New York, which discussed whether OCC permitting fintech companies to engage in the "business of banking" exceeds the authority of itself.[248] The judge held that only depositing banks can facilitate the business of banking.[249]

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[241] Andrew Lom, Rachael Browndorf SEC issues first no-action letter for unregulated ICO 2019 https://www.regulationtomorrow.com/us/sec-issues-first-no-action-letter-for-unregulated-ico/
[242] Ibid
[243] US. Securities and Exchange Commission, https://www.sec.gov/divisions/corpfin/cf-noaction/2019/turnkey-jet-040219-2a1.htm
[244] Press release OCC Begins Accepting National Bank Charter Applications From Financial Technology Companies https://www.occ.gov/news-issuances/news-releases/2018/nr-occ-2018-74.html
[245] Ibid
[246] Ibid
[247] Todd Stone, Can Fintech Startups Become Banks? OCC Opens The Gates https://debanked.com/2018/08/can-fintech-startups-become-banks-occ-opens-the-gates/
[248] Case 1:18-cv-08377-VM Document 28 (2019) https://www.csbs.org/sites/default/files/doc._28_order_denying_mtd_0.pdf
[249] Ibid

It should be analysed whether the benefits of this approach outweigh the risks. To begin with, the close relationship between regulators and financial technology services enables information flow between them. Therefore, based on this valuable information, tailored regulations will be more efficient as certain obligations are going to help to minimize the uncertainty and the risk.[250] At the same time, the implementation of unnecessary and unreasonable rules will be curbed.

On the other hand, the benefits of per-case approach come with a cost. At first, this approach may be advantageous, although the number of companies will increase by time. Thus, there will be more requisite for the labour force to ensure adequate treatment and as a consequence, the cost for each case. Besides, these companies may not be monitored adequately.

3. Structured Experimentalism

It can be said that structured experimentalism method is the rising trend among other approaches. There are several examples of this approach, such as sandbox umbrella, regulatory sandbox and innovation hub. Although, this essay will focus on the regulatory sandbox, which is the most common example in practice. Before start analysing, regulatory sandboxes, at a general level, involves case by case practices. In fact, the both provides privilege for fintech companies, nevertheless, this approach enables more systematic environment, in which all entrants can be assessed, rather than one by one.[251]

There is a great benefit to explain what a regulatory sandbox is in order to provide a comprehensive understanding. As known by all, a sandbox is a safe ground for kids to play, ensuring minimum risk for them. Hence, in the finance industry, a regulatory sandbox is *testing grounds for new business models that are not protected by current regulation or supervised by regulatory institut*ions.*[252]* The purpose of these sandboxes is to create an environment, where players can test their products with minimum risk of violating laws while adopting appropriate safeguards.[253] The objective of sandboxes is generally

[250] Financial Regulation - National Bank Chartering - OCC Allows Fintech Companies to Apply for National Bank Charters. Harvard Law Review. 2018;(Issue 4):1361
[251] Zesche (n.231)
[252]BBVA, What is a regulatory sandbox?, https://www.bbva.com/en/what-is-regulatory-sandbox/
[253] Howard Lee, “”All Authorized Institutios” (2016), http://www.hkma.gov.hk/media/eng/doc/key-infonTiation/guidelines-and-circular/2016/ 20160906el.pdf [https://perma.cc/P578-LZV3]

defined as to support innovation, market development and competition and to enable economic growth.[254]

In general, the procedure commences with the application of a company, which has to fulfil the pre-defined entry requirements.[255] Then, it can facilitate in the sandbox, for a certain duration and field of application. The first regulatory sandbox was commenced in the UK in 2015 and there were, at the beginning of 2018, more than 20 countries which had already started to adopt this system.[256] In 2019, 29 businesses have been accepted to participate in the sandbox out of 99 applicants, which is the highest number that ever applied for the sandboxes.[257] The result of this experiment would be of benefit to industry as the flaws of the system will come to light, without imposing a significant risk. When testing phase is succeeded, then, the company is being obligated to comply with financial regulation.[258] One of the most common results of it is either fully-fledged or tailored authorization can be given to the companies or, in rare cases, the regulatory framework may be amended based on the outcomes.[259]

An example can be given to provide a clearity. It is noted that it could be convenient to test a Robo-advisor company in a regulatory sandbox environment[260]. The product will be available to a limited number of people and it will only provide advice to its customers.[261] Before the execution of the advice, when the algorithm issues it, human financial advisors will evaluate the advice.[262] As a result, the advice of Robo-advisor will not create a negative impact on the customer and the accuracy of the advice can be compared with human assessment.

[254] Ibid
[255] Ibid
[256] UNSGSA FinTech Working Group (n.135)
[257] FCA. "Regulatory sandbox - cohort 5" https://www.fca.org.uk/firms/regulatory-sandbox/cohort-5
[258] Digital Finance Institute and McCarthy Tétrault LLP, 'Fintech in Canada – Towards Leading the Global Financial Technology Transition (British Columbia Edition)' (Report, 2016), 44
[259] Ivo Jenik and Kate Lauer "Regulatory Sandboxes and Financial Inclusion" (2017) Working Paper. Washington, D.C.: CGAP.
[260] FCA, Regulatory sandbox (2015) https://www.fca.org.uk/publication/research/regulatory-sandbox.pdf
[261] Ibid
[262] Ibid

The prerequisites for entry into the sandbox differ in every jurisdiction. It can be, nevertheless, said that there are common features of these preconditions; contribute to the financial services industry; generate solutions to existing or feature complications; enable genuine innovation; be of avail to customers.[263]

First, there may be a sectoral limitation on the sandbox, the meaning which is that some jurisdictions limit the sandbox's scope to certain sectors. It could be imposed that the regulatory sandbox is only eligible for crowdfunding platforms or payment services. While other jurisdictions may limit the type of participants as some sandboxes can only accept incumbents, others only start-ups.[264] Moreover, the lifespan and the size of the sandbox may be limited. In general, the life span of it varies between 6 months and 24 months.[265]

Despite these limitations, it is argued that standardized and publicized eligibility will improve cost efficiency and resource efficiency.[266] As well as, they will reduce the risk that a regulatory sandbox imposes on the finance sector.[267] For instance, in Switzerland, there is no time limitation for fintech companies to play in the sandbox, provided that the collection of monies does not *exceed 1 million Swiss francs*.[268]

There are several advantages of sandboxes. Firstly, it will *reduce the time to market at a potentially lower cost.*[269] Time to market is a term for the period of time from a product being conceived to its being available for the sale.[270] It is stated that regulatory uncertainty deters entrepreneurs due to the fact that it increases the time span of a product to be finalised.[271] A comparative example can be given in the

[263] Abu Dhabi Glob. Mkt., Policy Consultation on a Regulatory Framework to Support Participants Deploying Innovative Technology Within the Financial Services Sector 4 (May 10, 2016), https://adgm.com/media/70182/adgm-consult- paper-no-2-of-2016_reg-framewk-for-fmtech-fmal.pdf [https://penna.cc/F59J-RN9W]; Nederlandsche Bank ;
[264] Jenik (n.259)
[265] Barberis "Regulating a Revolution: From Regulatory Sandboxes to Smart Regulation" (n.214)
[266] Barberis "FinTech, RegTech, and the Reconceptualization of Financial Regulation" (n.23)
[267] Barberis "Regulating a Revolution: From Regulatory Sandboxes to Smart Regulation" (n.214)
[268] Eidgenossisches Finanzdepartement, Anderung des Bankengesetzes UND DF.R BANKENVERORDNUNG (Flntech): ERLAUTERNDER BERICHT ZUR Vernehmlassungsvorlage 33 (Feb. 1,2017), https://www.newsd.adinin.ch/newsd/me ssage/attachments/47046.pdf [https://perma.cc/J3S8-JRQD]
[269] George Chryssochoidis, "Rolling out new products across international markets : causes of delays" (Palgrave Macmillan 2004)
[270] Ibid
[271] FCA, "Regulatory Sandbox" (n.260)

UK's medical technology.[272] It is observed that when the period for a medical innovation to be ready for sale takes a longer time, there is a loss expected lifetime product revenues.[273] In this sense, a regulatory sandbox will decrease the time to market for a fintech service, which would cut down the cost of the product.

Moreover, there will be open and fluent communication between regulators and fintech companies. The reason is that the companies would not have the fear of losing their licences.[274] In a traditional sense, companies may cover work with good conduct in order to build a positive image to the authorities. Without the fear of losing their licence, the companies would be honest with the figures, which would foster improvement.

A concern on regulatory sandboxes is that the process is still human-driven, and the current sandboxes are not scalable.[275] There are approximately 25 participants of UK sandbox, which is one of the leading one in the world; yet, when the total number of licensed market participants is considered, the fintech companies' volume is insignificant. That is to say, it will be challenging to monitor the activities in the sandbox as the number of participants increase. Thus, the system has to be developed in a way such that it operates more fully automated.

One of the biggest critiques on regulatory sandboxes is that it creates an illusion that appeals to customers as a safe environment for who considers investing on fintech companies.[276] For instance, FCA publishes a list that they have accepted companies into the sandbox, and as a result, investors or customers may suppose that these companies are reliable.[277] However, regulatory sandboxes are just testing environments for the companies, which does not amount to a stamp of approval.[278]

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[272] Ariel Dora Stern, Innovation under regulatory uncertainty: Evidence from medical technology, Harvard University, 2014, available at: http://www.rotman.utoronto.ca/-/media/Files/Programs-and-Areas/Strategy/papers/JMP_Stern_Jan_2014.pdf.
[273] Ibid
[274] Barberis "Regulating a Revolution: From Regulatory Sandboxes to Smart Regulation" (n.214) pg. 71
[275] Zesche (n.231)
[276] Jemima Kelly A "fintech sandbox" might sound like a harmless idea. It's not https://ftalphaville.ft.com/2018/12/05/1543986004000/A--fintech-sandbox--might-sound-like-a-harmless-idea--It-s-not/
[277] Ibid
[278] Ibid

A risk-taking aspect of the regulatory sandboxes is that every jurisdiction establishes their practice and this, amounts to a lack of standardization across borders. Nevertheless, in practice, this is not an insurmountable problem. The potential to deliver financially stable practice can be achieved by a multi-jurisdictional sandbox, which can provide shared testing products.[279] This can, therefore, reduce the risk of regulatory arbitrage across individual sandbox jurisdictions.[280]

4. Specific Regulations

The last approach is regulating by specific regulations, which can be categorised as the opposite of the laissez-faire approach. In other words, existing regulations can be amended, or new regulations can be developed.[281] This approach is also called as "rule-based regime".[282]It is stated that many jurisdictions such as the US have developed and enacted a new legislative framework to create a secure environment for fintech innovations.[283] The jurisdictions that have taken measures mostly regulated the areas such as crowdfunding, digital payments or P2P lending activities.[284]

It is not a surprise that building specific regulations can weaken innovative firms desire to innovate.[285] If the scope of activity of these firms strictly regulated, the profit margin will drop and therefore, they will not be enthusiastic towards innovation. For instance, in the USA, P2P lending activities are regulated under US Securities and Exchange Commission (SEC), even though they do not constitute securities.[286] This mis-regulation makes P2P lending more expensive for customers and therefore threatens its existence.[287] Even if authorities prefer to impose specific regulations to fintech activities, it is of crucial importance that in coming up with tailored regulations and therefore, there is a need to understand underlying conceptual framework of the service type.

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[279] UNSGSA, (n.135)
[280] Ibid
[281] Zesche (n.231)
[282] Lawrence A. Cunningham Prescriptıon To Retire The Rhetoric Of "Prıncıples-Based Systems" In Corporate Law, Securıtıes Regulatıon And Accountıng Vanderbılt Law Revıew 2007)
[283] Barberis "Regulating a Revolution: From Regulatory Sandboxes to Smart Regulation" (n.214) p.53
[284] Zesche (n.231)
[285] Ibid
[286] Andrew Verstein, 'The Misregulation of Person-to-Person Lending' (2011) 45 UCDL Rev 445, 452
[287] Ibid

On the other hand, even though specific regulations come with accost, they will attract investors due to its relative certainty and predictability.[288] The rules will set boundaries as they will stipulate in detail what firms can do and cannot do.[289] This will, correctively, a create more stable environment for companies, meaning which there will be no room for surprises. According to a report, well-established rules do not always repel firms, on the contrary, it is observed that robust rules attract them.[290]

The benefits of strict regulations can be observed in P2P lending services. It is underlined that P2P lending services are one of the least regulated sectors and the reason for this is that they impose a risk on the system.[291] The light supervisory oversight resulted in bloom in this sector, which was followed by a series of scams. The latest numbers showed that $59 billion were taken from the investors due to lack of monitoring and legislations.[292] It can be said that the question on which type of regulatory approach is better for financial technologies also depends on what the subject matter of the regulation is. If cybersecurity is the concern, it should be strictly regulated.[293] Following this, with regard to peer to peer lending services, the scope of their regulation should be depended on their activity. Where a P2P platform has discretion in choosing potential borrowers for their clients, they should be regulated as portfolio managers.[294] As well as, if a platform accepts deposits without resorting to a third-party payment provider, it should be subjected to payment subject regulations.[295]

It is underlined that while specific rules will provide certainty and predictability, they can evade the underlying purposes. The financial technologies still relatively new sector and its outcomes and effects to the industry may not be foreseen. Just the fact that there are well-established rules in existence does

[288] Lawrence A. Cunningham. "A Prescription to Retire the Rhetoric of "Principles-Based Systems" in Corporate Law, Securities Regulation and Accounting." Vanderbilt Law Review 60, (2007): 1409-1494.
[289] Ibid
[290] The Goldman Sachs 2009 Annual Report http://www.goldmansachs.com/investor-relations/financials/archived/annual-reports/2009-annual-report.html
[291] Ibid
[292] Zhou Xin ,Chinese police swoop on HK$59 billion 'record-breaking online Ponzi scheme'https://www.scmp.com/news/china/economy/article/1908003/chinese-police-swoop-hk59-billion-record-breaking-online-ponzi
[293] Alexander dill
[294] Pozzolo (n.223)
[295] Ibid

not guarantee compliance. Regulators still may not monitor or there may not be a high-level of communication between regulators[296]

A successful legislation example can be seen within the European Union. The Payment Services Directive (PSD) is amended, which enables smoother and safer payment services.[297] One of the most prominent features of it is that PSD2 mandates banks to share some of the customer data with non-banking licensed providers.[298] The amended directive redresses the balance by supporting innovation and securing stability. The same approach can be seen in Australia, the legislation called "consumer data right" is introduced. Starting with the banks, the customer data has to be shared with other, provided that consent of the customers.[299] It can be said that regulations are not always beneficial just for financial stability; they can also be used to support innovation.

5. Comparison

Throughout this chapter, possible approaches to regulate fintech were analysed. Each approach has its own merits, nevertheless, it will not be practical to adopt just one of the approaches by itself. As indicated, regulators should aim the balance between promoting innovation, and financial stability, and consumer protection.

In order to redress the balance, the reasoning behind the rules must be well understood.[300] These are: *digital finance must contribute to efficient allocation of resources; it must not cause abrupt price fluctuations;* the protection of customers and investors must be ensured; fair competition must be provided; the balance between government supervision and industry self-discipline must be redressed.[301]

The laissez-faire approach enables fintech companies to. reach too-big-to-fail from tpp-big-to-small. Although, this unstable growth impose significant risks on financial stability and consumer protection. Stpecific regulations can distrupt the growth of the expansion of fintech services due to the fact that it

[296] Financial regulation of FinTech
[297] FSB (n.187) pg. 8
[298] Ibid
[299] Ibid
[300] Arner "The Evolution of FinTech: A New Post-Crisis Paradigm." (n.7)
[301] Financial Stability Analysis Group of PBOC China Financial Stability Report 2014

will increase compliance costs. Case by case approach and structured experimentalism seems like the most appropriate approach because it will promote innovation in a safe area. However, the results that obtained through hese approaches can be deceptive due to the fact that they are open to small number of companies and the result of which may not be coherent with the all fintech ecosystem.

Chapter V – Regulatory Examples

5.1. How it is regulated in the UK and the China

So far, four main approaches to regulation of financial technologies have been analysed. There is a great benefit to analyse the how it is regulated in the countries in which the financial technologies sector has a large market volume. It can be said that China takes the lead in the sector and it is followed by the UK.[302] The practices in the UK and China will be analysed and according to the findings it is going to be assessed that in which aspects their approaches will create a healthier environment for the development of fintech services is going to be assessed.

4.4.1. China

The significant expansion in the number of participants and the variety of non-traditional digital financial sector has already changed the shape of the financial system since *2013*.[303] The latest figures in China illustrate that investment in fintech enterprises in *2018,* reached to *US$25.5 billion:* this figure is almost amount to total global figure (*US$26.7 billion) in 2017 .*[304] Moreover, the China's largest segment is digital commerce, with a total transaction value of USD 855,465 million in 2018.[305]

[302] Arner "The Evolution of FinTech: A New Post-Crisis Paradigm." (n.7)
[303] Tjun Tang, and others, "The Rise of Digital Finance in China: New Drivers, New Game, New Strategy", The Boston Consulting Group (2014) at 5-6.
[304] EY, "PE/VC Agenda India Trend Book – 2018" (2018) https://www.ey.com/Publication/vwLUAssets/ey-pe-vc-agenda-india-trend-book-2018/$File/ey-pe-vc-agenda-india-trend-book-2018.pdf pg.45
[305] China Fintech Market - Growth, Trends, and Forecast (2019 - 2024) https://www.researchandmarkets.com/research/bg5wwx/china_fintech?w=5

There are several factors that triggered China's exponential growth in the sector, mainly there are two main actors of these improvements. First, the Chinese government have maintained a positive attitude to financial technologies in order to liberalise and to enhance financial inclusion.[306] The other driving force behind is that the incompatibility between the demands of consumers and the inadequate supply of finance services by conventional financial institutions has provided appropriate conditions for the expansion of digital finance.[307]

The pioneer and leading company in this filed is Alibaba Group, which is the world's largest e-commerce firm.[308] Alibaba has launched several products in different sectors.[309] With regard to third-party online payment services in China, its transaction volume reached approximately $30.27 trillion (the total number is *$41.51B*) in *2018*.[310] 90% of the total market share is occupied by Ali Pay and WeChat Pay. Alipay has currently *1 billion* users.[311] Another important digital finance services in China is P2P Lending, under which the accumulated amount of loan provided was about *$1.16 trillion* at the end of January *2019*.[312]

As indicated above, at first, Chinese regulators have taken the laissez-faire approach which allowed fertilise the ground for innovation.[313] The exponential growth took non-traditional financial companies from too-small-to-care to too big to fail, after which the concerns about regulation side had arisen. As a result of light regulations, for instance, the P2P lending services have collapsed, which indicated flaws in the current regulatory framework.[314] Thus, in *2015*, a guideline for digital finance services was

[306] Weihuan "Regulation of Digital Financial Services in China Last Mover Advantage Tsinghua China Law Review" (n.232) pg.31
[307] Tang (n.303)
[308] Microfinance, E- Commerce, Big Data and China: The Alibaba Story, CGAP (Oct. 11, 2013), http://www.cgap.org/blog/ microfinance-e-commerce-big-data-and-china-alibaba-story.
[309] Alipay, https://intl.alipay.com
[310] Mobile payments continue meteoric rise
http://www.chinadaily.com.cn/a/201903/21/WS5c932294a3104842260b1cc9.html
[311] Ibid
[312] Sara Hsu, China "Fintech Today: The P2P Boom Is Truly Over""
https://supchina.com/2019/02/27/china-fintech-today-the-p2p-boom-is-truly-over/
[313] Zesche (n.231)
[314] "China's peer-to-peer lenders face crisis, investors face ruin"
https://www.dw.com/en/chinas-peer-to-peer-lenders-face-crisis-investors-face-ruin/a-47634861

published in order to prevent a second major crisis.[315] It is underlined that at first, this guideline had not been transferred into practice due to lack of regulation.[316]

P2P Lending and Investment-Based Crowdfunding

Unlike the UK, there was not a unified regulator in China governs P2P lending.[317] Therefore, multiple regulatory entities increased the possibility of regulatory arbitrage and thereby, the concerns regarding to financial stability were at stake.[318] With the rules published, it was imposed a limitation on the total figure that can be borrowed, which is between RMB *1 million* to RMB *5 million,* depending on the borrower across multiple platforms.[319] Also, some transparency requirements were imposed, such as lending statistics and the rate of defaults.[320] New rules prohibited some existing practices such as guaranteeing investments and mandated the depositing of client funds.[321] Furthermore, the regulators have mandated P2P platforms to keep their funds in a custodian bank. After two years of implementation of such rules, provincial government agencies were told to complete the evaluation and registration of qualified P2P platforms.[322] It is worth noting that online P2P lending will be recorded at central bank credit reference system in order to prevent irregular activities.[323] In detail, it is required to disclose their information including online lending rates.

With regard to investment-based crowdfunding platforms, their regulatory statues remain uncertain, meaning which there are no explicit catch-all regulation or regulatory body for equity crowdfunding in China.[324] Nevertheless, there are some thresholds: the platforms which do not hold a licence have to be registered to China Securities Regulatory Commission (CSRC). There are prerequisites that platforms and investors have to fulfil: platforms must not offer investment opportunity related to their

[315] Ibid
[316] Nemoto, N., B. Huang, and D. Storey 2019. Optimal Regulation of P2P Lending for Small and Medium-Sized Enterprises. ADBI Working Paper 912. Tokyo: Asian Development Bank Institute
[317]Lei Xiao Improving China's P2p Lending Regulatory System: An Examination Of International Regulatory Experience (2016) US-China Law Review, 13(6), 460-473.
[318] Ibid
[319] China Banking Regulatory Commission
[320] Ibid
[321] BIS, P2P lending in China , BIS Quarterly Review https://www.bis.org/publ/qtrpdf/r_qt1809z.htm
[322] Nemoto (n.316) pg. 6
[323] Chen Liubing, Online P2P lending to be recorded at central bank credit reference system https://www.chinadaily.com.cn/a/201909/05/WS5d707df8a310cf3e35569e28.html
[324] China UK Equity Crowdfunding Regulatory and Market Comparison Study (2017) http://bop.co.uk/assets/others/China_UK_Crowdfunding_Regulatory_and_Market_Report_Final_2407 2017.pdf

company; investors must have a net asset amount to CNY *10* million or CNY 3 million and an average annual income of CNY *500,000* for the past three years.[325]

Payment Services

Until recently, there were not any restrictions on mobile payment services. For instance, banks did not have the ability to control transactions executed by third party payment services which in turn enabled illicit activities. With the latest regulation, China's central bank ("PBOC") has become the supervisory authority.[326] Non-bank firms that wish to facilitate payment services must hold a licence, and therefore, they need to comply with certain requirements such as minimum capital, not outsourcing its services.[327]Now, PBOC can track and monitor all capital flows of these third-party payment providers, and therefore, it will be more effective to prevent anti-money laundering activities and tax evasion issues. In addition, these firms are required to follow "know your client" (KYC) rules, which are requirements meant to ensure the effective verification of clients' real identities. Depending on the means of customer verification, there are limitations on transaction amount limit. In addition, payment services are under obligation to provide risk management system and remedy mechanisms in the case of a default.

Previously, the customer funds could be held in personal accounts of service providers. The Central Bank declared that it will not pay interest on the deposited money, which will have a huge impact on platforms' profits.[328] Another repressive rule that will decrease the profit of platforms is the prohibition of investing customer funds into mutual funds or peer to peer loans[329] New rules will enable enhanced customer protection and redress the financial stability balance.[330] The Central bank raised the ratio of reserve funds from 20% to 50%, which required to be held in a state-approved commercial bank.

[325] Ibid
[326] Chen Jia and He Wei, (2019)"PBOC reins in funds of payment platforms" http://www.china.org.cn/business/201901/15/content_74373549.htm
[327] Hogan Lovells, Third Party Payment Licences in China - Are They within The Grasp of Foreign Investors? http://www.lapres.net/hl.pdf
[328] Ibid
[329] Xu Ming, Controlling interst https://www.pressreader.com
[330] Ibid

With regard to foreign third-party payment firms to operate in China, the new rules enable foreign business to facilitate in China.[331] In general, it can be said that China aims to promote competition in the sector. Foreign firms, first, have to set up a local business in order to apply for a payment services license.[332] Moreover, it is required that client data and other financial information have to be stored in China, as well as these firms are obligated to set up technology and data infrastructure.[333]

Cryptocurrency

The Central bank also acts as regulatory body in the matter of blockchain and cryptocurrencies. In 2018, it has published a working paper which reveals issuance of legitimate digital currency. It states that the cryptocurrency which is issued by central bank will be deemed as fiat currency and the other, non-sovereign, cryptocurrencies shall not be regarded as currencies. In other words, it is emphasized that *it is essentially similar to a kind of commodity that can be circulated.*[334] Nevertheless, it is underlined that if they are deemed as commodities, then value-added tax, for the sale of intangible assets, may be imposed.[335] Therefore, tax regulation has not been imposed on cryptocurrencies. A joint statement published, by the central bank and government bodies, prohibited the Initial Coin Offering, which is a fundraising method.[336] With this prohibition, it is aimed to prevent illegal fundraising, financial fraud and pyramid schemes.

4.4.2. the United Kingdom

The United Kingdom is the other leading country in financial technologies. The total investment in digital finance companies reached over *$20.7bn.*[337] It is noteworthy that the total figure of investment hit a peak

[331] 'Central bank opens doors to foreign third-party payment firms' (2018), http://0-search.ebscohost.com.serlib0.essex.ac.uk/login.aspx?direct=true&db=edsens&AN=edsens.608064884&site=eds-live accessed
[332] Ibid
[333] Ibid
[334] Lefan Gong and Luping Yu, Blockchain and Cryptocurrency Regulation 2019 China https://www.globallegalinsights.com/practice-areas/blockchain-laws-and-regulations/china#chaptercontent2
[335] Ibid
[336] Greg Pilarowski, Lue Yue, "China Bans Initial Coin Offerings and Cryptocurrency Trading Platforms" http://www.pillarlegalpc.com/en/news/2017/09/21/china-bans-initial-coin-offerings-and-cryptocurrency-trading-platforms/
[337] KPMG, UK global leader for fintech investment in H1 2018 https://home.kpmg/uk/en/home/media/press-releases/2018/07/uk-global-leader-for-fintech-investment-in-h1-2018-.html

in *2018*, despite the Brexit concerns.[338] It can be said that there is no explicit regime for fintech activities. The UK is categorized as the most fintech-friendly jurisdiction in the world, owing to the fact that there were official initiatives to promote the innovation in the sector and regulation by sandbox regimes.[339]

Payment Services

The original payment services regulation was introduced in 2009, whereas this regulation fell behind on the new payment services. Therefore, payment service regulation was amended in line with the provisions of PSDII, which is an EU directive. The European Banking Authority (EBA) has developed regulatory technical standards.[340] There are other requirements: the focus, in general, is on "*applicants' security policies, governance, business continuity arrangements, and access to sensitive data processes as described in those guidelines, taking into account firms' business models".*[341]

The regulation is segmented based on the type of payment service providers as an authorised Payment Institutions ("PI"), a small PI or Account information service (AIS) and payment initiation service (PIS). PIS can be explained as a "*service which accesses a user's payment account to initiate the transfer of funds on their behalf with the user's consent and authentication".* AIS are used to obtain data from a user's account held with another provider (typically a bank) in order to provide financial insights.

There is an initial and ongoing capital requirement for authorised PIs, which is dependent on the service provided.[342] PI's may conduct services just money remittances or PIS, for which the minimum initial capital required is small amount compared to the PIs which accept deposit and execute payment transactions.[343] These type of PIs have to use their own fund for capital requirements.[344] With regard to AIS, there is no capital requirement because they do not control individuals' payment accounts. Furthermore, all authorised PIs are immediately required to take safeguarding requirements set it out in

[338] Ibid
[339] Caroline Binham, ''UK regulators are the most fintech friendly", Financial Times (2016) https://www.ft.com/content/ff5b0be4-7381-11e6-bf48-b372cdb1043a
[340] Ibid
[341] HM Treasury, Expectations for the third-party access provisions in Payment Services Directive II https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/630135/Expectations_for_the_third_party_access_provisions_in_PSDII.pdf
[342] FCA, "Payment Services and Electronic Money" https://www.fca.org.uk/publication/finalised-guidance/fca-approach-payment-services-electronic-money-july-2018-track-changes.pdf
[343] Ibid
[344] Ibid

the regulation with the purpose of protection of customers where funds are held by an institution. There are two ways investigated in order to safeguard relevant funds: the separation of customer funds with institution's working capital and other funds; to cover relevant funds by an insurance policy in case of insolvency of the platform.

On the other hand, companies that have "an average payment transactions turnover that does not exceed €3 million per month" is classified as a small PI and they cannot provide AIS and PIS services. There is not a minimum capital requirement or mandatory safeguards imposed on small PIs.

In general, the UK's regulatory approach regarding payment services reflects "case by case" or "structured experimentalism". The requirements are varying spending on the type of service and volume of service. Where a company fall into classification of small PI, which does not impose a significant risk to the finance sector and consumer protection, is only required to registration. Whereas, a company conduct complex and high amount of transactions are required to comply with strict requirements.

Investment-Based and Loan-Based (P2P) Crowdfunding

FCA issued a policy statement regarding to loan-based (P2P) and investment-based crowd- funding. Even though, there are general requirements for both types, it is stressed that the rules which apply to equity-based crowdfunding is stricter than those applying to of P2P lending due to the fact that online lending is considered to be less risky than equity crowdfunding. The UK is the first country that has a P2P lending platform.[345] It has a disclosure-based regulatory system for P2P, which aims to promote transparency, improve competition and enhance the protection of customers.[346] Firms needs authorization to provide P2P services. It is worth noting that P2P and Investment- based loans are not backed by the Financial Services Compensation Scheme (FSCS).[347] The rules focus on P2P lending aiming to ensure that individuals and business have access clear information about borrowers.[348] As well as there are minimum capital and money for protection of customers money requirements. Finally,

[345] Lerong Lu, "Promoting SME Finance in the Context of the Fintech Revolution: A Case Study of the UK's Practice and Regulation", (2018), 33(3)Banking and Finance Law Review , pp. 317-343
[346] Lerong Lu
[347] FCA, ""Loan-based ('peer-to-peer') and investment-based crowdfunding platforms: Feedback to CP18/20 and final rules" (2019) (PS19/14) https://www.fca.org.uk/publication/policy/ps19-14.pdf
[348] https://www.fca.org.uk/publication/thematic-reviews/crowdfunding-review.pdf

platforms are required to have resolution plans: meaning that if a platform is collapsing, it should ensure that it will continue to pursue the collection of loan payments.[349]

If the borrower is an individual or relevant recipient of credit ("a partnership consisting of two or three persons not all of whom are corporate bodies"), the agreement will be subject to Consumer Credit Act (CCA) and Consumer Credit Sourcebook (CONC).[350] There are several other requirements that firms have to abide by, such as Principles for Businesses (PRIN) Senior Management Arrangements, Systems and Controls sourcebook (SYSC) Threshold Conditions (COND). Where firms wishing to hold clients' money and safe custody assets, they have to comply with Clients Assets Sourcebook (CASS).

It is worth noting that depending on the core business model, the obligations of platforms will vary. All types of platforms are obligated to carry out due diligence on and administration of potential investment opportunities due the fact that platforms' role is just matching lenders with borrowers.[351] In addition, discretionary and pricing platforms are held responsible for accurate pricing because they act akin to a discretionary manager for the investor.[352] As well as these platforms are required to have an appropriate risk management system in place.[353] With regard to discretionary type platforms, "which set the price of P2P loans and also choose the investor's portfolio of loans to generate a given target rate of return", additional risk management parameters are imposed.[354] For instance, "platforms must re-value P2P loans that have defaulted and at the point an investor enters into, or exits, a loan".[355]

For the purposes of establishment and maintenance of a platform's risk management framework, the platform should have to designate a person, who will have the responsibility on this matter.[356] It is underlined that this type of business should be able to illustrate that it uses appropriate data, even if the data provided via third party and it has to have the transparency regarding the actual performance against target rates.[357]

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[349] Ibid
[350] Sian Wakeling, "Regulated crowdfunding" (2019) https://uk.practicallaw.thomsonreuters.com/w-005-5751?transitionType=Default&contextData=(sc.Default)&firstPage=true&bhcp=1
[351] FCA, (n.346)
[352] Ibid
[353] Ibid
[354] Ibid
[355] Ibid
[356] Ibid
[357] Ibid

Cryptocurrencies and Smart Contracts

The legal position of blockchain or cryptocurrencies is still a question in the UK, meaning that they are not recognized as legal tender.[358] FCA, which published a guide on cryptoassests, prefers to remain technology neutral in this sense. Within the perimeter of the guidance, the holder of a cryptocurrency does not hold any right accompanied with it. It is worth noting wherever cryptocurrencies are used to facilitate regulated payment services, they have to provide relevant permissions, and to follow relevant rules and regulations.[359] With regard to anti-money laundering requirements, they are expected to introduced in the beginning of the *2020* and will cover exchange services, such as issuance of new cryptocurrencies through ICO's, publication of open-source software, transfer of cryptocurrencies.[360] There are no guidance or regulations regarding to smart contracts.

Robo-Advisor

With regard to robo-advisors, FCA published a guidance which covers both automated advice services and traditional in person advice models. It is underlined that the requirements on providing financial advice are technology neutral. It worth noting that regulators in the UK acknowledge that robo-advisors are still developing industry and therefore, innovation should be supported. In this sense, FCA facilitates Advice Unit, which is akin to Regulatory Sandbox, that provides regulatory feedback to firms which meet the eligibility criteria.[361] In general, robo-advisors like any type financial advisors have to abide by with financial instruments directive (MiFID) and AML and so on. In this sense, firms are required to provide adequate level of information to their customers regarding to "the firm, designated investments and proposed investment strategies as well as costs".[362] In addition, the FCA's Conduct of Business Sourcebook (COBS) mandates that firms must retrieve information about their customers' knowledge and experience in order to make a decision or make a suggestion which is suitable for the client.[363]

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[358] FCA, "Guidance on Cryptoassets" (2019)(CP19/3) https://www.fca.org.uk/publication/consultation/cp19-03.pdf pg. 21
[359] Ibid
[360]FCA, "Guidance on Cryptoassets Feedback and Final Guidance to CP 19/3" (2019) (PS19/22)https://www.fca.org.uk/publication/policy/ps19-22.pdf
[361] FCA, "Advice Unit", (2018) https://www.fca.org.uk/firms/advice-unit
[362] FCA, Automated investment services - our expectations (2018) https://www.fca.org.uk/publications/multi-firm-reviews/automated-investment-services-our-expectations
[363] Ibid

Within the FCA's Project Innovate there are five sub-units: policy & management, regulatory sandbox, direct support team, the advice unit, and innovate regtech. The purpose of this organization is to promote innovation and tackle regulatory barriers as well as ensure market stability and consumer protection.[364] This approach can be categorised as structured experimentalism. In detail, as explained above, there are several requirements to be fulfilled in order to conduct a regulated activity in the UK. Instead of exposing confusing requirements, businesses can test their product under a protected environment, which provides certain pre-determined safeguards and rules.

5.2. Possible Best Approach

It has not been decades since fintech products were launched; nevertheless, their development has been at an unprecedented rate. However, under most jurisdictions fintech services are not completely or even mostly regulated. Notwithstanding that, even in the regulated countries the implications of this (lack of accumulated knowledge) have been observed. It is critical to come up with tailored regulations. Therefore, purpose of this section is to suggest a regulatory approach for the -fintech services. The most important point of the matter is: regulation must serve a particular purpose and produce intended results in order to be considered effective. Each approach has its own merits; nevertheless, it will not be practical to adopt just one of the approaches by itself.

The main focus should be on the risks that were identified in Chapter III; especially financial stability and consumers' interests matters play a key role. The Crisis illustrated that the financial sector is highly integrated. Even though the volume of fintech transactions does not constitute a significant portion of the financial sector, mismanagement in this point (risks) can have detrimental effects. That is why regulators should ensure adequate level of protection, regardless of the type of service. As stated above, the laissez-faire approach has given a great advantage to China-based fintech and big-tech companies, as it enabled these companies to reach too-big-to-fail from too-small-to-care. Despite the positive impact of the laissez-faire approach, China faced several heists, scams and fraudulent activities that reflected the concerns on the doing nothing approach.

[364] FCA, https://www.fca.org.uk/publication/forms/project-innovate-criteria.pdf

With regard to payment services and crowdfunding (P2P and investment based) services, the platforms that do not act only as an intermediary should be subjected to specific regulations. In detail, some of these platforms accept deposits and provide credit score services, which impose a significant risk on customers' interests and financial stability. Even if they do not accept deposit, they are involved in the circulation and reallocation of money.

The UK implementation constitutes an efficient example. The platforms are required to satisfy several prerequisites, depending on the type and trading volume of the service. For instance, mechanisms (such as capital and liquidity requirements as well as insolvency and resolution mechanism) are effective methods. It should be emphasized that there are several regulations and rules as well as guidelines issued in the UK, which may create confusion and be costly and therefore maybe frighten off investors. However, innovation hubs and regulatory sandboxes are providing opportunity for the businesses that would have difficulties satisfying regulatory parameters. It is worth noting that there are no rules imposed on investors' perspective in the UK. There should be a regulation on the investors side also, in order to provide minimum protection. In this sense China's new proposed regulations constitutes a useful example, which requires investors to have minimum net asset.

Regulation of crypto assets are still a question: there are significant diversity of opinions about their classification. Nevertheless, there are two issues that should be subjected to specific regulations. Firstly, crypto assets as a mean of exchange (cryptocurrencies) and the way that they are stored should be primarily settled/utilized. There should be a licence requirement (for whomever who aims to provide this service) that prompts customer protection and financial stability and controls illicit activities.

After these providers are deemed to be eligible to obtain the licence, they should be subjected to annually external auditing by auditors who are specialists about KYC/AML and also by blockchain analytics specialists. An equivalent of this practice is that public companies have to be audited under most jurisdictions. This approach may be criticized due to excessive compliance cost; however, if the worth of stolen cryptocurrencies are taken into account, this cost would be an affordable price.

With regard to smart contracts, the best approach would be the laissez-faire approach. Smart contracts are relatively pristine compared to other services. Imposing strict regulations would supress the innovation. Structured experimentalism would not provide the intended outcome, due to the fact that the number of smart contracts is not big enough to accumulate sufficient data (in order to gain comprehensive knowledge).

While authorities are assessing the best approach to digital financial services, they should be monitoring them in order to analyse whether the benefits outweigh the risks. In other words, monitoring will enable authorities to assess outcomes of fintech services as they satisfy the intended outcomes and following that, the tailored approach can be taken based on the risks they impose on the finance industry. In practice, the monitoring activity is conducted by subsidiaries of authorities or the banks, depending on the jurisdiction. Nevertheless, nationally based monitoring institutions do not satisfy the aimed outcome, due to the fact that platforms are not physically located in one place and because customers of these products can conveniently access them from all around the world. That is why there is a need for supranational monitoring association.

A relevant example of this issue is Legal Entity Identifier (LEI), which is a reference code prompted by the Financial Stability Board (FSB) after which identified by the G20 countries, with the purposes of monitoring financial activities in the global sense.[365] Before the LEI system, it was impossible to recognize transactions details of individual corporations due to the fact that each country had a different code system.[366] This system can be used to enable data transaction among different borders. Based on this system, a committee was established; it has 72 members at the moment.[367] In general, it is responsible for policy standards such as: “due diligence, and any other standards necessary to ensure sufficient data quality, and the principles governing data and information access”.[368]

A similar committee should be established with regard to fintech services, where especially the movements of non-traditional banking should be the main consideration. The committee should issue a

Ibid[365] Ka Kei Chan, Alistair Milne. The Global Legal Entity Identifier System: How Can It Deliver? Journal of Risk and Financial Management. 2019;(1):1
[366] Ibid
[367] Ibid
[368] Ibid

guidance that promotes innovation and takes the identified risks into account. Establishing a committee will enhance data aggregation and risk reporting, which in turn will create a balanced development. By means of using the accumulated information on these matters, it will be possible to come up with tailored regulations on KYC and AML issues.

In national level, authorities should establish regulatory sandboxes for two purposes: firstly, regulatory sandboxes are the perfect environment to promote innovation while preserving financial stability; second, they can be used to monitor fintech activities and then accumulated data regarding their activity can send to international committee.

Chapter VI – Conclusion

The technological innovations have led financial products to step into a new age. This dissertation begins with describing the history of financial technologies and the Global Financial Crisis considered as a milestone for the development in digital finance. While technological expansion has continued, the Crises led to significant changes in the sector. After the Crisis, the trust on banks by individuals and companies have seen a dramatical fall, which in turn, caused a considerable increase in the number of new fintech companies. The scope of activity of these new entrants can be divided into three main sections: credit, deposit and capital-raising services; payments, clearing and settlement services; investment management services. It was not possible to study each type of services due to the wide range of services. For this reason, this dissertation focused on payment services, crowdfunding, peer to peer lending cryptocurrency, smart contracts and robo advisor.

It can be said that payment services are the first branch that non-traditional banking firms developed. Even though new entrants are able to process and settle payments through its infrastructure, their need for banks is not diminished yet. One of innovations provided by fintech companies is that crowdfunding. For the purpose of this dissertation investment-based and P2P were the main focus, which are a money-raising method and borrowing loan methods, respectively. Conventionally, when obtaining a loan or raising money for individuals or enterprises is an endless process due to banks over thresholds, however, they can borrow money more conveniently throw new channels.

With regard to cryptocurrency, which is a distributed, decentralized, public ledger based on blockchain technology, is a digital asset function as a medium exchange. The aim with this invention is to diminish the need for a central authority. Smart contracts are computer code that running automatically according to prespecified functions. The purpose of this innovation is to diminish human interference for and the reduce costs of execution of the contracts. Lastly, robo-advisors discussed, which provide digital financial advice based on mathematical rules or algorithms.

The dissertation, then, analysed the effects of new entrants on the financial system as the benefits and risks that fintech companies accompany. First, benefits of fintech analysed, which are: the potential of raising efficiency; decreasing fees; advanced access to financial services; diminishing the need for a central authority. On the other hand, there are risks accompanied by these innovations should not be underestimated, which are: legal risks (regulatory arbitrage and lack of control), data security, theft, anti-money laundering, third-party reliance, liquidity and mismatch risk, and macro-financial risks

Overall, it could be said that the risks, that fintech impose on the financial sector and individuals, overweigh its benefits at the moment, which lead this essay to focus on regulatory issues. In other words, regulators should be fascinated with exciting innovations, on the contrary, they should take the measures before these risks have an impact on financial stability. The balance must be redressed between encouraging innovation and risks imposed on individuals and the finance sector. There are four possible approach to fintech development: the laissez-faire (doing nothing), case by case basis, structured experimentalism and adoption of new regulatory frameworks.

The laissez-faire approach is also called as doing nothing. This approach will provide a great advantage for fintech companies as they do not have to concern with several requirements as imposed on banks. China is one of the successful examples of this approach, in which fintech companies had a fast-growing environment; yet the positive perception came to an end when the fintech or big-tech companies have reached to the scale of too-big-to-fail, and several scams and heists took place**.** The opposite approach to this is “specific regulatory framework”, and the aim is to minimise financial exposure risk and enhance the protection. It is emphasized that every company which takes part in any financial matter should be

regulated in the same way Although, this safe approach will increase the fees and restrict the speed of innovation. The other approaches are case by case and structured experimentalism, both of which provides controlled freedom. No-action letters, restricted licensing and special charters are the ways to provide exception in case by case basis.

While structured experimentalism also provides exceptions, providing that some conditions, it is more systematic and accessible by large groups. There are several types structured experimentalism such as sandbox umbrella, regulatory sandbox an innovation hub. After analysing each approach, it can be said that the size of fintech companies, the development level of banks and protection of individuals and financial stability should be taken account. With regard to data protection, cybersecurity and financial stability issues, regulators impose strict regulation. Where the size of fintech companies are small, regulators could have an affirmative approach. For instance, Chinese regulators allowed the growth of fintech and when the companies became a risk for the financial system, they have taken the technology-neutral approach. On the other hand, the UK's regulatory sandboxes are the best example for a balanced environment, which allows fintech companies to be active in highly regulated areas and provides adequate safeguards. It can be said that is why the UK have become the most invested country in the world. When the pace of innovation is considered, it is more sensible to take structured experimentalism approach. As indicated in the section 5.2., regardless from the fact that which approach is implemented, the authorities should establish national monitoring organizations. This duty can be given the regulatory sandboxes as they will already have the most of the data's of fintech companies. After this step, a multilateral body will prevent a new global crisis and it will bring AML, theft, consumer protection issues under control.

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