



**FACULTAD DE CIENCIAS ECONÓMICAS Y ADMINISTRATIVAS**

**“Establishing Regulatory Sandboxes for FinTech Companies in the European Union to Foster the Development of the FinTech Sector –an Analysis”**

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Establishing Regulatory Sandboxes for FinTech  
Companies in the European Union to Foster the  
Development of the FinTech Sector – an Analysis

**Affidavit**

I hereby affirm that this Bachelor's Thesis represents my own written work and that I have used no sources and aids other than those indicated. All passages quoted from publications or paraphrased from these sources are properly cited and attributed.

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## Abbreviations

AI	Artificial Intelligence
API	Application Programming Interface
Bn	Billion
BTS	Binding Technical Standards
CAGR	Compounded Annual Growth Rate
CFPB	Consumer Financial Protection Bureau
CFTC	Commodity Future Trading Commission
CIB	Corporate Investment Banking
DLT	Distributed Ledger Technology
EBA	European Banking Authority
EIOPA	European Insurance and Occupational Pensions
EMDE	Emerging Markets and Developing Economies
ESA	European Supervisory Authorities
ESFS	European System of Financial Supervision
ESMA	European Securities and Markets Authority
ESRB	European Systemic Risk Board
FCA	Financial Conduct Authority
FTEG	Financial Technology Enabler Group
GDP	Gross Domestic Product
M	Million
M&A	Mergers and Acquisitions
MAS	Monetary Authority of Singapore
NFC	Near Field Communication
P2P	Peer to Peer
PE	Private Equity
Q	Quarter
SME	Small and Medium Sized Enterprise
SSM	Single Supervisory Mechanism
UK	United Kingdom
US	United States
USD	US Dollar
VC	Venture Capital

## Abstract

This paper aims to find an answer to the question whether and to what extent the concept of a Regulatory Sandbox for FinTech companies should be applied at the supranational level of the European Union. In several steps the term "FinTech" will be narrowed down and its effects on the global financial sector analyzed. Afterwards, the three most common regulatory approaches are presented, whereby the Regulatory Sandbox is described in more detail using the sandbox of the Financial Conduct Authority from the United Kingdom as an example. Finally, the relevant regulatory authorities in the EU are discussed. The results make clear that the economic importance of FinTechs is increasing significantly. Considering the fact that FinTechs from Great Britain account for almost three quarters of the total market volume, it is still clear that the EU must become much more attractive in the face of the coming Brexit in order not to lose ground globally. One way to do so is to provide regulatory certainty. A regulatory sandbox is suitable for this purpose, as it reduces uncertainty for companies and makes them more attractive for investors. Regulators also benefit from receiving direct feedback on their regulatory framework and being able to adapt and develop it accordingly. It is proposed that in the run-up to a joint European sandbox, interested National States establish their own national sandboxes, whereby all of them should decide slightly differently on both the structure and the objectives. Based on the experiences of the National States, it is up to the competent authorities in the EU to prepare a supranational sandbox. When implementing the establishment of such sandbox, clear coordination and responsibility of the actors as well as the assumed demand and potential problems have to be considered carefully.

*Keywords:* FinTech, Regulatory Sandbox, Regulation, European Economy, Single European Market

## 1. Motivation

In 2016, Zavolokina *et al.* (2016) have examined in a scientific essay, among other things, how the number of published articles on the topic “FinTech” in literature and press has changed over time. The result was that, apart from a small peak during the years of the dotcom bubble around 1998 and 2001, the number of articles published was almost always between zero and five. In 2010, the number of publications was three. Suddenly, however, in 2012, this figure rose sharply and reached its highest level of 285 publications to date in the last year of the study, 2015. Today, FinTech is a term with which everyone already came into contact at some point and can somehow be classified accordingly. In Germany, for example, the term became known to the general public at the latest with the rise of companies such as the payment service provider N26, founded in 2013, or a subsidiary of Commerzbank, the online broker Comdirect. Although few people appear to know what exactly lies behind it, it seems as if everyone has their own idea about this topic. However, the fact that FinTechs, like all other participants in the financial world, must be regulated and supervised is common sense. Not only to ensure the stability of the system or to protect consumers, but also because FinTech is an area of great potential, huge markets and outstanding technological innovation, ideally promoted through adequate regulatory mechanisms and prudential supervision. To what extent the current regulation is adapted to the needs of FinTechs, however, remains questionable.

An approach that has become increasingly important worldwide in recent years is the *Regulatory Sandbox*. They are not only used in the financial sector but in a variety of sectors,<sup>1</sup> and also play a major role in considerations of FinTech regulation. In such Regulatory Sandbox, the FinTech companies, after fulfilling specific requirements, are supported by regulatory authorities in legal matters, which results in easier market entries for companies and relaxed regulation through the regulating authority. After conducting deeper research and finding out more about current worldwide regulatory approaches like Innovation Offices, RegTech and Regulatory Sandboxes, this work aims at answering the following general research question:

*“Should Regulatory Sandboxes be established in the European Union to foster the development of the FinTech sector?”*

Before coming to a conclusion about the central question, it is important to explain the underlying frameworks and concepts that are relevant to the central issue. This is achieved by answering three instrumental questions that arise when dealing with the subject matter and may be posed as follows:

1. What exactly is FinTech and what is its current worldwide situation?
2. Which regulatory approaches are currently used for FinTech?

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<sup>1</sup> This includes e.g. energy transition, logistics, product development etc. (German Federal Ministry for Economic Affairs and Energy 2019). In the following work, the term Regulatory Sandbox will only be used in connection with the financial sector.



### 3. What is a Regulatory Sandbox?

The work thus establishes a link between a number of topics that have been the subject of research individually but in scientific studies have not been related to each other in a clear way. The focus here is not leaning specifically towards legal regulations or rules in detail but rather based on experience and a look into the future to discuss to what extent the introduction of the Regulatory Sandbox makes sense at European level or not.

To achieve this, the work first provides a definition about the term “FinTech” itself and introduces a possible concept to classify FinTech companies (Section 2). Then, after having given the reader a more precise idea about FinTech, the current situation of FinTech is evaluated (Section 3). This includes the development of the FinTech sector in terms of market volume and investments in the sector, divided into the most important FinTech regions which are Europe, Asia-Pacific and America (including North- and South America). Furthermore, the impact of FinTech on banking and central banks is evaluated. After that, the three prevailing regulation approaches (Innovation Offices, RegTech and Regulatory Sandboxes) are presented (Section 4). To give an idea about the setup, aims and conditions of currently existing sandboxes, some real-life examples are given subsequently (Section 5). Lastly, the regulating authorities in the European Union and the most relevant regulation norms are examined (Section 6). Based on the findings, the work provides a recommended action how to further proceed with Regulatory Sandboxes in the European Union.

## 2. FinTech – a broad concept

*“Banking is necessary. Banks are not.”*

Bill Gates, 1994

This quote, stated by Microsoft founder Bill Gates in 1994, has served as the mantra for the first wave of FinTech. Following the Silicon Valley obsession with disrupting incumbent industries, numerous FinTechs were ready to challenge every aspect of banking and deliver better banking services directly to consumers. Armed with the recent Millennial disruption index where 71% of respondents claimed to rather visit the dentist than listen to their bank everyone was convinced that the days of incumbent banks were numbered (Hernæs 2017).

Times have changed a little since then. Contrary to the prevailing opinion at the time that FinTechs are always newly established companies in the financial sector, today, in addition to the new players, there is also a considerable number of FinTechs on the market that come from large and long-established financial institutions. Furthermore, despite the bankruptcies originating from the financial crisis 2008/2009, all major financial institutions which were active to that time still play an important role in today’s banking landscape.

FinTech, a term which originates from the marriage between “finance” and “technology”, is currently an innovative and emerging field, which attracts attention from the public as well as up-growing investments. Dorfleitner *et al.* (2017) define FinTechs as “*companies or representatives of companies that combine financial services with modern, innovative technology*” and furthermore “[...] *aim to attract customers with products and services that are more user-friendly, efficient, transparent, and automated than those currently available*” (p.5). According to a McKinsey report by Galvin *et al.* (2018), global fintech investment has grown in average 50% p.a. from USD 1.8 bn in 2011 to USD 30.8 bn in 2018. These figures demonstrate that the sector is becoming of high interest in the world of finance and, therefore, provide fruitful soil for further ingenious ideas and research. Furthermore, FinTech brings new opportunities to give power to people, e.g. by allowing transparency, reducing costs or cutting middlemen and – more importantly – to make information accessible. FinTech also affects banks which are cautious of being disrupted and therefore try to catch on the FinTech-train by observing new entering startups which create alternatives to traditional banking services.

Even though the term “FinTech” is in the limelight of hot public debate in fields of business, finance and innovations, its meaning remains fuzzy. This vagueness refers both to experts, who deal with FinTech in their working practices or create and shape the field by themselves, and to those, who are looking at it from outside, who are mainly targeted customers or just observers. One reason for this could be novelty and rapid tremendous rise of the FinTech industry. FinTech is a very broad phenomenon which changes every day through new entering entrepreneurs who step into the industry, willing to transform and adjust it to market requirements. On the one hand, FinTech could be understood as a financial service, which is disrupted by innovative technologies in order to satisfy the major requirements of “tomorrow”: high efficiency, cost reduction, business processes improvement, rapidity, flexibility and innovation (Dapp 2014). On the other hand, the term “FinTech” is also used to refer to companies (mostly startups), which serve as enablers of such kinds of services. At this point this term is ambiguous and leaves space for further discussion (Zavolokina *et al.* 2016).

Apart from that, further approaches have been made to categorize FinTech companies. Gomber *et al.* (2017) categorize FinTechs based on a concept called the “Digital Finance Cube” which is made off the “*three central Digital Finance dimensions: Digital Finance business functions, relevant technologies and technological concepts as well as institutions providing Digital Finance solutions*” (p.542). These three dimensions are shown graphically in Figure 1:

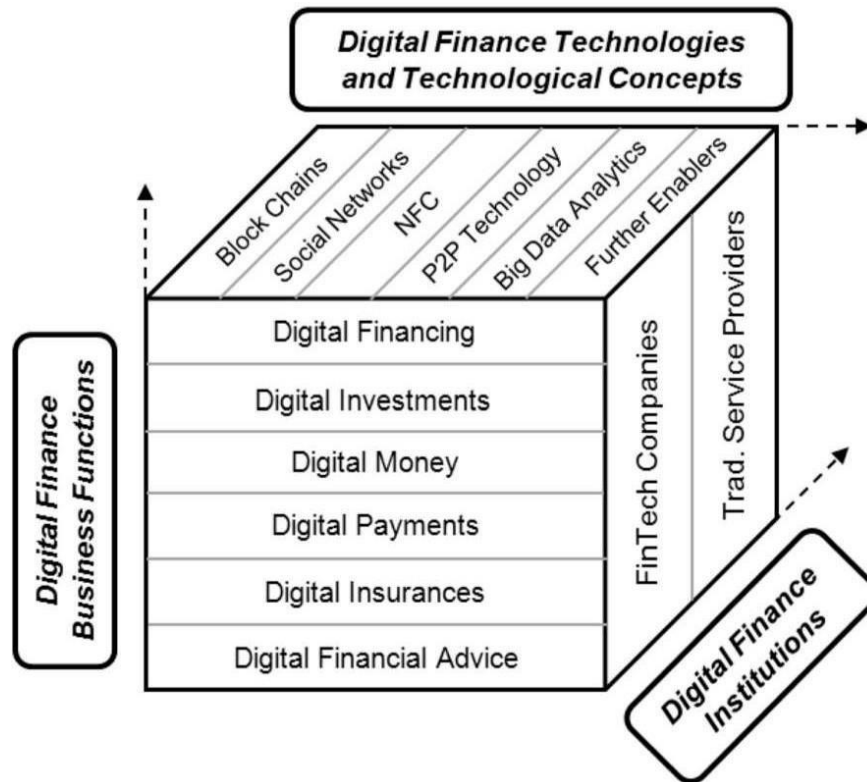


Figure 1: The digital finance cube  
Source: Gomber *et al.* (2017) p.542

Below, the three categories as well as their sub-categories are further explained.

## 2.1. Digital finance business functions

The *Digital Finance Business Functions* dimension defines business ideas related to real, monetary payment transactions that use new technology. This includes new options for the procurement of capital, investing capital and all kind of financial services.

The first sub-category is *Digital Financing*. Traditionally, banks are the suppliers of financial resources for individuals or companies. To become independent from these traditional ways, the internet can be used to acquire the

necessary financing (“Digital Financing”). Financing can be further distinguished in factoring,<sup>2</sup> invoice financing,<sup>3</sup> leasing<sup>4</sup> and crowdfunding<sup>5</sup>.

The second sub-category, *Digital Investments*, supports individuals and institutions in investment decisions and in arranging the required investment transactions on their own by use of the respective devices and technologies. Digital Investments include mobile trading,<sup>6</sup> social trading,<sup>7</sup> online brokerage,<sup>8</sup> and online trading<sup>9</sup> in the B2C area and high frequency<sup>10</sup> and algorithmic trading<sup>11</sup> in the B2B context.

*Digital Money*, a generic term for ‘digital currency’, ‘virtual currency’, ‘e-money’ and ‘cryptocurrency’, describes a type of currency that fulfills all typical functions of money but exists only electronically and is mainly used on the internet. The most famous examples are crypto currencies such as Bitcoin or Ethereum.

*Digital Payments* are all kinds of payments that are initiated, processed and received electronically and contain only traditional currencies (“fiat currencies”) that are issued and regulated by central banks (Hartmann 2006). They can be further distinguished in mobile payments, P2P payments<sup>12</sup> and e-wallets/digital wallets.

*Digital Insurances* (also known as InsurTechs or InsuranceTechs) are technology companies that specialize in customer-oriented services in the insurance industry (Mitschele 2018).

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<sup>2</sup> Factoring means selling all or only part of the accounts receivable of a company to a factoring firm to a value less than the original invoice value. The factoring company is then in charge of dealing with the accounts receivable, while the company receives its money directly from the factoring company and thereby improves its working capital management.

<sup>3</sup> Similar concept as factoring with the difference that the company receives money from the invoicing firm directly and pays back the total amount + interest after collecting the accounts receivable.

<sup>4</sup> Leasing is a special type of renting, where a company uses e.g. production facilities which are owned by another company over a certain time while paying a monthly fee. At the end of the time period, the production facility returns to the owning company.

<sup>5</sup> Crowdfunding defines a form of financing (“funding”) a project/product/idea through a big number of small investors (“crowd”), mostly over the internet. The investors do not necessarily have to get paid back with money.

<sup>6</sup> Mobile Trading is the use of wireless technology in securities trading. Investopedia.com, “Mobile Trading”, last access 29.12.19.

<sup>7</sup> Usually online platforms, where private investors can review and copy the investment strategy of more experienced investors. bafin.com, “Social Trading”, last access 29.12.19.

<sup>8</sup> Online brokerage a service to trade securities over an online platform, mostly offered by bigger financial institutions. The user acts as its own broker.

<sup>9</sup> Similar to mobile trading, with the use of non-wireless devices.

<sup>10</sup> High frequency trading (HFT) is a trading method that uses powerful computer programs to transact a large number of orders in split seconds. nasdaq.com, “High-frequency trading”, last access 29.12.19.

<sup>11</sup> Algorithmic trading is a process for executing orders using automated and pre-programmed trading instructions by taking into account variables such as price, timing and volume. nasdaq.com, “Algo or Algorithmic trading”, last access 29.12.19.

<sup>12</sup> P2P: A grouping of workstations with equal rights in networks that enables the use of distributed applications and the exchange of files. A central server is not necessary. In the FinTech context, P2P defines (mostly) transaction processes between two or more individuals without intermediation by a financial institute like a bank or insurance company.

*Digital Financial Advices* fulfil the same purpose as review sites and comparison portals in the non-financial sector that rate, score, rank, evaluate and compare products and services. In the financial sector, however, those platforms exist as well and can be differentiated based on two characteristics: firstly, providers that primarily offer financial product reviews and secondly, providers that focus on financial product comparisons which are for example based on figures and features.

## 2.2. Digital finance technologies and technological concepts

The *Digital Finance Technologies and Technological Concepts* dimension describes all new invented technologies and concepts by FinTech companies. Those inventions include for example new introduced technologies on which new forms of payments are based to make the process more transparent as well as technologies that enhance P2P transactions.

The first sub-category is *Block Chain*. The block chain concept has its origin in the invention of the crypto currency Bitcoin and basically is a decentralized, distributed, and public, digital ledger<sup>13</sup> that is used to record transactions across many computers so that any involved record cannot be changed retroactively, without changing all the subsequent blocks. That makes it safe against fraud and, apart from financial purposes, can also be used for many other purposes.

Secondly, *Social Networks*, are “*web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system*” (Boyd and Ellison 2007, p.211). On this type of websites, people can share their opinions, experiences, photos, videos and can ask for specific questions or initiate discussions.

*NFC* is a “*short-range wireless point-to-point interconnection technology*” that enables two devices to “*communicate without any further configuration steps when [...] brought very close [to] each other*” (Nagashree et al. 2014, p.20). These days, most phones and even credit cards use this technology, making it possible to pay within milliseconds by just holding the card/phone close to the end device while the payment transaction is initiated, and the transfer of money is arranged. *P2P Technology* or ‘P2P systems’ are “*self-organizing system of equal, autonomous entities (peers) [which] aims for the shared usage of distributed resources in a networked environment avoiding central services*” (Steinmetz and Wehrle 2005, p.10). That means that participants in such a network share part of their own resources, such as processing power, storage capacity or network-link capacity.

*Big Data Analytics* is characterized by an enormous volume of data to be analyzed with high processing velocity and a variety of data sources (McAfee

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<sup>13</sup> graphics.reuters.com, “Blockchain explained”, last access 29.12.19.

and Brynjolfsson 2012). Big data analytics should be able to deal with very large amounts of data in order to be able to scale to big data volumes, fulfill data loading and the calculation of answers to related requests in an appropriate time, support analytic modeling and manage visual display of data and results (Russom 2011).

*Further Enablers* are new technologies and devices that facilitate financial processes, functions and business models such as mobile devices, worldwide connectivity, intuitive user interfaces and security technologies (Gomber *et al.* 2017).

### 2.3. Digital finance institutions

*Digital Finance Institutions* refer to all kind of companies that offer digital financial services.

*Traditional Service Providers* are referred to as the “brick-and-mortar” financial service providers like investment banks, retail banks, insurance companies and brokerage firms. *FinTech Companies* emerge either as FinTech start-ups or technology companies which lack a history in banking business and/or financial services. According to Lee (2015) especially new entrants apply business models that promise more efficiency, security, flexibility and opportunities compared to traditional service providers. Another feature of FinTech Companies is that they face barriers to entry such as regulatory burdens and the demand for bank licenses, which can make market entry significantly more difficult.

In conclusion it can be said that "FinTech", contrary to what is often erroneously assumed, is not only the generic term for newly emerging companies in the financial sector, but rather describes a number of matters. It starts with business functions which describe the characteristics of new business fields within the financial sector and continues with technologies, with which completely new approaches are created, e.g. in data transmission or data processing. Finally, there is financial institutions (in the following report “FinTech companies”) which ultimately make use of all this and transform it into business concepts.

## 3. FinTech’s current situation and impact on the financial environment

Over the past three years, the banking industry was confronted with a wave of new emerging terms from the financial sector: P2P, crypto currencies, blockchain, AI, big data etc. Simultaneously, new service providers emerged in all fields of digital finance: companies like Alipay and WeChat Pay from China,

PayPal from the US or M-Pesa from Kenya<sup>14</sup> disrupted the market of digital payment. TransferWise and WorldRemit, both from the UK, compete with well-known players Western Union and MoneyGram for international money transfer and remittance. On the credit side, Lending Club, Prosper and SoFi from the US, Zopa and Funding Circle from the UK, Prêt d'Union from France or Alibaba from China compete with established banks in the unsecured consumer loan and SME market as well as the residential lending market. Furthermore, Prodigy Finance from the UK offers loans to international students attending top universities (Dermine 2017). FinTechs are considered to attract new clients easily through simpler propositions, a more convenient user experience, more transparency and better personalization options. Their core characteristics are the focus on the customer proposition and their willingness to apply technology in new ways. All these are powerful differentiators in a market, where many product-focused incumbents struggle to deliver the seamless and personalized user experience that is more and more expected by the customers (Obe *et al.* 2017).

In October 2015, the *Financial Times* commented on the recent development regarding the object these new emerging FinTechs pursue as following:

*“The aim is to inflict death by a thousand cuts. Fintech start-ups are nimble piranhas, each focusing on a small part of a bank’s business model to attack.”*<sup>15</sup>

This quote impressively demonstrates the pessimistic outlook one of the most influential finance newspaper had regarding the future of the traditional banking industry. Soon replaced through an innumerable amount of highly specialized FinTech companies, old-established financial institutions are either too big to implement more efficient business models or did realize upcoming trends and new consumer preferences too late. Four years later, after some time has passed and more studies were conducted this quote can be considered more differentiated. The following part examines the current situation of FinTechs and its implications for the financial environment.

### 3.1. Current situation

FinTech is considered to have the potential to change the financial sector substantially. It could disrupt existing financial intermediation which includes banks, insurances, funds, leasing and factoring companies and asset managers, with new business models empowered by intelligent algorithms, cloud computing, big data and AI. Driving forces could be the lower costs and better consumer experience. However, by looking at empirical data, FinTech remains very small compared to the traditional financial intermediation sector, especially

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<sup>14</sup> M-Pesa has been founded 2007 by Kenyan telecom company Safaricom in cooperation with the British telecom company Vodafone.

<sup>15</sup> ft.com, “Mobile bank chief mocks big street rivals”, last access 28.10.19.

in the European Union. Even China, the largest FinTech market, is of marginal size compared to overall financial intermediation, as shown in Figure 2.

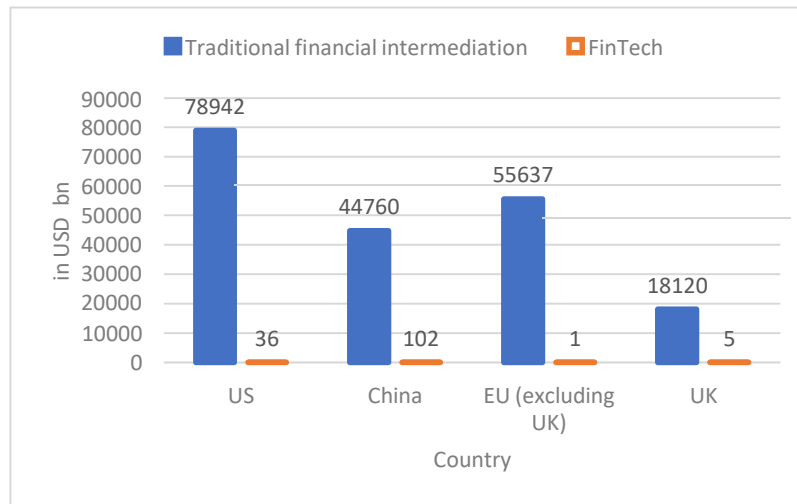


Figure 2: Transaction volume of traditional banking sector vs. FinTech in 2015  
Source: own elaboration, data from Demertzis *et al.* (2018)

Especially in the EU (excluding UK) the financial intermediation landscape changes slowly and remains dominated by traditional banking (Demertzis *et al.* 2018). Nevertheless, investments in all major FinTech markets USA, Asia-Pacific and Europe steadily increased in the last years on average with reaching a record year in 2018 with counted deals of 2590 and USD 120.2 bn in total investment activity (see Figure 3).

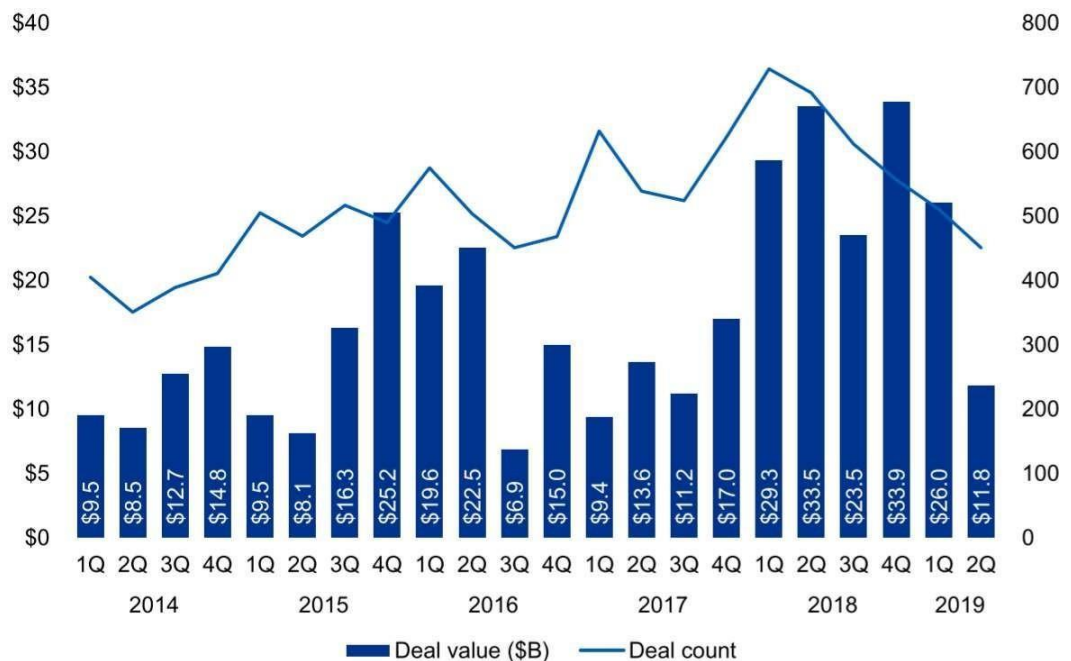


Figure 3: Total global investment activity (VC, PE and M&A) in FinTech 2014-2Q 2019  
Source: Pollari and Ruddenklau (2019) p.9, data provided by PitchBook



Even though deal size plummeted in the first half of 2019, this year can still be a record year since major investments have been signed but not executed yet. Furthermore, the total amount of deals is predicted to decline while average deal size is said to increase which is a sign that investors are moving away from the “fear-of-missing-out” mentality and making more mature investment decisions by using a considerable amount of money instead of making smaller investments in a larger number of companies (Pollari and Ruddenklau 2019). Data from the past five years in Table 1 seem to confirm this prediction only in part. Although the average deal size is steadily increasing with one exception, this is more due to the fact that more money is being invested. In fact, the total number of transactions is rising in the same period. *Annex 1* provides a more detailed summary over the top ten deals regarding transaction size in 2018. By far, the biggest alternative finance<sup>16</sup> market in terms of market volume is China, which exploded by 134.3% from €94.61 bn in 2015 to €221.66 bn in 2016.

2014	2015	2016	2017	2018	1Q+2Q 2019
<b>Total number of counted deals in FinTech 2014-2Q 2019</b>					
1,556	1,981	1,998	2,318	2,590	962
<b>Total deal volume in FinTech 2014-2Q 2019 (in bn USD)</b>					
45.5	59.1	64	51.2	120.2	37.8
<b>Average deal volume 2014-2Q 2019 (in m USD)</b>					
29.24	29.83	32.03	22.09	46.41	39.30

Table 1: Overview over number of counted deals, total and average deal volume 2014-2Q 2019  
Source: own elaboration, data by Pollari and Ruddenklau (2019)

Figure 4 provides an overview over the development of the alternative finance market from 2013-2016 in the three most relevant regions. Especially in the Asia-Pacific region, the market volumes rocketed whereas in America and Europe the market volumes only slowly increased.

<sup>16</sup> *Alternative finance* refers to channels, processes and instruments that have emerged outside of the traditional finance system such as regulated banks and capital markets including crowdfunding, P2P consumer/business lending and third-party payment platforms and excluding e.g. InsureTechs, jbs.cam.ak.uk, last access 13.11.19.

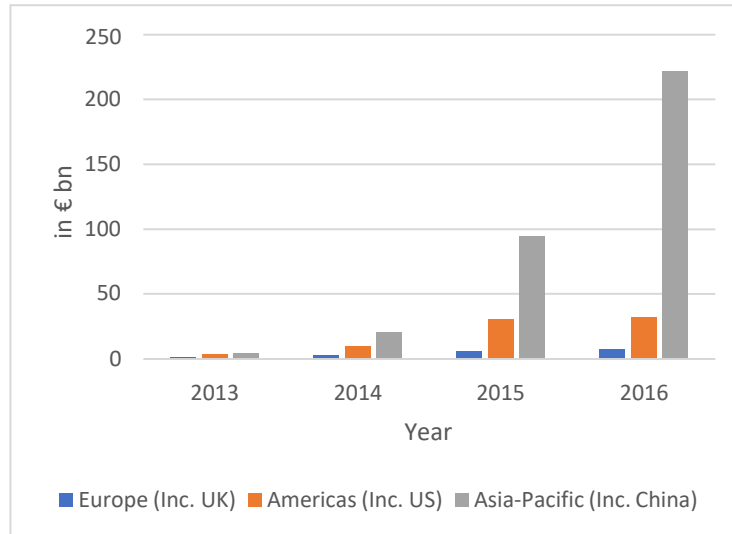


Figure 4: Regional online alternative finance market volumes 2013-2016  
Source: own elaboration, data by Ziegler *et al.* (2018)

One similarity all the regions share is the fact that in each of the regions one country accounts for a substantial proportion of total market volume, namely UK in Europe, US in Americas and China in Asia-Pacific. This applies in particular to Americas and Asia-Pacific, which are highly dependent on USA and China, respectively. Anyway, there is differences between the main FinTech markets Americas, Asia-Pacific and Europe which will be more closely examined in the upcoming part. The main problem FinTechs face across the globe is according to Gulamhuseinwala *et al.* (2017) the fact that the companies are not articulating the clear benefits of their work and technology to consumers and banks they could potentially collaborate with. FinTechs must communicate their value proposition clearly, differentiate themselves with regulatory prowess, must be well-networked and have to build a robust business model in order to survive and grow in the market.

### 3.1.1. Europe

The total European FinTech market grew by 41% from 2015 to reach €7.67 bn in 2016 (Figure 5). Excluding UK, the European FinTech industry grew 101% from €1.02 in 2015 bn to €2.06 bn in 2016, which is above the CAGR of 85% between 2013 and 2016 (Figure 6). This indicates that while the UK is the key volume driver for the region, Europe's growth in transaction volume is higher when excluding the UK from the data set due to fast developing markets in smaller European countries and an increasing importance of other European countries in FinTech, like France and Germany. UK's dominance on the European FinTech market can also be confirmed by looking at the Top ten deals in Europe regarding transaction size (*Annex 2*). Except for the second place among the largest transaction volumes in the FinTech sector, position one to seven were executed in the UK. Apart from regulatory incentives, which are discussed more detailed in Section 5, the reasons for this may be greater attractiveness for American investors due to London as the financial capital in Europe and lower language barriers. It is worth highlighting the fact that the transaction volume generated does not necessarily correlate with the amount of

alternative finance platforms<sup>17</sup> distributed across the country. For instance, Finland only had eight platforms 2016 but ranked fourth in terms of transaction volume whereas Italy with a total of 26 platforms is only ranked sixth place (Ziegler *et al.* 2018).

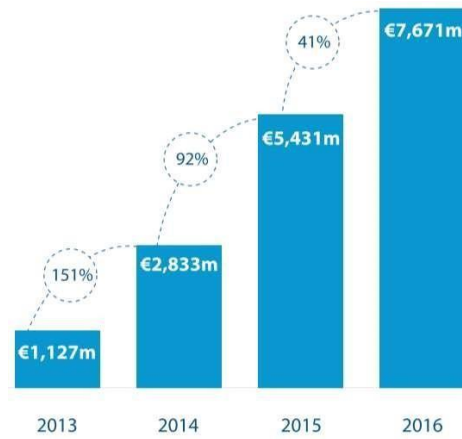


Figure 5: European FinTech Market Volumes 2013-2016 (including UK)

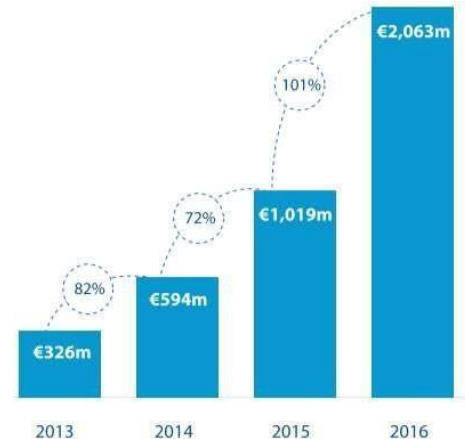


Figure 6: European FinTech Market Volumes 2013-2016 (excluding UK)

Source: Ziegler *et al.* (2018) p.21

One interesting particularity in the European market is the market share distribution across the countries (Table 2). The UK is with 73% of total market volume (as of 2015) in the whole European region by far the biggest and most important country while the remaining European countries share the outstanding 27%. France, Germany and the Netherlands are following as most important single markets. Looking at the European Union, it becomes clear that the Brexit will result in major shifts in the FinTech sector and will significantly reduce the market position of the European Union as a whole.

Rank	Country	Total market volume (in m €)	% on total market volume
1.	UK	5,608	73.11%
2.	France	444	5.79%
3.	Germany	322	4.20%
4.	Netherlands	194	2.53%
5.	Finland	142	1.85%
6.	Spain	131	1.71%
...	...	...	...
21.	Russia	4.8	0.06%

Table 2: Total FinTech market volume per European Country 2015

Source: own elaboration, data by Ziegler *et al.* (2018)

Like in any other region, investments in FinTech decreased in 1Q and 2Q 2019 in Europe due to the initially mentioned causes (see Figure 7). Like the other

<sup>17</sup> Ziegler *et al.* (2018) broadly refer to alternative finance platforms as a variety of financial activity being realized on online platforms.

regions, 2018 marked a peak in investment activity. *Annex 3* provides an overview over the FinTech segments ranked by market volume. It can be observed that P2P consumer lending (34%) and P2P business lending (17%) are the most important markets in the European region since several years, followed by invoice trading (12%) and equity-based crowdfunding (11%). Based on company's valuation, the biggest FinTechs in Europe are the payment processor Adyen from Netherlands (USD 8.3 bn), digital payments platform Nexi from Italy (USD 8.2 bn) and payment provider Klarna from Sweden (USD 5.5bn)<sup>18</sup>.

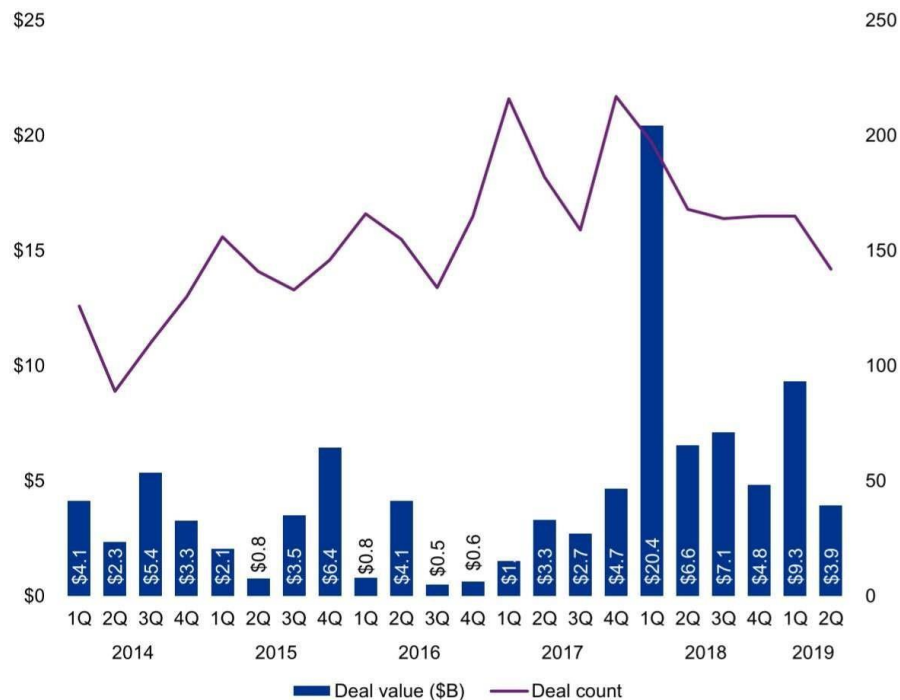


Figure 7: Total European investment activity (VC, PE and M&A) in FinTech 2014-2Q 2019  
Source: Pollari and Ruddenklau (2019) p.51, data provided by PitchBook

### 3.1.2. Americas

In the region “Americas”, consisting of Canada, the USA and Latin America the US accounts for 98% of total market volume in 2018 which makes it the most important market in the region (Pollari and Ruddenklau 2018). As in the years before, US investors are the driving force in the region regarding FinTech investment. Furthermore, seven of ten top deals in Americas region took place in the US, two in Canada and one in Argentina. In 1Q+2Q 2019, FinTech investment in the Americas reached USD 21,1 bn across 545 deals (see Figure 8) where number of deals counted and transaction volume decreased compared to 1Q+2Q 2018. This dip, especially in the US, is not expected to last long since there are massive M&A deals announced in 3Q+4Q 2019 which are supposed to be record-breaking. The payment segment together with B2B services are considered to be the major investment fields in the second half of 2019 (Pollari and Ruddenklau 2019). Based on company valuation, the biggest FinTechs in

<sup>18</sup> insights.invyo.io, “The European Top 50 of the most valued Fintech”, last access 29.10.19.

Americas are B2B service provider Stripe (USD 22.5 bn), cryptocurrency trading platform Coinbase (USD 8 bn) and online broker Robinhood (USD 5.6 bn), all from the US<sup>19</sup>.



Figure 8: Total Americas' investment activity (VC, PE and M&A) in FinTech 2014-2Q 2019  
Source: Pollari and Ruddenklau (2019) p.29, data provided by PitchBook

### 3.1.3. Asia-Pacific

In the Asia-Pacific region China accounts for 99% of market volume in 2018. In 1Q+2Q 2019, investments in FinTech companies in this region received USD 3.6 bn across 102 deals (see Figure 9). After a record high of USD 25.5 bn in 2018, investment activities in the region are declining because of a lack of megadeals triggered by the US-China trade tensions and an increasing regulatory focus on FinTech by the Chinese government (Pollari and Ruddenklau 2019). Hong Kong Monetary Authority made efforts to develop the FinTech sector during 1Q+2Q 2019 by issuing its first eight virtual banking licenses and thus offers simplified access to the banking sector<sup>20</sup>. Compared to the 154 banking licenses that are currently in circulation and held by incumbent banks, this marks a new step towards the digital age. Motivated by that, Singapore wants to follow by issuing five digital banking licenses in the upcoming half a year. China is expected to see its main investment activity in blockchain technology, AI, big data and cloud services. What differentiates China from the two other major regions is the fact that not many small FinTech companies are dominating the market but essentially three major players which are Baidu, Alibaba and Tencent (Pollari and Ruddenklau 2019). According to Tong *et al.* (2018), China and India are the largest FinTech ecosystems in the world based on investments and number of startups. In 2018, Ant Financial raised with USD 14 bn the world's

<sup>19</sup> forbes.com, "The 11 biggest Fintech companies in America 2019", last access 04.11.19.

<sup>20</sup> vantageasia.com, "Eight virtual banks approved for HK", last access 15.11.19.

largest VC round ever in order to fund its global expansion (Pollari and Ruddenklau 2018).

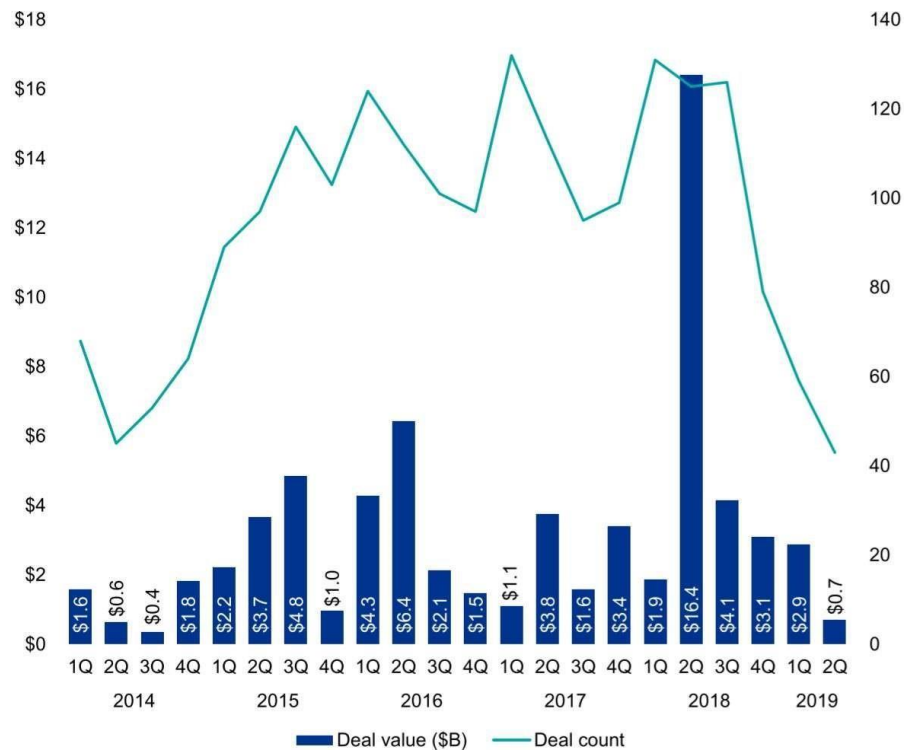


Figure 9: Total Asia-Pacific's investment activity (VC, PE and M&A) in FinTech 2014-2Q 2019

Source: Pollari and Ruddenklau (2019) p.65, data provided by PitchBook

### 3.2. Impact on financial environment

FinTech is said to have a huge impact on the financial sector. This is true in two ways: on the one hand, its disruptive power will influence the incumbents in the traditional sector and banks need to find out how to deal with the not-so-new phenomenon. On the other hand, FinTech will have impact on macroeconomic circumstances and therefore on monetary policies and central bank decision. The following part is examining those two fields in more detail.

#### 3.2.1. Impact on retail and investment banking

Taking into account the previously examined massive deal sizes and increasing investments in the FinTech sector it is no wonder that the incumbent financial sector is striking back. Traditionally, banks have focused more on products, while new entrants are more focused on the customer. According to Vives (2017), traditional retail banks have two competitive advantages. Firstly, banks can cheaply borrow money with their beneficial access to deposits and explicit or implicit governmental guarantees. Secondly, they enjoy privileged access to a stable customer base that can be sold a range of products. However, those advantages can be eroded by the new entrants in the future. FinTechs intervene in the traditional business of banks, the banks have recognized this and are now

also reacting to the digital change. At the beginning of the rise of FinTechs the incumbents were slow to respond directly to the new players and started their first steps in the FinTech world with digital offerings in non-core businesses or geographical areas where they could take more risk (Galvin *et al.* 2018). Nowadays, they realized the possible threat and now counterattack the market with more determined products. Goldman Sachs' "Marcus" is perhaps the most high-profile push into digital by an investment bank and the bank's first step into private retail. It is a consumer lending franchise and offers different types of loans to customers while being transparent and easy to understand<sup>21</sup>. Entering in 2016, Marcus already surpassed the USD 3 bn mark in US consumer lending volumes in 2016<sup>22</sup>. Furthermore, it hit the USD 1 bn mark in loans in just eight months while many competitors took over a year. To achieve this, Goldman used established digital sales and marketing techniques to become a leading provider in a short period of time. Marcus' success in the US let Goldman Sachs to launch it as well in the UK in September 2018, where it captured 100,000 customers in the first month (Cahill 2018). Another example for a FinTech entry of an investment bank is "Access Investing", a digital wealth management platform in the US, launched by Morgan Stanley in 2017. In order to use the platform, customers must invest a minimum amount of USD 5,000. In the same year, Bank of America Merrill Lynch with "Merrill Edge Guided Investing" and Deutsche Bank with "Robin" launched similar offerings. Furthermore, there is an increasing number of partnerships between incumbents and FinTechs to profit from benefits in combining partnership models. The incumbent banks bring their higher speed and risk tolerance as well as their flexibility in reacting to market changes. In addition to that, they do already have a large client base, the associated data bases and long-established relationships. FinTechs can furthermore profit a lot from the incumbent's compliance and regulatory competencies, which are especially valuable for newer, smaller entrants. Global banks which already are in a partnership with FinTechs are for example JP Morgan and ING. JP Morgan's digital strategy includes partnerships with Roostify, a digital, self-service mortgage platform,<sup>23</sup> AccessFintech, which aims to deliver collaboration and transparency to the financial service industry<sup>24</sup> and Symphony, a platform providing business intelligence<sup>25</sup>. ING, on the other hand, launched with ING Ventures in 2017 a €300 million fund focused on FinTech investing and has already invested or partnered with a total of 115 startups between 2014 and 2017<sup>26</sup>.

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<sup>21</sup> marcus.com, "We created Marcus to help people achieve financial well-being", last access 03.11.19.

<sup>22</sup> compliance.com, "Goldman Sachs so far has loaned USD 3 billion to Main Street America", last access 08.11.19.

<sup>23</sup> roostify.com, "Delivering a simpler and faster lending process with JPMorgan Chase", last access 08.11.19.

<sup>24</sup> fintechfutures.com, "JP Morgan extends partnership with AccessFintech", last access 14.06.19.

<sup>25</sup> businessinsider.de, "Wall Street made an ambitious, 300 USD million bet to build a challenger to Bloomberg – here's how it's getting on", last access 09.11.19.

<sup>26</sup> ing.com, "ING launches ING Ventures: a EUR 300 million fintech fund", last access 09.11.19.

Another approach is taken by Chinese financial institutions, partnering with large technology ecosystem firms<sup>27</sup> as opposed to smaller FinTechs. In 2017, each of China's "big four" banks<sup>28</sup> has partnered with at least one ecosystem company (Galvin *et al.* 2018). Examples are a joint FinTech-laboratory launched by Bank of China and technology-giant Tencent in 2019<sup>29</sup> or an agreement between China Construction Bank, Alibaba and Ant Financial to digitize customer banking experience in 2017<sup>30</sup>.

In conclusion, two major observations can be made:

1. FinTechs can help incumbents – not just disrupt them

Dietz *et al.* (2016) found that a substantial majority – almost three-fourths of FinTechs – focus on retail banking, wealth management, lending, and payment systems for SMEs. While this indicates that FinTechs seek to target the end consumer directly and therefore bypass traditional banking business, the trend develops to more B2B offerings (from 34% of B2B start-ups launched in 2011 to 47% of launched B2B start-ups in 2016, worldwide). This shows that FinTechs more and more prefer to partner with and provide services to established banks which continue to own the relationship with the end customer. That trend is especially true in corporate and investment banking (CIB), which accounts for 15% of all FinTech activity across the market. Two-thirds of all FinTechs active in CIB provide B2B products and services, and only 12% truly try to disrupt existing business models and directly attacking incumbents. There are many reasons for that. On the one hand, CIB is mostly based on relationships and trust, which is a huge incumbent advantage. On the other hand, CIB services, like fixed-income trading, financial derivatives or structured financial products, are capital intensive or require highly specialized knowledge. That is why FinTechs rather focus on retail and SME segments, while those active in CIB enter into partnerships to provide specific solutions with long-established players that own the technology infrastructure and client relationships. Incumbent banks thereby profit from an improved value chain and can focus on their core business. According to Vives (2017), the true disruption may come to the full-scale entry of top digital internet companies such as Amazon, Apple or Google. They indeed are already active in the FinTech market but have not entered the market in a resolute way yet.

2. Collaboration – not competition – will be the primary driver of disruption coming through the emergence of FinTech

According to Gulamhuseinwala *et al.* (2017) the biggest near-term threat to most banks does not come from FinTechs but from traditional competitors that know how to better leverage those FinTechs. All 45 major banks which were analyzed

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<sup>27</sup> Technological ecosystem companies are large and well-established tech-companies active in a variety of other business fields, e.g. Tencent or Alibaba.

<sup>28</sup> "Big four" banks: Bank of China, China Construction Bank, Industrial and Commercial Bank of China, Agricultural Bank of China

<sup>29</sup> chinabankingnews.com, "Tencent Teams up with Big State-owned Bank to Launch Fintech Lab in Shenzhen", last access 14.11.19.

<sup>30</sup> spglobal.com, "China Construction Bank, Alibaba sign corporation pact", last access 07.11.19.



in the report were engaged with FinTechs in one way or another, but only a quarter of them were extensively engaged with them because of barriers that hinder incumbents to effectively collaborate with FinTechs. True to the motto “partner or perish” the core strategic challenge for incumbents is to choose the right FinTech partner and not the question to or not to collaborate. Regarding the huge amount of FinTechs on the market, finding the right cooperation partner can be difficult and is considered to be the key strategic challenge. Furthermore, cooperating can be very complex and costly. Successful incumbents need to consider many options, including acquisitions<sup>31</sup>, simple partnerships like the previously mentioned one between JP Morgan and Roostify or more-formal joint ventures<sup>32</sup>.

In order to participate in future developments, incumbents must focus on three critical behaviors that can transform them into “digital winners”, which could ultimately decide over success and failure (Skan *et al.* 2015). First, it is important to act open. That is meant in the way that incumbents have to open up the organization’s own intellectual property, assets and expertise to outside innovators in order the help generate new ideas, identify and attract new skills, change organizational culture and discover new areas for growth by using the concept of Open Source<sup>33</sup>. This concept has already been adopted and implemented by many banks including Fidor Bank (Germany), BBVA (Spain) and Goldman Sachs (USA).

Second, it is important for incumbents to collaborate with newly emerging FinTechs. Collaboration inside the financial sector is a common phenomenon, especially when there is opportunity to share processes or services that are considered to be “non-core”. One of the most famous examples is MasterCard, which was founded by a consortium of banks to support interbank card payments for consumers in 1966. While collaboration with new start-ups is getting more and more common, incumbents still need to open up for new players in order to maintain and increase value. Skan *et al.* (2015) reveal that 80% of 25 business leaders in the financial sector think that working with start-ups brings new ideas to their business and improves their competitive situation.

Third, incumbents have to venture invest. Start-ups usually have a high innovation quotient but are in need for capital, whereas incumbents with a lot of capital must increase their ability to innovate. By investing in new entering companies, synergies can be created, even though venture investing is always connected to high risk which must be considered when investing.

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<sup>31</sup> Example: reuters.com, “London Stock Exchange shareholders bless USD 27 billion Refinitiv deal”, last access 04.01.20.

<sup>32</sup> This applies in particular to joint ventures established between two incumbents like the one between Saxo Bank and Geely Holding in December’19. home.saxo, “Saxo Bank and Geely Holding Group to establish fintech joint venture serving the China market”, last access 04.01.20.

<sup>33</sup> “Open Source“ is a term used to describe software whose source text is available for the public, so it can be reviewed, changed and used by third parties. gruenderszene.de, “Open Source”, last access 17.11.19.

### 3.2.2. Impact on central banks and monetary policy

Not only will FinTech have an impact on the commercial finance sector but on central banks and their different areas of responsibility – mainly monetary policy and financial stability – as well. Central banks have to react on the recent development in the financial sector by developing new models and operational frameworks. *Amara's law* describes the expected impact of technological change as tending to be overestimated in the short run but underestimated in the long run<sup>34</sup>. In the long run, FinTech may affect the different areas of responsibility of central banks in two main ways (Meyer *et al.* 2017): changing money demand and changing the industrial organization of the financial system which both can directly affect the conduct of monetary policy, currency demand, financial stability and the need for a lender of last resort. Central banks and its representatives have to ask themselves two main questions in order to continue carrying out their mandates effectively: (1) When should a central bank be concerned about developments in FinTech? (2) If there is a concern, what should the policy response be?

Certainly, the most important responsibility of a central bank is conducting monetary policy. The adoption of new forms of electronic means of payment, especially through DLT technology<sup>35</sup> and value storing may fundamentally affect money demand and thus how central banks achieve low and stable inflation. A second traditional area of responsibility is the design and distribution of currency. FinTech could affect this function if there is a widespread substitution away from banknote retail transactions where its main impact would be a drastic change of the composition of the balance sheet of the central bank. However, both cases seem to be unlikely in the near future, especially in countries with a credible monetary policy. In the long run, citizens may prefer virtual currencies since they offer the same cost and convenience as cash – no settlement risks, no clearing delays, no central registration, no intermediary (Lagarde 2017). In this case however, as a last resort, central banks can still choose to issue their own digital alternative to banknotes for retail transactions (Fung and Halaburda 2016).

Currently, FinTech is more likely to bring change by creating new financial intermediation applications rather than changing the ones that exist today. Therefore, the best response of central banks is to monitor FinTech to form a view on its risks and opportunities. This, however, can be accomplished by

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<sup>34</sup> Roy Charles Amara was an American researcher and scientist and president of the “Institute for the Future”. He is best known for his “Amara’s Law” among technologists, Silicon Valley entrepreneurs and economic historians which is based on the observation that most applications of new technologies are implemented only after much trial and error. neatorama.com, “Four Geeky Laws That Rule Our World”, last access 30.12.19.

<sup>35</sup> Distributed ledger technology is a database that exists across several locations or among multiple participants and eliminates the need for a central authority or intermediary to process through its decentralization. It is considered to be the most revolutionary technology within the FinTech industry. The most famous example for a distributed ledger is the blockchain technology with its well-known representative Bitcoin. tradeix.com, “The Difference Between Blockchain & Distributed Ledger Technology”, last access 10.11.19.

providing access to the infrastructure central banks control and to encourage the testing of new business models with the new technology.

#### 4. Regulation approaches for FinTechs

The previous two sections have shown that FinTech will have an increasing impact on the financial landscape, both on the commercial sector and, in the long run, on monetary policy too. Both FinTech companies and governments have a genuine interest in having clarity about the prevailing regulatory situation in the particular jurisdiction. For example, the high cost of regulatory uncertainty is a major concern of new entering innovators. Regarding high uncertainty costs in the US, GAO (2018) states the following: “...*the cost of researching applicable laws and regulations can be particularly significant for FinTech firms that begin as technology start-ups with small staffs and limited venture capital funding. FinTech start-up businesses told us that navigating this regulatory complexity can result in some firms delaying the launch of innovative products and services — or not launching them in the United States — because the FinTech firms are worried about regulatory interpretation*” (p.41). Of course, this statement can be applied to all other jurisdictions and demonstrates the need for clear regulation specifications. Regulating FinTech, however, can be difficult when considering that FinTechs are not financial entities in the traditional sense but companies with different techniques, new technologies and business models. This poses a challenge to regulators when willing to promote Fintech’s prosperity and at the same time avoiding financial exclusion because the typical regulatory model assumes well-defined financial institutions. Especially in emerging and developing economies, regulators with limited expertise in technology may find it difficult to understand FinTech and assess its implications for regulation. Furthermore, in those regions, regulators often have limited resources and technology-led innovation adds additional pressure. Therefore, it is important for governments and regulators both in advanced and developing economies to find a way how to deal with the new emerging players and how to properly regulate them.

To do so, it is worth to take a look on why regulation, especially in the financial sector, is necessary. In an economic sense, regulation takes place when market failures occur. This in turn happens, when the allocation of goods and services is not efficient (pareto-efficient), often leading to a net social welfare loss. Market failures are often associated with five core problems<sup>36</sup>, whereby the relevant ones for the financial sector and therefore for FinTechs are *information asymmetries* and *non-competitive markets*. Information asymmetries occur when market participants lack information to make a rational choice about the value of an asset. This, in turn, can lead to adverse selection<sup>37</sup> which defines the

<sup>36</sup> These core problems include public goods, time-inconsistent preferences, information asymmetries, non-competitive markets, principal-agent problems or externalities. edchoice.org, “Defining Market Failure”, last access 04.01.20.

<sup>37</sup> wirtschaftslexikon.gabler.de, “Adverse selection”, last access 04.01.20.

retrieve of high-quality companies from a certain market due to the insufficient information customers can obtain<sup>38</sup>. This can have several implications for FinTechs and FinTech's customers, including the disappearance of high-quality providers of financial services and a reduced cost-benefit ratio. Non-competitive markets, on the other hand, occur, when a relatively small number of financial institutions dominate particular financial markets which may lead to a cartel-like behavior (e.g. the Libor scandal)<sup>39</sup>. This is especially true when referring to the emergence of new platforms that are serving specific niches, for example a FinTech providing Mezzanine financing for real estate<sup>40</sup>. The more specific the niche, the less competitors on the markets and the bigger the net welfare loss through overpriced services.

Regulators in advanced, emerging and developing economies have responded to such challenges by establishing new regulatory approaches in order to achieve market improvements and financial inclusion<sup>41</sup> (see *Annex 4* for a detailed overview about the yet applied approaches in the world). In this part, three common regulatory approaches (Innovation Offices, RegTechs and Regulatory Sandboxes) will be examined more closely.

#### 4.1. Innovation Offices

Innovation Offices can have different names, forms and functions but all engage with, and provide regulatory clarification to, financial service providers that seek to offer innovative products and services and are often the first step for a jurisdiction when considering applying a regulatory framework.

The key objective of Innovation Offices is to promote regulator-innovator engagement and mutual learning in a pro-innovation setting. This can work in many ways: holding office hours, offer a dedicated telephone number, maintain a website or link FinTech employees with a dedicated case officer<sup>42</sup>. For regulators, this interaction helps to identify emerging issues and can be used as evidence base for broader regulatory reform. They provide insights on whether further innovative regulatory initiatives are appropriate or necessary. For instance, they can provide input on the pros and cons of introducing a Regulatory Sandbox, which is considered to be a bigger, complex and cost-intensive step, to facilitate product or policy testing and could be called a "Regulatory Sandbox

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<sup>38</sup> "The Market for Lemons" is a phenomenon in economic science discovered in 1970 by G.A. Akerlof.

<sup>39</sup> [economicsonline.co.uk](http://economicsonline.co.uk), "Financial market failures", last access 04.01.20.

<sup>40</sup> Example: Linus-capital, FinTech that provides mezzanine financing for high net-worth individuals, family offices and institutional investors that has a unique business model in Germany. [linus-capital.com](http://linus-capital.com), last access 04.01.20.

<sup>41</sup> Financial inclusion refers to efforts to make financial products and services accessible and affordable to all individuals and businesses, regardless of their personal net worth or company size and is particularly important in emerging and developing countries. [worldbank.org](http://worldbank.org), "Financial Inclusion", last access 03.11.19.

<sup>42</sup> See as an example LabCFTC, an Innovation Office within the CFTC in the US. [https://www.cftc.gov/sites/default/files/2018-09/labcftc\\_officehours102318.pdf](https://www.cftc.gov/sites/default/files/2018-09/labcftc_officehours102318.pdf), last access 03.11.19.

light”<sup>43</sup>. One of the earliest Regulatory Sandboxes, in the UK, grew out of evidence of demand for the service of an existing Innovation Office. For the participants it helps understand the current regulatory landscape in a local context and in what direction FinTech-related regulation might be going.

Innovation Offices are a favorable option for capacity-constrained regulators (poor financial and material resources, insufficient staff, etc.) and therefore are likely to be installed in emerging and developing countries. They are often easier to establish than other regulatory approaches since they don’t require protracted legislative or regulatory change. In reality, however, most Innovation Offices are active in advanced and near-advanced countries. The offices consist mostly of officials from the regulating organ which can start small and simply educate the FinTech’s representatives e.g. by explaining relevant regulations for a planned new service or providing guidance for licensing. Those Innovation Offices can then iteratively expand based on demand. Innovation Offices usually choose the FinTechs based on eligibility criteria to determine which providers they engage with on specific regulatory objectives. This helps the regulators to find the innovators where support is most appropriate. That is especially important in the context of scarce resources and capacity problems, which problems authorities are mainly facing in emerging and developing economies. Common eligibility criteria (criteria names) of Innovation Offices are for example *genuine innovation*, *consumer benefit*, *financial inclusion*, *need for support*, or *risk mitigation* (UNSGSA FinTech Working Group and CCAF 2019). A prominent example for an Innovation Office is the Financial Technology Enabler Group (FTEG) in Malaysia<sup>44</sup>.

Empirically proven impacts of Innovation Offices according to UNSGSA FinTech Working Group and CCAF (2019) are:

- Reduced costs for innovators and consumers:  
Innovation Offices, a key point of contact between innovators and regulators, help FinTech companies quickly and easily understand regulatory frameworks, reduce barriers to entry and regulatory uncertainty. This can furthermore result in lower prices for the end consumer and better access to financial services.
- Improved consumer protection:  
Consumer protection is according to Mazer and McKee (2017) an integral part of financial inclusion. Financial innovation can lead to both opportunities and risks for consumer protection. Innovation Offices’ guidance to FinTechs about consumer protection requirements helps the companies to more efficiently develop compliant products by clarifying appropriate regulations. Furthermore, regulators profit from understanding trends and potential issues and risks for consumers.

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<sup>43</sup> Term developed by the author.

<sup>44</sup> FTEG was initiated by Bank Negara Malaysia (BNM) in June 2016 to improve the quality, efficiency and accessibility of financial services in Malaysia and is responsible for formulating and enhancing regulatory policies to facilitate the adoption of technological innovations in the Malaysian financial service industry, myftg.com, last access 25.10.19.

- Better informed policy making:  
Based on the experiences Innovation Offices made while working with the innovators, policy makers can identify risks of innovative new financial services and their implications for regulatory policies easier and apply the newly acquired knowledge on their policies.
- Increased competition:  
Innovation Offices decrease entry barriers by reducing regulatory uncertainty which promotes the entry, capitalization and growth of new firms in this sector. Besides do new entrants promote innovation and competition which, in turn, leads to lower prices for consumers, a greater range of products and better services. All this result in enhanced financial inclusion, which is important for countries with a high unbanked population (Mazer and Rowan 2016).

On top of that, due to the experiences made with Innovation Offices, some other remarkable observations can be made. On the one hand do Innovation Offices facilitate international regulatory knowledge exchange on financial innovation. Regulators take the inspiration and lessons learned by other regulators who had launched innovative regulatory initiatives and apply it on their regulatory initiative. On the other hand, do Innovation Offices act as a catalyst for a pro-innovation culture. Studies have shown that a dedicated Innovation Office with knowledgeable staff and the strong will to “push things through” is a key enabler of a pro-innovative culture (UNSGSA FinTech Working Group and CCAF 2019).

#### 4.2. RegTech

The term “RegTech” is a mixture of the words “regulation” and “technology” and represents an increasingly important tool for regulators when trying to achieve innovation and promoting financial inclusion. It encompasses all technologies used for regulatory purposes and was first conceptualized to describe compliance technology used to improve regulatory processes. First-generation RegTech primarily focused on reducing compliance costs of large and well-resourced financial firms. In the past few years, however, the definition of RegTech has broadened. Regulators and regulating institutions began to consider RegTech as a tool to keep up with the substantial changes in the financial services sector.

According to Murphy and Mueller (2018), RegTech consist of two distinct but complementary branches: compliance technology (CompTech) and supervisory technology (SupTech). Compared to Innovation Offices and Regulatory Sandboxes RegTech is unique. First, while the other two initiatives help regulators determine *which* set of activities to include within their scope, RegTech focuses on *how* to monitor and enforce those activities against relevant regulations and can therefore create opportunities for new ways to regulate the

financial sector. Second, it is not yet a common term among regulators. While Innovation Offices and sandboxes are common-known regulation approaches, the term “RegTech” can be difficult to pinpoint. Third, regulators must often overcome significant burdens within their organizations to meaningful use RegTech. In most cases it requires upgrading existing technology, including data infrastructure, and navigate difficult procurement requirements in the process. Another important component is trusted machine-readable data. Furthermore, regulators also have to attract relevant staff and align organizational culture towards innovation. For those reasons RegTech is more considered to be a longer-term proposition that often develops over a more extended timeframe to see tangible financial inclusion results than other regulatory initiatives. However, RegTech can turn out to be a longer lasting solution due to its potential to help regulators adapt to a changing market environment.

There is a great range of technologies underpinning RegTechs such as application programming interfaces (API), AI, machine learning, big data or cloud computing. RegTech approaches in the past have demonstrated that they improve effectiveness and lead to positive financial inclusion outcomes. RegTech can be used for the following purposes (UNSGSA FinTech Working Group and CCAF 2019):

- Supervising institutions:  
Regulators can use RegTech to keep up with the technology transformation that are changing the industry and to ensure compliance. Its impact is most visible in regulatory data collection and analysis efforts, where it can aid human decision-making. One example is the Banko Sentral ng Pilipinas (BSP) that used API-based regulatory reporting<sup>45</sup>. It provided greater real-time visibility on the conditions of supervised institutions and enabled them to act swiftly when necessary. Another example is the Central Bank of Brazil (BCB), which implemented a web based RegTech solution to allow the easy and secure sharing of information between regulators and providers. This system in particular collects data to assess risks and supports the supervisory process by generating automated reports (World Bank *et al.* 2018).
- Monitoring the marketplace:  
RegTech can help regulators monitoring the financial service marketplace. Just as the previously mentioned API-based tool used by the BSP that helps to better oversee individual institutions, data can also be visually aggregated to provide real-time snapshots of the entire market. Monitoring the market allows regulators to spot systemic risks and other forms of consumer harm that could extend beyond a single institution.
- Protecting consumers:  
Another area of application is the protection of consumers. RegTech can be used to engage more directly with consumers to ensure that they are

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<sup>45</sup> <https://www.r2accelerator.org/bsp>, last access 27.10.19.

protected properly. For instance, the Consumer Financial Protection Bureau (CFPB) in the US developed a consumer complaint portal and database<sup>46</sup> that makes it easier for consumers to report issues and provides greater visibility on consumer trends. Other examples are chatbot solutions which have the potential to promote consumer protection through better oversight of consumer complaints and firm behavior.

- Supporting rulemaking:  
Improved data collection and analysis through RegTech tools can help generate insights that lead to rule refinement and guidelines that contribute to financial inclusion.

On top of that, further observations can be made. On the one hand, it is important that the implemented RegTech is supported by senior leadership of the regulating institution, which is especially true for capacity-constrained environments. On the other hand, multi-disciplinary teams with complementary skillsets can be essential to establish useful RegTech solutions for addressing the identified problems in the adequate way. This works even better when individuals from the outside are involved (UNSGSA FinTech Working Group and CCAF 2019).

Regarding the FinTech development, RegTech is a useful tool for regulators to process and analyze data coming from the FinTech sector. This data can be used to predict trends and anticipate gaps in a regulatory framework as well as necessary changes in such framework because of too tightened-up regulatory requirements. Those trends can only be discovered in a medium to a long run time period.

### 4.3. Regulatory Sandboxes

Regulatory Sandboxes are, at their core, a framework set up by financial sector regulators or regulating entities to allow small-scale live testing of innovations by private firms in a controlled environment (operating under a special exemption, allowance, or other limited or time-bound exception) under the regulator's supervision (UNSGSA FinTech Working Group and CCAF 2019). They are established in order to promote FinTech development in a jurisdiction by applying laxer regulation, lowering entry barriers and providing support in all kinds of question regarding regulatory interrogations. They are furthermore meant to change the nature of the relationship between regulators and FinTechs towards a more open and active dialogue (Jenik and Lauer 2017). FinTech companies profit from having easier access to the traditionally high regulated financial sector and therefore higher chances of being successful, as do regulators by developing valuable experiences which they can apply on future regulation frameworks. In recent years, Regulatory Sandboxes have become a synonym for regulatory innovation (UNSGSA FinTech Working Group and

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<sup>46</sup> <https://www.consumerfinance.gov/complaint/>, last access 27.10.19.



CCAF 2019). If a sandbox is successful or not, regarding the intended impact, highly depends on how it is framed and on the prevailing market conditions (providers, competition, quality of innovations, level of development of the financial market infrastructure, customer trust and engagement).

The first sandbox approach was set up in the US by the CFPB in 2012 under the name “Project Catalyst” in order to serve as an opportunity for the FinTech industry and government regulators to work together on behalf of the consumers (McGreevy 2018). After the Financial Conduct Authority (FCA) from the UK coined the term “Regulatory Sandbox” in 2015, the concept has spread across more than 20 countries worldwide. In fact, most literature consider the FCA’s sandbox as the first sandbox to be ever established. The global interest in Regulatory Sandboxes is strong with sandboxes now live or planned in over 50 jurisdictions. Today, many other sandbox-like frameworks have been established around the world under the names *innovation hubs*, *incubators*, *accelerators* and *industry sandboxes*, which are, however, not only restricted to the FinTech sector (McGreevy 2018). They all follow the idea of facilitating innovation but differ slightly from each other (see Annex 9)

Figure 10 shows that currently many jurisdictions implemented Regulatory Sandboxes. Especially in the European Union, African countries and in the Asian region are many Regulatory Sandboxes operating at the moment. The same is true for forthcoming and proposed sandboxes. This can be explained through the legal structure of the particular regions: while the US, Canada or Russia are each controlled by one supervising financial authority, the EU, Asia-Pacific or Africa are all regions consisting of many small countries with independent financial supervision.

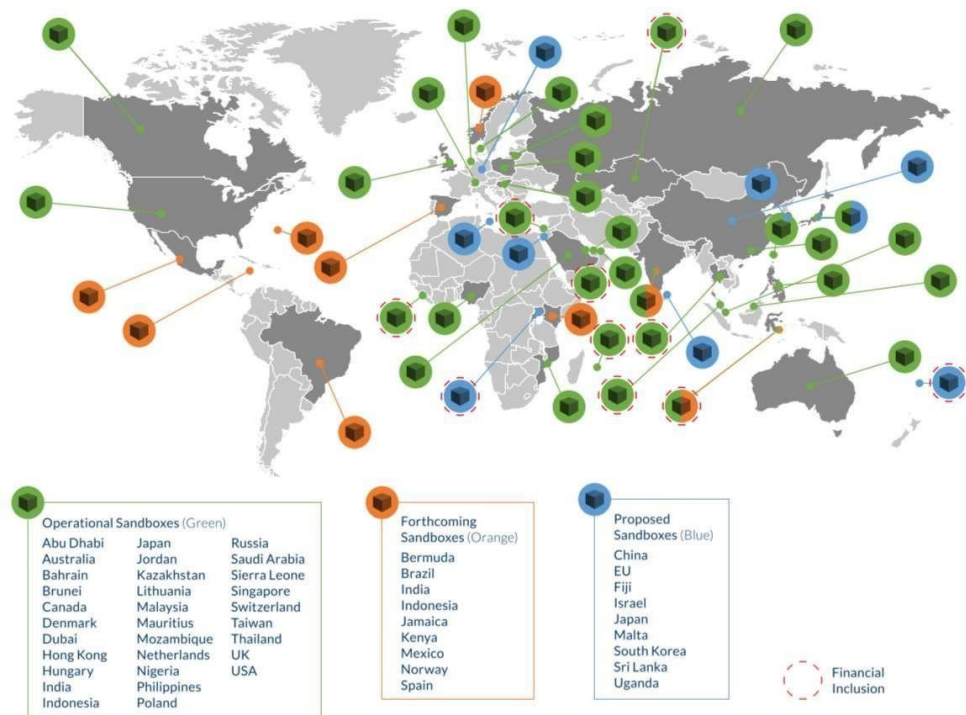


Figure 10: Overview of global Regulatory Sandbox initiatives by jurisdictions  
Source: UNSGSA FinTech Working Group and CCAF (2019) p.26

According to UNSGSA FinTech Working Group and CCAF (2019), Regulatory Sandboxes can be further divided into (1) *product testing sandboxes*, (2) *policy testing sandboxes* and (3) *multi-jurisdictional sandboxes*.

### 1. Product testing sandboxes

Product testing sandboxes are used as a safe zone to allow FinTech companies to live test their new products prior to formal licensing or registration. The participating innovators gain feedback on their product/service or business model, assess consumer uptake and commercial or technological viability and refine product features to address regulatory feedback. If the product turns out to be economically viable, it is typically allowed to launch on the wider marketplace either on an existing licensing regime or a bespoke regulatory framework. The objective of the product testing sandbox is to allow the product to see the light of the day with a lower initial burden. The output of such sandbox is the launch of a financial product into the marketplace under either an existing or a modified license.

### 2. Policy testing sandbox

Policy testing sandboxes are set up to evaluate regulations or policies that may hinder beneficial new technologies or business models. The leading policy testing sandbox is the approach by the Monetary Authority of Singapore (MAS). They describe this type of sandbox as a mechanism for evaluating whether particular rules or regulations should be changed based on specific use cases<sup>47</sup>. The testing process then assesses a particular regulatory hypothesis, e.g. whether a particular rule or regulation should change with respect to a particular test result, rather than the economic viability of the underlying technology. The sandbox becomes the final step in a process which begins with the informal guidance on regulatory uncertainties and ends with a test to determine whether the business model requires modification of an existing rule or regulation. The output of a policy testing sandbox is the revision, cancellation or approval of a legacy rule or policy.

### 3. Multi-jurisdictional sandboxes

This concept of a Regulatory Sandbox is being actively explored to promote cross-border regulatory harmonization and enable innovators to scale more rapidly on regional or global basis. They can operate as product testing or policy testing sandbox – or both which depends on the sandbox’ objective. The resources required to design and implement a Regulatory Sandbox vary according to local market context and the specific parameter of each sandbox. Multi-jurisdictional sandboxes may offer economies of scale through multiple regulators who operate the sandbox together, however, the initial resources to design such sandbox may be significant, given the challenges in developing a sandbox framework across multiple jurisdictions. Almost 20% of all FinTech companies in the Latin America-Caribbean region operate in more than one

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<sup>47</sup> mas.gov.sg, “Overview of Regulatory Sandbox”, last access 05.11.19.

jurisdiction, most likely because of the small size of individual regional markets (Herrera and Vadillo 2018; Inter-American Development Bank 2017). Many FinTechs with the aim to provide their financial products and services need to find sustainable solutions beyond the reach of country-level markets. In theory, this is where the multi-jurisdictional sandbox can remedy the situation: it facilitates cross-border expansion through shared testing programs and reduce the potential for regulatory arbitrage across individual sandbox jurisdictions<sup>48</sup> (EBA 2018).

However, the lines between the three types are not rigid. Almost all product testing Regulatory Sandboxes have some elements of regulatory uncertainty in the testing process and therefore may provide some of the possible benefits of policy testing sandboxes. Vice versa, policy testing sandboxes will also function as a product testing sandbox for participating companies. Policy testing sandboxes may be less resource intensive than product testing sandboxes if the regulator admits only a small number of companies to test a policy, which, however, is not a strict rule since regulators may admit any number of firms to a sandbox (UNSGSA FinTech Working Group and CCAF 2019).

Regulatory Sandboxes can provide several advantages for regulators as well as for FinTech companies and consumers. Regulators can create a signal of commitment to innovation and learning, which may encourage FinTech companies to finally start their business. Through direct contact between regulating authorities and companies they promote communication and engagement with market participants. Furthermore, after they had time to analyze the experiences they gained, regulators can update the regulations which may prohibit beneficial innovation and therefore improve the regulatory situation for new established FinTechs. The Fintech companies profit from a reduced time to launch products and services at the market through accelerated authorization processes. Furthermore, they gather feedback on regulatory requirements and risks and face therefore less regulatory uncertainty. Investors may furthermore be more attracted to invest in FinTechs that work in such regulatory safe zone as it improves the chances of a successful outcome. Consumers profit through the fact that the introduced new products and services are potentially safer as they come from a regulated environment. Lastly, customers profit from enhanced financial inclusion and do therefore have better access to financial products and services (Jenik and Lauer 2017; Murphy and Mueller 2018; Mueller *et al.* 2018).

Sandboxes, regardless of the type, have certain benefits for the regulation authorities as well as FinTech companies and consumers:

Regulating authorities:

- Obtaining information on how to build long term policies through learning and experimentation

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<sup>48</sup> *Regulatory arbitrage* defines the practice of companies to capitalize on loopholes in regulatory systems in order to circumvent unfavorable regulations, [businessdictionary.com](http://businessdictionary.com), last access 12.11.19.

- Changing existing regulation that may prohibit beneficial innovation
- Promote communication and engagement with market participants
- Sending out positive signal to FinTech sector by showing engagement and commitment

#### FinTechs:

- Reduced market entry through shorter authorization processes
- Reduced regulatory uncertainty
- Direct feedback from regulators on regulatory requirements and risks
- Improved access to capital since money lenders (equity and debt lenders) have higher confidence in the FinTech and its chances of success through less regulatory uncertainty

#### Consumers:

- Increased access to financial products and services
- Safety of products enhances through regulatory observation

On the downside are the costs and effort involved in establishing a sandbox. In contrast to Innovation Offices, where the organizational and personnel effort is limited, sandboxes require trained personnel who concentrate exclusively on the support of the participants. In addition, a sandbox is usually set up over a longer period of time, which reduces the marginal costs per supported company but increases the total costs. UNSGSA FinTech Working Group and CCAF (2019) came in their report to the following observations after analyzing the first sandbox approaches, which can turn into downsides as well if the issue is not handled properly:

1. Regulatory Sandboxes are neither necessary nor sufficient for promoting financial inclusion

Regulators in general seem to prioritize the resource-intensive sandbox programs over more comprehensive innovation policies, market engagement strategies or financial inclusion programs. Establishing sandboxes can vary substantially by regulator and across the operational stage. Furthermore, setting up a sandbox takes at least six months in advanced economies and 18 months in developing economies. Even though cost may decrease in the operational stage, two thirds of interviewed regulators stated that they significantly underestimated the resources required to develop and operate their sandbox and were overstrained with processing the number of applications for a sandbox. Nevertheless, it has to be taken into account that a quarter of the interviewed regulators admitted to not having had evaluated feasibility, demand, potential outcomes or collateral effects before setting up a sandbox. A reason for that maybe a feeling of “peer pressure” to establish a sandbox in order to stay competitive. Furthermore, depending upon the development of a country, experience has shown that regulatory questions raised could be resolved without the need for a live testing environment. Instead, proportional or risk-based licensing regimes

and regulations<sup>49</sup> may help lower the costs of regulatory compliance for FinTechs and are available to all market participant, unlike sandboxes.

## 2. The effort of processing a Sandbox should not be underestimated

As mentioned before, many regulators were unprepared for the level of effort and resources required to process a sandbox. In order to e.g. efficiently handle a large amount of applications, the process can be streamlined and simplified, and the communication channels can be expanded. This is currently being done by MAS<sup>50</sup> and the Canadian Securities Administrators<sup>51</sup>.

## 3. Regulatory coordination is essential, most of all in multi-peak jurisdictions

In multi-peak jurisdictions<sup>52</sup>, FinTech-related innovations often fall within the supervisory scope of different regulators. This often leads to no coordination among the regulating authorities and generates inefficiencies. Clearly defining the regulatory scope of each possibly involved authority is indispensable. Hong Kong, for example, has experienced the benefits of improved regulatory coordination. While the Securities and Futures Commission and Insurance Authority of Hong Kong had independent Regulatory Sandboxes before, which made organization and coordination difficult, they now linked their sandboxes and provided a single point of entry for FinTechs and its products in Hong Kong. As a result, the number of companies that are testing their products across the three sandboxes has now significantly increased (UNSGSA FinTech Working Group and CCAF 2019).

## 4. The importance of senior leadership and institutional engagement is critical to sandbox initiatives

A lack of leadership and institutional engagement could have negative consequences for the Regulatory Sandboxes. Obtaining clear support from relevant regulatory officials, on the other side, encourages alignment among participating departments and individuals. The officers in charge therefore need to communicate purpose and goals across internal divisions and have to ensure hiring appropriate staff.

### 4.4. Concluding overview

Table 3 summarizes the concept, purpose, advantages and disadvantages of the individual regulatory approaches.

<sup>49</sup> “A proportional or risk-based approach generally implies simpler rules for small, less complex financial institutions, but can also take the form of additional regulations for large and more complex institutions”, (UNSGSA FinTech Working Group and CCAF 2019), p.31

<sup>50</sup> mas.gov.sg, “MAS Proposes New Regulatory Sandbox with Fast-Track Approvals”, last access 14.11.19.

<sup>51</sup> securities-administratos.ca, “CSA Regulatory Sandbox”, last access 14.11.19.

<sup>52</sup> Multi-peak jurisdictions are jurisdictions with multiple financial regulators, UNSGSA FinTech Working Group and CCAF (2019).

<u>Innovation Office</u>	<u>Regtech</u>	<u>Regulatory Sandbox</u>
<b>Concept</b>		
<ul style="list-style-type: none"> <li>- Representatives of the regulating authorities are available as contact persons (e.g. office hours, hotlines, websites etc.)</li> <li>- Provides regulatory clarification and basic regulatory assistance</li> <li>- Used in both emerging/developing and developed countries</li> </ul>	<ul style="list-style-type: none"> <li>- Software</li> <li>- Consists of compliance technology (CompTech) and supervisory technology (SupTech)</li> <li>- Collects relevant information based on which new regulatory approaches can be introduced</li> <li>- Focuses on how to monitor and enforce regulatory activity</li> <li>- Long-term orientated</li> </ul>	<ul style="list-style-type: none"> <li>- Frameworks in which products/services of companies can be live tested under special exemption or allowance</li> <li>- Product testing sandboxes, policy testing sandboxes and multi-jurisdictional sandboxes</li> <li>- Time-bounded</li> <li>- Full regulatory support and monitoring through regulating authority</li> <li>- Mainly used in industrialized countries</li> </ul>
<b>Purpose</b>		
<ul style="list-style-type: none"> <li>- Improvement of the regulator-innovator relationship</li> <li>- Often used as first step before establishing a sandbox</li> <li>- “Sandbox light”</li> </ul>	<ul style="list-style-type: none"> <li>- Obtaining resilient data to improve regulatory framework</li> <li>- Used both by regulators and companies</li> </ul>	<ul style="list-style-type: none"> <li>- Significantly improve relationship between regulator and company</li> <li>- Obtain resilient long-term data to improve regulatory framework</li> </ul>
<b>Advantages</b>		
<ul style="list-style-type: none"> <li>- Learning effects for both regulator and innovator</li> <li>- Improves regulator-innovator relationship</li> <li>- Comparatively inexpensive to establish</li> <li>- Attractive for resource-restricted countries</li> <li>- Can be reduced/enlarged as required</li> </ul>	<ul style="list-style-type: none"> <li>- Evaluable data through statistical data acquisition</li> <li>- Relatively inexpensive to maintain once established</li> </ul>	<ul style="list-style-type: none"> <li>- High learning effects for both regulator and innovator</li> <li>- Very good communication between regulator and innovator</li> <li>- Regulator obtains resilient data</li> <li>- Simplified access to market through lower entry barriers and therefore higher chances of being successful in the real market for participating companies</li> <li>- Can be designed differently and flexibly according to requirements</li> </ul>

Disadvantages		
<ul style="list-style-type: none"> <li>- No comprehensive support of the FinTechs, only basic assistance</li> <li>- Only limited learning effect, as effects on the financial system are not evaluated separately</li> </ul>	<ul style="list-style-type: none"> <li>- Especially for regulators expensive and elaborate to establish (buying/developing software, adaption of internal systems, hiring adequate staff)</li> <li>- Data can only be used after long time period to have statistical certainty</li> </ul>	<ul style="list-style-type: none"> <li>- Bigger, more complex and highly resource intensive compared to Innovation Offices</li> <li>- Time consuming</li> <li>- Special training of personnel necessary</li> <li>- Pre- and postprocessing of obtained information</li> <li>- High degree of regulatory effort</li> <li>- Not suited for solving financial inclusion related problems</li> </ul>

Table 3: General overview over regulatory approaches  
Source: own elaboration

## 5. Examples of Regulatory Sandbox approaches

As of 31.12.2018, there is more than 50 Regulatory Sandbox approaches used in jurisdictions across the globe (see *Annex 5* and *Annex 6*). When ordering the countries by yearly per capita income (PCI) (see *Annex 7*) it can be observed that more sandboxes are established in countries with higher PCI and vice versa (Figure 11).

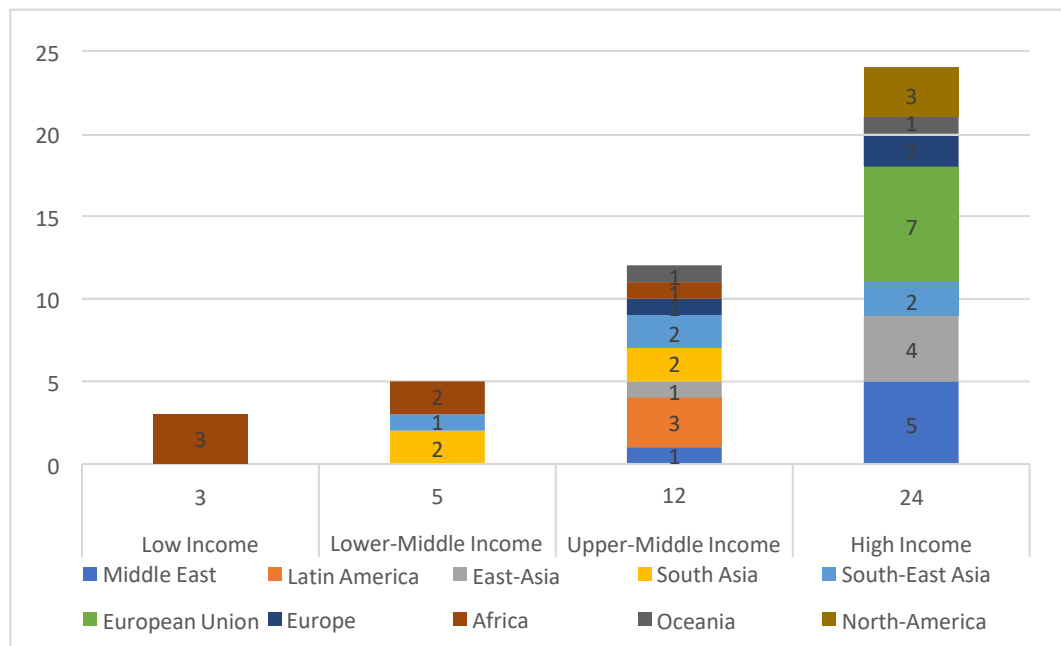


Figure 11: Number of countries that established Regulatory Sandboxes by PCI level as of 31.12.2018

Source: own elaboration, data by ESMA *et al.* (2018); UNSGSA FinTech Working Group and CCAF (2019); World Bank (2019)

For that reason, in the following section the already established sandboxes in the EU as well as the sandboxes in the countries, which in their geographical regions represent the largest role for the FinTech market (USA for Americas and China for Asia-Pacific) will be further examined. The intention is to find similarities and differences among the Regulatory Sandboxes, with the possible implications for the EU being described in the next section. This helps to get a general idea of the structure and functioning of real-life examples, which can then be applied to a potential sandbox in the EU.

### 5.1. USA, China and the European Union

The state of Arizona (USA) and China recently launched their Regulatory Sandboxes. For this reason, there is little data that can be evaluated. In general, they follow the same objectives as the ones established in the EU (see Section 5.2.). They want to increase the quality and price benefit ratios of the products/services, stabilize the financial system and are open only if the participant offers an innovative products/services (see *Annex 8*).

In the European Union, there are currently seven operating Regulatory Sandboxes with five of them providing accessible information (GBR, PL, NLD, LTU, DN). Furthermore, Norway is currently preparing one and Austria is considering the launch of a Regulatory Sandbox. The list of the current operating Regulatory Sandboxes in the EU, which are included in *Annex 9*, make clear that the sandboxes have a significant number of common features. When comparing the European sandboxes to the Regulatory Sandboxes from the US and China in *Annex 8* again, it can be observed that there are many similar characteristics. In order to understand the concept of a “European Regulatory Sandbox” it is worth considering the following common distinguishing marks:

- The sandboxes are not limited to a specific financial sector and open for all kind of FinTech. This includes general banking and broker services, investment services, insurances, crypto currencies and blockchain technology.
- They are no limits regarding the candidates that can operate within the sandbox framework: all of them are open for both incumbents and new entrepreneurs.
- All of the applying companies have to be “in need” for supervision, meaning that they either don’t have the capacities to meet the regulatory requirements, are uncertain how to comply to them, or both.
- Common objectives of the European Regulatory Sandboxes are supporting the development of innovation in the financial market. Furthermore they should foster innovation an meanwhile improve the stability of the financial market. On top of that, they are set up for providing a learning effect (e.g. identifying risks, problems and approaches for regulatory improvements) for the regulating authority and improve the cost/benefit ratio for customers through enhanced quality and lower prices.



- To enter the sandbox, the new technology, service, or product must be genuinely innovative and on the same hand providing a clear consumer benefit and contribute to financial stability.

ESMA *et al.* (2018) furthermore note following aspects:

- No jurisdiction had to change its law to establish the Regulatory Sandbox because each sandbox involves the use of general supervisory powers available to the regulating authorities
- No regulating authority referred to powers directly derived from the EU law, nor did any consider that the absence of any such powers represented a direct barrier to the establishment and operation of a Regulatory Sandbox
- The FinTechs interested in participating in a sandbox had to acquire all necessary licenses when wishing to carry out an activity that requires such license before entering the sandbox in order to get accepted

## 5.2. Example of a Regulatory Sandbox: UK – Financial Conduct Authority (FCA)

The second ever established Regulatory Sandbox in the financial sector and first one in the European Union was created in 2015 and is run by the FCA, which is an independent, non-governmental financial regulatory authority. Its main objective is to maintain the integrity of the financial markets in the UK<sup>53</sup>. This sandbox will be presented for the following three reasons: First, as the world's best-known Regulatory Sandbox, it serves as a model for all subsequent boxes. Second, the UK accommodates 50% of all promising FinTechs in Europe and therefore had to establish a well thought-out and result-oriented concept due to the responsibility involved, in order to stay an attractive site for FinTech companies. Third, the FCA sandbox is the only sandbox that already evaluated its success/failure to some extent and can therefore be taken as reliable source when looking on the effects of Regulatory Sandboxes. The UK Regulatory Sandbox works with so called “cohorts”. Those cohorts are testing rounds, which are announced before opening the particular cohort, so FinTech companies can apply. Then, FCA checks if the company matches the eligibility criteria (see *Annex 9*). Each cohort takes between six and nine months. Currently, the Regulatory Sandbox is in its seventh cohort (as of 31.11.19).

The aim of the regulators was to achieve the following points with the establishment of a sandbox in the UK (Financial Conduct Authority 2015):

- Reduced time-to-market at potentially lower cost: delays through regulatory uncertainty cause discouragement of innovators and a lot of time and money.

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<sup>53</sup> complyadvantage.com, “What is the Financial Conduct Authority?”, last access 20.11.19.

- Better access to financing: since many investments in the FinTech sector rely on equity-based funding. Regulatory uncertainty, seen as a risk by investors, can make raising funds for FinTechs more difficult, since investors want to get compensated through higher interest.
- More innovative products reaching the market: regulatory uncertainty can lead to the fact that many products are not even tested or left abandoned, since FinTechs fear high opportunity cost through investing in a product that does not meet the regulatory requirements.
- Better product quality and lower prices for the consumer: more products lead to enhanced quality, more competition and consequently to lower prices. In contrast to other European Regulatory Sandboxes is “promoting competition” a separately defined objective of the FCA.
- Learning effects for FCA: through the cooperation between company and regulator, the FCA can get aware of arising problems at an early stage and learn for future regulatory frameworks.

The FCA furthermore imposed access criteria for companies, to ensure supporting the most promising FinTechs that are in need for help. FCA assessed the potential candidates by the following points (Financial Conduct Authority 2015): the *scope of the firm* assesses to what extent the new solution is a support for the financial service industry. *Genuine innovation* defines, if the introduced solution is new or significantly different to existing products. With the point *consumer benefit* it is made sure that there is a clear consumer benefit being offered. This criterion has continued to be met throughout the period of sandbox testing. With *need for sandbox* it is evaluated whether the applying business has a genuine need for testing within the sandbox framework. The last point *background research* describes the practice of testing companies if they have invested appropriate resources in developing the new product, and if they are understanding the applicable regulations and are furthermore mitigating the risk.

After two years, the FCA evaluated in their second report the previous two years, coming to the conclusion that “*the sandbox has been successful in meeting its overall objective*” (Financial Conduct Authority 2017, p.5). In particular this means the following (Financial Conduct Authority 2017):

- The access to regulatory expertise offered by the sandbox reduced time and cost of getting innovative ideas to market:  
75% of the accepted companies completed the first test round and 77% the second test round successfully. From all the companies that passed the testing round successfully 90% continued with a wider market launch after testing. Furthermore did the vast majority of the firms receive a full authorization to further proceed in the market.
- Testing in the sandbox has helped facilitate access to finance for FinTech companies:  
At least 40% of firms from the first test round received an investment during or following the sandbox tests, underlining the fact that sandbox participants are attractive investment targets.

- Enabling products to be tested and introduced to the market:  
Around one third of tested companies used the experiences made in the test phase to pivot their business model before entering the wider market.
- Enhanced consumer protection in new products and services:  
All companies adhered to the standard safeguards of the FCA, resulting in higher consumer protection.

FCA created this sandbox with the aim to keep UK being the most attractive country for FinTech in Europe. By referring at the data provided in Table 2 again, this strategy seems to have worked out well, with the UK being the clear number one in Europe with 73% of total market share in the EU. Furthermore, the FCA broke the myth of regulating being a barrier to innovation and showed that regulators can play an active and positive role in encouraging innovation by giving unique business models a “permission to play” in the highly competitive financial services sector (Strachan *et al.* 2018).

In order to assess the need of a Regulatory Sandbox at the European level and to develop some key features of such sandbox, the experiences gained with the UK Regulatory Sandbox should be kept in mind.

## 6. Applying Regulatory Sandboxes in the European Union

This section covers the current regulatory practice of the financial sector in the European Union with regard to FinTech companies. The main questions here are who the regulatory authorities are and to what extent FinTechs are subject to their regulation.

### 6.1. Regulating authorities in the EU

The financial sector in the European Union is supervised by the *European System of Financial Supervision* (ESFS) and the *Single Supervisory Mechanism* (SSM). Since the SSM is only responsible for systemically important large banks whose total balance sheet € 30 bn or 20% of GDP<sup>54</sup>, it will not be examined in more detail in the further course of the work, as it can be assumed that this authority will not play a role for FinTechs for the time being.

The ESFS, however, is a system of EU authorities and committees on financial market supervision established in response to the financial crisis 2008/2009. It consists mainly of the three European Supervisory Authorities (ESA) which together build the European Systemic Risk Board (ESRB). The main purpose

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<sup>54</sup> [bankingsupervision.europa.eu](http://bankingsupervision.europa.eu), “Einheitlicher Aufsichtsmechanismus”, last access 28.11.19.

of the three financial supervisory authorities is to develop uniform standards, guidelines and recommendations and to monitor the application of EU law. The authorities only have the right to intervene in exceptional cases, such as when a national supervisory authority violates EU law. All three institutions that build the ESRB are independent from the European Commission and ultimately report to the ECB (Figure 12).

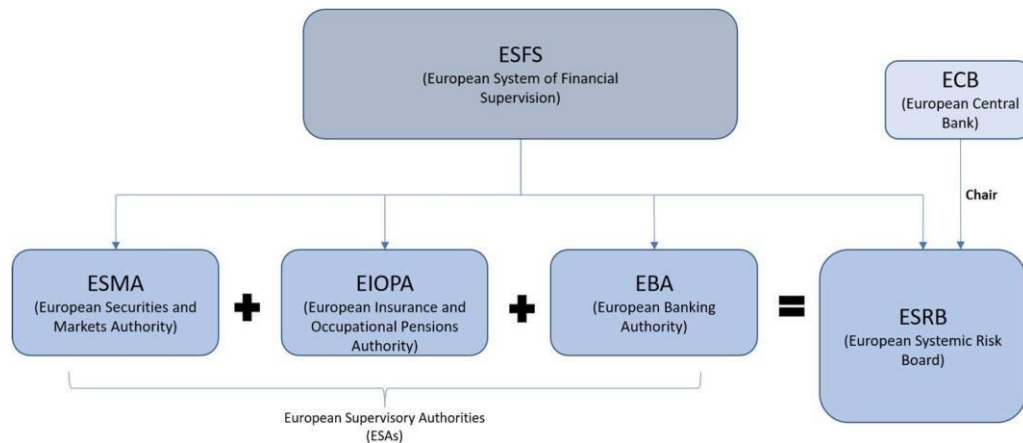


Figure 12: Structure of the European System of Financial Supervision (ESFS)

Source: own elaboration

In general, EU law takes precedence over the national law of the Member States when it comes to banking regulation and the corresponding legislation in the European Union, and the requirements of the institutions are thus legally binding (Hsu and Bahar 2019). That results in national banking laws that are mainly driven by legislation from the EU level and consequently means that, whatever happens on EU level regarding banking legislation, has a major impact in the Member States and the acting financial players.

As already discussed in Section 3.2. FinTech has a considerable impact on the private economy as well as macroeconomic structures. This requires adequate control and regulation. To get a better idea about the regulating authorities FinTechs mostly have to deal with, the upcoming part presents the three ESA institutions which have the biggest impact on the legislation and regulation framework of FinTechs. They cover, amongst others, financial market regulation, insurance regulation and banking regulation. Pollari *et al.* (2019) have identified potential risks arising for several FinTech stakeholders. In conjunction with the European regulatory units those risks are particularly important for financial stability. To be mentioned here are among others the development of a small number of FinTechs into systemically important institutions and the use of crypto assets which can lead to financial instability as a result of price volatility and the potential impact of payment services. Lastly, a risk for financial stability is the possible development that non-bank providers of credit and payment systems and other financial activities grow rapidly while not being regulated appropriately. The three ESA institutions have the task of keeping these risks in view and, if necessary, reacting appropriately.

### 1. ESMA

The *European Securities and Markets Authority* is an EU authority that contributes to safeguarding the stability of the EU's financial system by enhancing the protection of investors and promoting stable and orderly financial markets. Its main activities are the assessment of risks to investors, markets and financial stability, the completion of a single rulebook for the European financial markets, the promotion of supervisory convergence and the direct supervision of specific financial entities<sup>55</sup>. It is empowered to submit proposals for regulations to the European Commission or to act directly vis-à-vis national authorities and, in specific cases, individual market participants.

### 2. EIOPA

The *European Insurance and Occupational Pensions Authority's* core responsibilities are supporting the financial system, achieving transparency of markets and financial products and the protection of policyholders, pension scheme members and beneficiaries. They are entitled to monitor and identify trends, potential risks and vulnerabilities<sup>56</sup>. EIOPA can address binding individual decisions to insurance institutions and settle disagreements between national supervisory authorities. Nevertheless, the focus of supervision of insurance and occupational pensions remains on the national supervisory authorities (in the case of Germany, for example, the Federal Financial Supervisory Authority).

### 3. EBA

The *European Banking Authority* ensures effective and consistent prudential regulation and supervision across the European banking sector. The main task of the EBA is to contribute to the creation of the Single European Single Rulebook through the adoption of Binding Technical Standards (BTS) and guidelines. The Single Rulebook aims to provide a single set of harmonized prudential rules for financial institutions across the EU. BTS are legally binding and directly applicable across all Member States. The authority also plays an important role in promoting convergence of supervisory practices and is mandated to assess risks and vulnerabilities in the EU banking sector<sup>57</sup>.

## 6.2. Relevant regulatory standards

When referring to *Annex 3* again, it becomes clear that most popular FinTech companies are active in two ranges: the lending business or the crowdfunding business. Both business fields, however, can furthermore be either (1) *loan-based* or (2) *investment-based*. With loan-based activities, the participants

<sup>55</sup> esma.europa.eu, "Who We Are", last access 28.11.19.

<sup>56</sup> eiopa.europa.eu, "Missions and tasks", last access 28.11.19.

<sup>57</sup> eba.europa.eu, "EBA at a glance", last access 28.11.19.

get compensated through predefined future interest payments. In investment-based activities, in return for their payment, investors receive securities (usually shares) in whose performance they participate and, if previously agreed, through dividend payments<sup>58</sup>. Therefore, only the regulation aspects regarding those two categories will be focused in this Section, since they apply for the majority of the FinTech businesses. At the moment, each Member Country treats the FinTechs concerned in its own way, so there are a variety of approaches. They all have in common that they are consistent with the regulatory requirements of the ESRB.

#### 6.2.1. Loan-based activities

In Europe, lending platforms do not usually lend money directly, but only facilitate loans among their customers. Nevertheless, in some business models, either the platform participates in the loans granted through it or a bank grants the loans on behalf of the lenders (European Commission 2016). This can trigger a number of laws and regulation (banking, payments, financial markets and services, consumer protection, anti-money laundering). According to Ferrarini (2017), various approaches are possible. The approach pursued by the EBA, however, sees loan-based activities as subject to payment services regulation, with the argument that these activities can include the execution of payments of lenders and borrowers on the platform (EBA 2015).

#### 6.2.2. Investment-based activities

The legislation regarding investment-based activities is completely diverse among Member States (Ferrarini 2017). In the core, the particular jurisdictions are at variance with the question, if the Markets in Financial Instruments Directive (MiFID) is enforced or not. MiFID aims to strengthen competition and promote the integration of the European financial market by harmonizing the rules and regulations. After the financial crisis, MiFID was revised and is known under MiFID II today<sup>59</sup>. In general, however, ESMA has the regulatory power in this area.

## 7. Summary, conclusion and recommended action

This thesis has set itself the aim of classifying the term "FinTech" and to provide information as to whether the regulatory approach of a "sandbox" is suitable for promoting the sector as a whole at European level. The last part of this work includes a summary of the most important findings and concludes with a proposition by the author for setting up a Regulatory Sandbox, including some design features, taking into account current and future developments.

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<sup>58</sup> greenrocket.de, "Crowdfunding – die verschiedenen Arten", last access 29.11.19.

<sup>59</sup> deutsche-boerse.com, "From MiFID I to MiFID II/MiFIR", last access 29.11.19.

## 7.1. Summary

First of all, the term “FinTech” has been narrowed and explained and the individual characteristics of FinTechs were presented in the form of categories. It became clear that FinTech describes a large number of companies that are active in different fields in the financial sector. They reach from financing and investment platforms over technologies and solutions to the observation that FinTechs can be both newly founded start-ups and subsidiaries of incumbents. After that, the consequences FinTech has on both international economies and the financial sector has been briefly discussed. The most important findings here were that FinTech still plays a subordinate role compared to the "traditional" financial sector, which is particularly true in the case of the EU. This is especially evident when looking at EU market shares including and excluding UK. The EU will lose by far its most important player in the FinTech sector due to an imminent Brexit and will therefore lose immense importance in international comparison. However, investments in FinTech are continuously increasing in all important regions worldwide, and thus also in the EU, which speaks for the ever-increasing relevance of FinTech in the financial sector and should be promoted accordingly. Globally, investors tend to invest bigger sums in FinTech, and average transaction volume steadily increases. Looking at the effects on the "traditional" banking sector of retail and investment banking, it became clear that the established companies recognized the increasing competition from FinTechs and their important role and are now reacting by offering their own products and services. However, it was also shown that a large proportion of FinTechs did not focus, as one might initially assume, on taking market share away from incumbents. They concentrate much more on offering services to incumbents and supporting them in their own process optimization while the established banks continue to own the relationship with the end customer. For traditional banks this means that the priority should be to find the best matching FinTech(s) to cooperate with and invest in early. It is said that, while the incumbents have the financial capacity and the customer base, FinTechs possess a high degree of innovative strength and the ability, to get products to the market quickly. For central banks, on the other hand, the effect is less pronounced. For one thing, FinTechs can change the way money is deposited away from established passbooks and overnight money accounts towards storage in DLT networks such as the blockchain. The trend towards non-centralized currencies, largely supported and promoted by some FinTechs, may limit the central banks' ability to influence the monetary system and thus monetary policy. However, as this is not foreseeable in the medium term, central banks have no choice but to monitor FinTech closely and, if necessary, take action.

Subsequently, the focus was on understanding the need for regulation and existing regulatory concepts. Regulation usually is necessary in the event of market failures, which in the FinTech sector are mainly information asymmetry and non-competitive markets. It is one main objective of a regulating authority to protect the markets from failures. With regard to the importance of having regulatory certainty for business it has been found that regulatory uncertainty is

a major threat for companies, especially for new entering businesses. It can result in high costs and in the worst case in the decision to not start the business. Promoting regulatory certainty therefore is an important task for governments and regulators, which is currently done by various regulatory approaches. The three most widely used approaches in FinTech regulation are Innovation Offices, RegTech and Regulatory Sandboxes. Innovation Offices, which can also be seen as an attenuated form of a sandbox (“Regulatory Sandbox light”), are by far the most widespread of the three approaches. They are easy to set up and to run. The regulatory support, in turn, is only superficial and regulators only have limited possibilities to get insights in the effectiveness of a regulatory framework. RegTech, on the other hand, is a technological approach in which software can be used to simplify or analyze regulatory processes both within companies and in support of regulating authorities. Regulatory Sandboxes, in contrast, are frameworks set up by financial regulators to allow small-scale live testing of innovations by private firms in a controlled environment in which laxer regulation is applied, entry barriers are lowered, and regulatory support is granted. The three common forms of sandboxes are product testing sandboxes, policy testing sandboxes or multi-jurisdictional sandboxes. The distinction is blurred, however, as many sandboxes combine elements of several forms. There are numerous advantages for both the participating businesses and the regulating authority. This includes higher regulatory certainty for FinTechs on the one hand. For regulating authorities, on the other hand, the advantages are no less important: it means that regulators can assess the effectiveness of the existing regulatory framework and the impact of changes. Based on those insights they can then further develop the framework. Also, participating in a Regulatory Sandbox results in a higher level of attractiveness of the FinTech for potential investors while for customers this means enhanced financial inclusion through more competition and better price-benefit ratios, amongst others. Downsides of sandboxes are said to be high total costs, the effort involved when establishing a sandbox and the high coordination efforts within the regulating authority. Seen as an instrument in a long-term framework, however, the importance of these counter arguments is greatly diminishing. Furthermore, it became clear that the level of the PCI is positively correlated to the country having established a Regulatory Sandbox.

When analyzing the European sandboxes, it has been shown that the sandboxes’ design did not really differ from each other in terms of either their objectives or the eligibility criteria. They all have the aim to support and foster the development of innovation in the financial sector and thereby improving the stability of the financial market. Apart from that, one important reason for authorities to establish such sandbox was to gain a learning effect on where regulatory gaps are and how to improve the overall regulatory system. There are currently five sandbox approaches conducted in the European Union, namely Denmark, Netherlands, Lithuania, Poland and the UK. The British sandbox, ran by the FCA, plays a special role because it is the leading and internationally best-known sandbox. Several things could be observed there. On the one hand, a positive assessment was made of the number of companies that had successfully completed one of the two test rounds (as of 2017). Furthermore, 90% of the



companies have launched new products in the market after participating in one of the test rounds, which speaks for a positive development of the companies and can be justified by the security gained with regard to regulatory issues. In addition, most of the companies have now unrestricted access to the market. There is no reason why this development should not also take place at European level. The investments that FinTechs received during or after their time in the sandbox are also important. For investors, the sandboxes seem to represent a reduced risk and thus increase the willingness to invest.

Finally, it was shown who in the European Union is in charge for the regulation of the financial sector. Generally, this is the ESFS, which consists of ESMA, EIOPA and EBA. Each authority, in turn, is responsible for a sub-cleared area in the financial sector. It is important to note that laws and regulations in the financial sector at European level are legally binding on all Member States and must be implemented swiftly. In the regulation of FinTechs, a distinction can be made between investment-based and loan-based activity, with the respective authorities having developed their own regulatory approaches. This should also be followed in the further course, as national law must be subordinated to this one way or another.

## 7.2. Conclusion and recommended action

Based on the previously discussed observations and lines of argumentation, the author of this paper proposes that a sandbox, which is uniformly valid throughout Europe, should be introduced after the completion of a clearly defined period of time. Such a uniform Europe-wide sandbox contributes in the best way to the aim mentioned in the title of the paper - namely to strengthen the competitiveness of the EU financial sector in global competition. The section is divided into three parts to outline the decisive points that are relevant for establishing a sandbox and gives furthermore some ideas about what to consider when doing so.

### Current developments and future trends

First, FinTech is no short-term phenomenon but the beginning of a long-term structural change. Since there still is no uniform framework for digital financial technology, new approaches must be considered to meet the necessary changes. Embedded in a globalized world, not only participating in, but especially shaping this structural change must be of paramount importance for the European Union.

Second, innovation in the financial sector is mainly driven by FinTechs and therefore makes them an important player in the sector. Neglecting this trend may have strong negative consequences for the overall financial sector, especially for the incumbents, which account for the main share of the sector's return. Incumbents profit from the high innovation degree of FinTechs and use them for cooperation and acquisitions. It is therefore in the interest of incumbents too to foster the development of the FinTech sector.

Third, there is no uniform regulatory framework for digital financial technology yet in the European Union. To quickly create uniform standards is important for the competitiveness and future viability of the FinTech sector in the EU.

Fourth, the upcoming Brexit is of strategic importance for the European Union. With the UK, EU loses its biggest and by far most important player in FinTech business. Losing the UK does not only mean losing global market position and relative importance, it also affects the attractiveness of the European Union for FinTechs to launch their new business or locating an existing one. The EU must prepare for this change. The Brexit negotiations currently underway, however, will have tremendous impact on to which extent the UK (and therefore the FinTech sector) will be part of the Single European Market.

Fifth, the fact that UK is already running a sandbox which soon won't be part of the EU anymore, puts the EU "on the spot". In order to stay competitive after Brexit, regulatory initiatives such as a Regulatory Sandbox should be considered. The role of the important UK sandbox in this context (close links between the UK and the EU, clear demarcation from the EU or something in between) must be clarified as a matter of urgency. For this purpose, however, it is important that the results of the exit negotiations and thus the valid legal framework conditions are clarified.

Sixth, the emerging European FinTech market grows faster when excluding UK growth rates. Even though the European market will remain small compared to the British market over the next few years, the growth figures indicate a positive trend which is to be exploited. The Brexit also offers opportunities: in case of UK not being part of the Single European Market anymore, financial companies would lose access to it. In turn, European financial centers such as Frankfurt and Paris could benefit from this. In this case, offering regulatory security would be an important step towards becoming more attractive for FinTechs.

Seventh, the competition in the financial sector is global, with main opponents for the European Union being USA and China. With ApplePay and GooglePay, power is increasingly shifting to tech giants; other tech giants like Amazon, Facebook or Alibaba, all of them based either in USA or China, have access to huge amounts of customer data. The EU can only create a counterweight if it uses the strength of the Single European Market and acts in a coordinated and self-confident manner.

#### Creating a Regulatory Sandbox and some proposed features

First, it is not enough to create uniform regulations in the EU; uniformity in implementation must also be ensured. The aim should be to give the EU a long-term position in international competition.

Second, instead of individual Member States focusing on establishing its own Regulatory Sandbox, the long-term goal of the EU should be to create one joint sandbox for all Member States which is administrated by the ESFS institutions and the ECB. To achieve this, during the transition period, EU Member States that currently run a sandbox as well as countries that consider to setting up a sandbox should do so in a coordinated way. For example, the sandboxes could

differ in their form (product testing or policy testing), their eligibility criteria (more restricted entry vs. less restricted entry) and design of test rounds. The national authorities then report regularly to the EU authorities, stating their experiences and observations. The EU authorities gain insights in the positive and negative peculiarities of the particular sandbox. Based on the experiences made on national level, the ESFS together with the ECB can then establish their own, European-wide sandbox, in which one has learned from the short comings and applies proven methods. This sandbox uses uniform standards for all applicants and achieves economies of scale and scope due to the potentially high number of participants.

Third, regulatory coordination as well as clearly defining a hierarchy and involving competent personnel is key for the success of a sandbox. Furthermore, before launching, regulators need to assess feasibility, demand, potential outcomes and possible collateral effects of the sandbox.

Fourth, compared to the co-existence of various national sandboxes, a joint sandbox avoids distortions between Member States. Ideally, the FinTechs are indifferent concerning the country in which they become active.

Sixth, many companies from all EU Member States, including FinTechs and incumbents, would profit from a joint sandbox. After successfully participating in the sandbox, the companies would be “ready to go” to continue with their products/services on the market.

Seventh, for a successful Regulatory Sandbox, it is important to stay flexible for being able to quickly react to upcoming trends. When designing a common European sandbox, it is important to take into account the potentially disruptive role of non-European tech giants like the ones mentioned above.

#### Potential implications of EU sandbox at a global perspective

First, the EU sends a positive signal regarding economic competitiveness to FinTechs worldwide seeking to find a location to start their business and also increases the attractiveness of the European Union for incumbents that want to invest in the FinTech sector.

Second, as a result of internationalization, the National States and the regulatory instruments they have developed are also in intense competition with each other. A particular demand on a European sandbox could be to design it in such a way that it serves as a model for the design of sandboxes worldwide. Such a sandbox would have the capacity to set global standards.

Concluding remark is the observation, that a joint European Regulatory Sandbox would be a useful and applicable tool to react on ongoing economic and political changes globally. The potential of a Regulatory Sandbox lies not only in the sustainable promotion of the FinTech sector as a whole but could also be an opportunity to spread European values worldwide.

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## Appendix - Figures

### Annex 1



Figure 13: Top 10 global FinTech deals (VC, PE and M&A) in 2018  
Source: Pollari and Ruddenklau (2018) p.21, data provided by PitchBook

## Annex 2

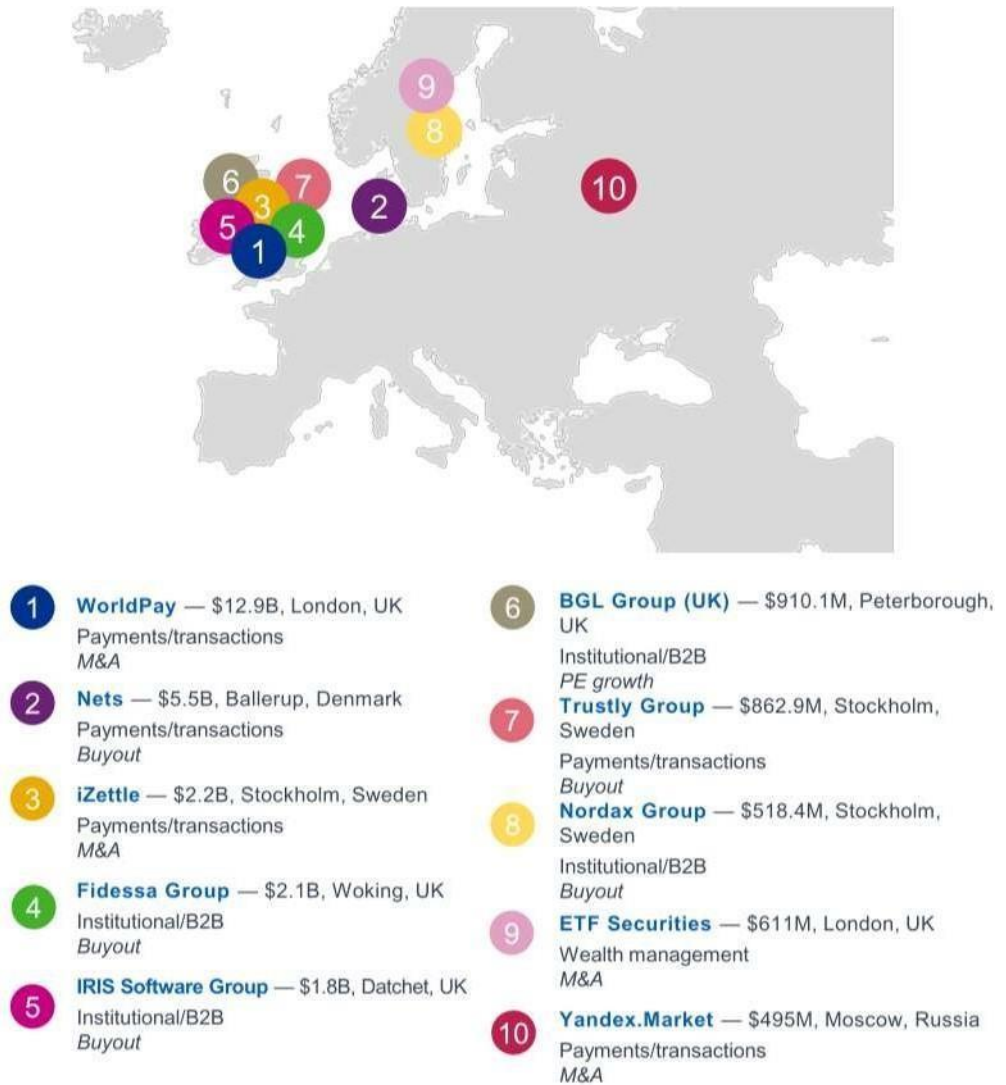


Figure 14: Top 10 FinTech deals in Europe (VC, PE and M&A) in 2018  
 Source: Pollari and Ruddenklau (2018) p.56, data provided by PitchBook

**Annex 3**

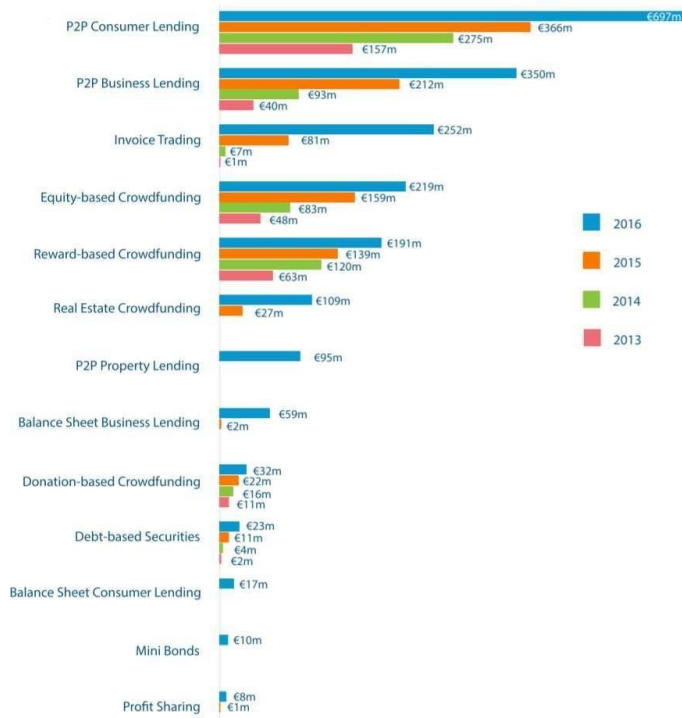


Figure 15: Fintech Categories by market volume in Europe 2013-2016  
Source: Ziegler *et al.* (2018) p.30

**Annex 4**



Figure 16: Examples of innovative regulatory initiatives around the world  
Source: UNSGSA FinTech Working Group and CCAF (2019) p.18

## Appendix – List of Regulatory Sandboxes

### Annex 5

Jurisdiction	Operator	Name of Sandbox
Denmark	Danish Financial Supervisory Authority (FSA)	FT Lab
Spain	Ministerio de Economía y Empresa	Regulatory Sandbox
Hungary	Magyar Nemzeti Bank	-
Lithuania	Bank of Lithuania	LB Chain
Netherlands	Autoriteit Financiële Markten (AFM) + De Nederlandsche Bank (DNB)	Regulatory Sandbox
Poland	Komisja Nadzoru Finansowego	Regulatory Sandbox
United Kingdom	Financial Conduct Authority (FCA)	Regulatory Sandbox

Table 4: Currently operating sandboxes in the EU as of 31.12.2018

Source: own elaboration, data from ESMA *et al.* (2018)

### Annex 6

Note: Hong Kong is presented here and in the following charts as an independent country.

RSB = Regulatory Sandbox

Geo. Region/Jurisdiction	Operator	Name of Sandbox
<b>Middle East</b>		
Abu Dhabi	Abu Dhabi Global Market (ADGM) Financial Services Regulatory Authority	FinTech Reg Lab
Abu Dhabi	ADGM Financial Services Regulatory Authority	Digital RS
Bahrain	Central Bank of Bahrain (CBB)	RSB
Dubai	Dubai International Financial Centre	FinTech Hive
Israel	Israel Securities Authority + Bank of Israel + Ministry of Finance	RSB
Jordan	Central Bank of Jordan	FinTech RS
Saudi Arabia	Saudi Arabian Monetary Authority + Saudi Arabia Capital Market Authority	RSB
<b>Latin America</b>		



		Laboratory of Financial and Technological Innovations
Brazil	Banco Central do Brazil (BCB)	RSB
Jamaica	Bank of Jamaica	RSB
	National Banking and Securities Commission (CNBV) + Ministry of Finance + Bank of Mexico	RSB
Mexico		RSB
<b>East-Asia</b>		
China	China Banking Regulatory Commission	RSB
	Hong Kong Monetary Authority (HKMA) + Securities and Futures Commission of Hong Kong (SFC)	FinTech Supervisory Sandbox
Hong Kong	Insurance Authority	Insuretech Sandbox
		FinTech Proof of Concept Hub
Japan	Japan Financial Services Agency	RSB
Japan	Tokyo Metropolitan Government	RSB
South Korea	Financial Supervisory Service	RSB
Taiwan	Financial Supervisory Commission	RSB
<b>South-Asia</b>		
India	State of Maharastra	RSB
India	Reserve Bank of India (RBI)	RSB
	Insurance Regulatory and Development Authority of India	RSB
Indonesia	Otoritas Jasa Keuangan (OJK)	RSB
Indonesia	Bank Indonesia	RSB
Kazakhstan	Astana Financial Services Authority	FinTech RSB
Sri Lanka	Central Bank of Sri Lanka	RSB Sandbox
<b>South-East Asia</b>		
Brunei	Autoriti Monetari Brunei Darussalam	RSB Sandbox
		Financial Technology
Malaysia	Bank Negara Malaysia (BNM)	RSB
Philippines	Bangko Sentral ng Pilipinas (BSP)	RSB
	Monetary Authority of Singapore (MAS)	FinTech RSB
Singapore		RSB
Thailand	Bank of Thailand (BoT)	RSB
<b>Europe</b>		
Malta	Malta Gaming Authority	Cryptocurrency Sandbox
Russia	Central Bank of Russia	RSB
	Swiss Federal Council + Swiss Financial Market Supervisory Authority (FINMA)	RSB
Switzerland		RSB
<b>Africa</b>		

Kenya	Kenya Capital Markets Authority	FinTech Sandbox
Mauritius	Economic Development Board	RSB
Mozambique	Central Bank of Mozambique + Financial Sector Deepening Mozambique	RSB
Nigeria	Central Bank of Nigeria + Nigeria Inter-Bank Settlement System	Financial Industry Sandbox
Sierra Leone	Bank of Sierra Leone (BSL)	RSB
Uganda	(to be confirmed)	RSB
<b>Oceania</b>		
Australia	Australian Securities and Investments Commission (ASIC) + Australian Prudential Regulation Authority	RSB
Fiji	Reserve Bank of Fiji	RSB
<b>North-America</b>		
Bermuda	Bermuda Monetary Authority (BMA)	Insurance RSB
Canada	Canadian Securities Administrators (CSA)	RSB
USA	Arizona State Regulators	FinTech Sandbox
USA	Bureau of Consumer Financial Protection (BCFP)	RSB

Table 5: Current non-EU operating Sandboxes as of 31.12.2018

Source: own elaboration, data from UNSGSA FinTech Working Group and CCAF (2019)

**Annex 7**

Low-Income Economy	Lower-Middle Income Economy	Upper-Middle Income Economy	High Income Economy
Mozambique Sierra Leone Uganda	India Indonesia Kenya Nigeria Philippines	Brazil China Fiji Jamaica Jordan Kazakhstan Malaysia Mauritius Mexico Russia Sri Lanka Thailand	Abu Dhabi Australia Bahrain Bermuda Brunei Canada Denmark Dubai Hong Kong Hungary Israel Japan Lithuania Malta Netherlands

			Poland Saudi Arabia Singapore South Korea Spain Switzerland Taiwan United Kingdom USA
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Table 6: Sandbox countries ordered by income level, according to World Bank  
Source: own elaboration, data by ESMA *et al.* (2018); UNSGSA FinTech Working Group and CCAF (2019); World Bank (2019)

## Annex 8

<b>Regulatory Sandbox Arizona (USA) - Arizona State Regulators</b>	
Initiated:	2018
Tested companies:	8
Open for:	Entrepreneurs and incumbents
Sandbox objective:	<ul style="list-style-type: none"> <li>- Encourage businesses to develop innovative products and services in the financial sector</li> <li>- Making financial products and services more available, affordable and safe</li> </ul>
Eligibility criteria:	<ul style="list-style-type: none"> <li>- Product/service must be innovative</li> <li>- Have to have thorough knowledge of the own product/service</li> <li>- Need to have resources in place to ensure successful testing</li> </ul>
<b>Regulatory Sandbox China - China Central Bank</b>	
Initiated:	2019
Tested companies:	N/A
Open for:	N/A
Sandbox objective:	<ul style="list-style-type: none"> <li>- Increase the efficiency of financial services</li> <li>- Improve policy measures that suit FinTech development</li> </ul>
Eligibility criteria:	N/A

Table 7: Regulatory sandboxes in USA (AZ) and China  
Source: own elaboration, data by Arizona Attorney General Mark Brnovich (2018); CBNEditor (2019); Watkins *et al.* (2018)

## Annex 9

Note: Only sandboxes with accessible data have been analyzed.

<b>FT Lab Denmark - FSA</b>	
Initiated:	2018
Tested companies:	2
Open for:	Entrepreneurs and incumbents
Sandbox objective:	<ul style="list-style-type: none"> <li>- Providing a basis for testing innovative financial products and services</li> <li>- Promoting the development of beneficial financial products and services for the consumers and the society</li> <li>- Enabling the Danish FSA to better understand Fintech</li> <li>- Supporting the use of new technology in the financial sector</li> </ul>
Eligibility criteria	<ul style="list-style-type: none"> <li>- The activity is directly or indirectly covered by the financial legislation</li> <li>- The technology or the business model new</li> <li>- The product or the service is beneficial for the consumers or the society</li> <li>- There is a need to participate in the FT Lab</li> <li>- The company is ready to test in the FT Lab</li> </ul>
<b>Regulatory Sandbox Lithuania - Bank of Lithuania</b>	
Initiated:	2018
Tested companies:	1
Open for:	Entrepreneurs and incumbents
Sandbox objective:	<ul style="list-style-type: none"> <li>- Pave the way to easier and faster access to new financial solutions</li> <li>- Increasing competition</li> <li>- Improved customer benefits (more convenient, safer and cheaper financial services)</li> <li>- Providing help when regulation of innovation is insufficient or unclear</li> <li>- Understand the impact of financial innovation on customer</li> <li>- Identifying emerging risks</li> <li>- Determine regulatory shortcomings</li> <li>- Eliminate and reduce any negative effects</li> </ul>
Eligibility criteria	<ul style="list-style-type: none"> <li>- Genuine innovation</li> <li>- Consumer benefit</li> <li>- Need for testing a live environment</li> <li>- Readiness for testing</li> <li>- Ambition to provide financial services in Lithuania</li> </ul>
<b>Regulatory Sandbox Netherlands - DNB + AFM</b>	
Initiated:	2016

Tested companies:	N/A
Open for:	Entrepreneurs and incumbents
Sandbox objective:	<ul style="list-style-type: none"> <li>- Review established policies with new technological developments</li> <li>- Sustaining confidence in established and new financial services or activities</li> <li>- Improving stability of financial sector and financial markets</li> <li>- Enhancing well-being of consumers and investors</li> </ul>
Eligibility criteria	<ul style="list-style-type: none"> <li>- In need for overcoming regulating barriers</li> <li>- Company uses procedures and measures to protect any of its stakeholders</li> <li>- Product must contribute to the stability of financial system and must follow orderly and transparent financial market process</li> </ul>
<b>Regulatory Sandbox Poland - Komisja Nadzoru Finansowego</b>	
Initiated:	2018
Tested companies:	N/A
Open for:	Entrepreneurs and incumbents
Sandbox objective:	<ul style="list-style-type: none"> <li>- Actively support young technology companies entering the financial market</li> <li>- Supporting the development of innovation in the financial market</li> <li>- Improving own regulatory framework</li> </ul>
Eligibility criteria	N/A
<b>Regulatory Sandbox UK - Financial Conduct Authority</b>	
Initiated:	2015
Tested companies:	119 through five cohorts
Open for:	Entrepreneurs and incumbents
Sandbox objective:	<ul style="list-style-type: none"> <li>- Reduced time-to-market for products and services</li> <li>- Better capital access through investors for companies</li> <li>- More innovation products reaching the market</li> <li>- Better product quality and lower prices for consumers</li> <li>- Learning effects for the FCA</li> </ul>
Eligibility criteria	<ul style="list-style-type: none"> <li>- Product/service must support financial service industry</li> <li>- Genuinely innovative</li> <li>- Given consumer benefit</li> <li>- Need for testing</li> <li>- Awareness of current regulation status and implicated risks</li> </ul>

Table 8: Overview over currently operating sandboxes in the EU

Source: own elaboration, data by Financial Supervisory Authority (2018); Magyar Nemzeti Bank (2018); De Nederlandsche Bank and Autoriteit Financiële Markten (2016); Shah (2018); Financial Conduct Authority (2015)

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