

**Keeping Pace with Innovations in Fintech:
Overcoming Regulatory Challenges by using
Structured Experimentalism Framework**

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Abstract

The world has seen a dramatic change in our everyday lives due to the advancements in technology. Every one of us has been affected or influenced with the latest technology in a variety of ways. The financial services industry is no different and over the past decade has witnessed reform in regulation and the way in which traditional financial services interact with consumers. Part of this reform has come from the advances in financial technology or as the new ambiguous word of FinTech as it's now known. FinTech is already revolutionising the industry as hundreds of new start-ups design new innovative financial products and services for customers. These new entrants are challenging the traditional financial services model or framework.

The research is to look further into the financial services industry and gain a much greater insight into where the industry is now and where it's going in the future. The thesis will aim to recommend the steps needs to be take in order to overcome the regulatory challenges posed by the innovations coming into the Fintech sector. The research is a qualitative study which involves stakeholder interviews from industry experts and Fintech firms operating in Indian financial services industry. These interviews will provide direct insight with an overview of the financial services industry currently. One of the key objectives is to understand whether FinTech will disrupt the financial services here in India or will it collaborate with the existing providers and also understand the global situation regarding Fintech innovations.

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Abbreviations

AGR	Aggregate Growth Rate
AI	Artificial Intelligence
ASEAN	Association of South east Asian Countries
ATM	Automated Teller Machine
BR	Banking Regulation
CCI	Competition Commission of India
EFT	Electronic Funds Transfer
FCA	Financial Conduct Authority
FDI	Foreign Direct Investment
FII	Foreign Institutional Investment
Fintech	Financial Technology
IMPS	Immediate Payment Service
KYC	Know Your Customer
LPG	Liberalisation Privatisation and Globalisation
ML	Machine Learning
NECS	National Electronic Clearing services
NEFT	National Electronics Funds Transfer
P2P Lending	Peer to Peer Lending
RBI	Reserve Bank of India
RTGS	Real Time Gross Settlement

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Chapter 1

Introduction

Technology is modulating financial system around the world, generating new opportunities and new risks. Financial regulators must develop new approaches to regulation, including the use of technology, to balance the benefits of innovation and economic development with the need for financial stability and consumer protection. Prior to the Global Financial Crisis of 2008 (hereafter the Crisis), financial innovation was generally viewed very positively. This led to laissez-faire, deregulatory approaches to regulation particularly in global institutional markets. Post-Crisis financial regulatory reforms have seen a reversal of this approach with the regulatory pendulum arguably swinging to the other extreme (Coffee, Jr., 2012).

Over the last decade financial industry, globally, has seen fast growing adoption of financial technology, or fintech. Banks and venture capital funds have made sizeable investments in fintech, reflecting their expectations for substantial change in the industry. Innovation is often ahead of the regulation mechanism existing in the country. Financial technology (Fintech) is one such arena which has seen lot of development in the recent years and financial regulators around the world had been struggling to regulate and make these services risk free without distorting the market (BIS 2018). To understand the dilemma of the regulator and challenges they face with respect to innovation, we need to understand the nature of innovation and the reason why they are happening right now. In other words what were the conditions prevailing in the market which led to the growing ground of that innovation.

At this point of time we need to ask some crucial questions like in what manner FinTech will shape the financial landscape going forward. If we could find a frame that answers these questions, it would illuminate a path that regulators and supervisors could follow to ensure the safety and stability of the global financial system. Addressing that question, however, is very difficult. Understanding some of the foundations of FinTech could prove useful for understanding its growth and the hype surrounding it.

Post-Crisis regulatory changes combined with increasingly rapid technological change have spurred the development of financial technology (Arner et al. 2014). financial regulators have started to seek to balance the traditional regulatory objectives of financial stability and consumer protection—the focus of post-Crisis regulatory changes—with the objectives of promoting growth and innovation. The result has been a process of regulatory innovation including technology.

Increasing number in FinTech firms, and corresponding venture capital and corporate investment in the sector, is sure to have a profound impact on the evolution of the financial services industry. According to the FinTech Adoption Index developed by Ernest and Young, in the sampled twenty economies 33% of ‘digitally active consumers’ are making use of FinTech products and services (Report 2018). Consumer base wise China scored high in terms of adoption rate, on the other hand UK leads in incubating new innovations coming into the market. The spill over effect of these are seen in the Asia-Pacific countries like ASEAN, Japan etc. A huge of investments in the Fintech markets are coming from China’s global investors who are investing large sum of money in these developing nations, they are either opting for international market entry through FDI or FII and companies situated in these countries are replicating the products designed by these Chinese Fintech players in their economies.

Regulators needs to understand the nature of these new incoming innovations and how they are going to change the interface of interaction between the consumers, regulators and Financial services firms. For example, issues regarding the ‘remote account opening’ or smart banking using android technology needs to be carefully tackled to understand its impact/risk on consumers, or investment suitability of decisions made by investors with the help of robo-advisories. This requires clear guidelines of market operations for these businesses so that there is no ambiguity or grey area where they can find a easy pass away of a wrong doing in the market.

Unless innovators understand the regulatory context, it is almost impossible to bring compliant services to market. Regulators around the world have resorted to various methods to deal with the disruption caused by Fintech in the financial market and trying to understand its nuances before regulating them according to their own market context.

The main challenge with regards to the regulation of fintech is that, the fintech companies in operation have limited track records and due to lack of clear guidelines these fintech firms also face difficulty with regards ‘what their obligation actually is’. From regulators point of view, because they don’t have the experience as well as any tool to establish an understanding as to how much they need to regulate and up to what extent.

Through these regulators decide in terms of what degree of regulation should be applied for any kind of sector or innovation coming into the market. But with regards to Fintech firms, regulators are unaware of the kind of technology they are bringing into the market. This causes lack of knowledge with regards to potential risks it has for market stability, consumer risk it involves.

It is difficult for the regulators to place Fintech innovations within the three blocks of discussed in Chapter 2. For this we need to, as mentioned above, ask right questions and look for approaches which are responsive to the innovations happening around.

In context of India, after demonetization, a further push was imparted in the digital payments systems. USSD (Unstructured Supplementary Service Data) based mobile banking, AEPS (Aadhar Enabled Payments System) with Banking Correspondents for fund transfer, and United Payments Interface (UPI) etc was made. All these has shown a rapid growth since. The Government of India also launched BHIM app to enable digital payments. Despite these initiatives and increased investment to promote digital payments, India is significantly behind its peers in the arena of digital transaction. On the other hand, it has also driven new start-up entrepreneurs, who are opening completely new vistas in the financial technology space. It also brings the challenge of regulating these financial technologies. It is said that technology often runs ahead of the law and new applications are constrained by regulation, and when in the area where finance and money is involved, caution is well advised. Therefore, a schematic framework like Regulatory Sandbox can be an invaluable tool in the regulator’s hand.

1.1 Research Objective

With more than 600 start-ups in the space of lending, payments, insurance, trading etc., in last few years and there is room for massive growth, FinTech has exploded in India. There is an inherent risk attached with this sector and Government policies will play a major role in minimising this risk.

Regulating innovation can play an important role in building a healthy competitive financial market with better services in a country like India and help in pushing forward the mission of digitalizing financial economy. In this regard there is a need to see what are the options available for the regulators in terms of tackling challenges posed by these innovations and risks involved in adopting these new innovations in context of Indian financial market and banking sector, along with its effect on the regulatory mechanisms and competition in Indian market.

In this thesis, the researcher intends to provide analysis regarding the potential benefits and guidelines needed if the option of structured experimentalism approach is to be adopted for overcoming challenges posed by incoming innovations in Indian financial sector. There is a need for specific and proper guidelines for the regulatory authorities to tackle this disruption within this sector in India, so there can be an effective answer in place, to experiment new and innovative products or businesses in the market. The researcher also aims to propose a method for India to elaborate competitive and suitable regulatory framework for the country to be favourable towards fintech start-ups.

1.2 Research Questions

1. (a) Why “FinTech” is happening right now. Many of the technologies that support FinTech innovations are not new, but financial institutions and

entrepreneurs are only now applying them to financial products and services.

Why now? (In both global and Indian context).

(b) Why FinTech is getting more space and importance than traditional innovation. Financial innovation is a constant process, and yet now the financial industry has a set of innovations that share a common link of being enabled by technology and that have been given a special name. Why is this set of innovations getting so much more hype than traditional innovation normally does? What are the challenges which regulators face with respect to this kind of innovation?

2. While one principal effect post 2008 crisis was a very cautious regulatory approach to innovation, the rapid evolution of FinTech in the past decade, increasing policy pressure to re-start economic growth, especially the pressure on regulators to support innovation particularly digital disruption, which requires regulators to balance support for innovation with their core regulatory mandates of financial stability and consumer protection. What are the different approaches that had been adopted by regulators to tackle the disruptions in different sector (with emphasis on financial sector)?
3. How structured experimentalism like regulatory sandboxing can enable innovations that are likely to benefit Indian financial market start-up and help regulators face the challenge of nurturing innovations without over regulating but at the same time protecting consumer interest? What, should be the criteria of well design regulatory sandbox, it's guidelines and entry conditions?

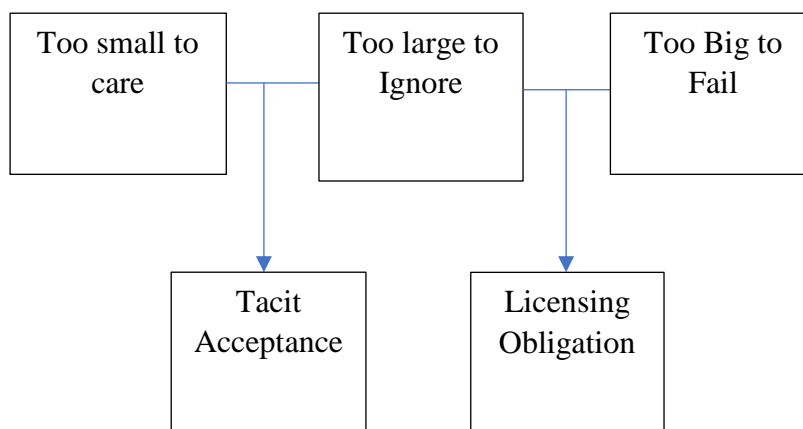
Chapter 2

Literature Review

2.1 Innovation and Regulation: An Unmatched Relation

In order to understand the problem of Fintech challenge which possess in front of the regulator, one needs to ask right questions, which in turn will help in building the framework for regulation in future. The aim should to establish where Fintech, in eyes of regulator, is placed under the turf of entire financial spectrum. In other words, we can divide the regulators consideration into three parts: 1. Too small to care. 2. Too large to ignore. 3. Too big to fail. If the Fintech lies between ‘Too small to fail’ and ‘Too large to ignore’ then it calls for ‘tacit acceptance’ in terms of regulation. On the other hand, if it lies between ‘Too large to ignore’ and ‘Too big to fail’ then it calls for ‘licensing obligation’ in terms of regulation.

Figure 2.1 Regulatory Mapping



Source: Compiled by the author

‘Regulation can be said to generally refer to policies where the government acts as a referee to oversee market activity and the behaviour of private actors in the economy’ (OECD 2018).

The justification of such intervention is generally given to ensure wellbeing/equal distribution of resources in the society and to prevent market failures in large. Regulation is generally categorised into three types –

1. Economic Regulation
2. Social Regulation
3. Administrative Regulation

The aim of this section is to give perspective regarding the nature of interaction between Innovation and Regulation. This will help in setting up the background for research work in Fintech innovations and regulatory challenges. To start with Government regulations can have both positive and negative effects on the innovation. Regulatory reforms should be aimed to take such shape which will be responsive to changes in economic, social and technical/administrative changes surrounding them (OECD 2018). These changes/reforms must take into account the aftereffects and consequences it will have on innovation and technical change it will bring in to the regulatory framework (keeping rationale and design of regulation intact). The interface where innovation and regulation interact should be dynamic as well as mutual in terms of orientation i.e. profit maximization for innovations, market stability for the regulators.

‘In all domains, regulatory reforms should yield benefits in terms of reducing costs, enhancing efficiency and stimulating innovation’ (OECD 2018). But at the same time the underlying objective of having a regulatory framework for any sector should not change or it should not be compromising with original idea behind having a regulatory body (For example:-- introducing single window clearance for real estate project should not compromise the rigour of ensuring quality consumer service in the sector). Like any other reforms regulatory reforms also comes with adjustment/modulation cost whose burden may be shared between the regulators and players in the market or taken individually. Thus, a thorough assessment of long-term effects must be taken into consideration before reforms. It also becomes the point of controversy because of the very fact of re-distributing the compliance cost among the actors. Therefore establishing/striking a right balance/degree of regulation is a difficult task because the effects are long term in nature. But at the same time the innovation is something which

is always ahead and regulation comes later in the process. It is this gap between innovation and regulation which makes the task more difficult.

Table 2.1

Types of Regulation

Economic Regulation	The main intention is to improve upon the existing efficiency in markets existing in various sector. This includes regulatory restrictions on prices of products or services, quantity, market entry and market exit.
Social Regulation	The main intention is to protect the citizen rights and ensure well-being/welfare of the society. This includes arena such as environment, workplace safety, labour rights, consumer protection etc.
Administrative Regulation	It relates to management tasks within the Government/state bodies or private sectors. This includes regulation relating to taxes, business operations, distribution of public resources, intellectual property rights.

Source: Compiled by the author

2.1.1 Understanding Depth of Innovation

In order to build a framework of analysis between regulation and innovation, it is also imperative to understand the nature of innovation. For this purpose, the standard

practice is to determine the ‘depth of innovation’ (Schindler 2017), which will further pave the way in terms of regulatory analysis. According to economist John Schindler, there are three different depths of innovation:

1. Surface innovation,
2. Foundational innovation
3. Genuine innovation

Table 2.2

Depth of Innovation and their Definition

Surface Innovation	‘Innovations that do not change the original/fundamental nature of the previous product/services but perhaps the superficial element’ (Schindler 2017). Not very deep comparatively. Mostly, financial innovation happens at surface level.
Genuine Innovation	The one that changes the existing fundamental nature of the product/services. Comparatively deeper than the surface innovation. Financial innovation at this depth is less often or we can also say it is less likely to get successful than surface innovation.
Foundational Innovation	Comparatively deepest level of innovation. It refers to the innovation which are significant enough to change the framework and infrastructure of

	system. Financial innovation happens at very rarely at this level.
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Source: Compiled by the author

If we take ‘Surface innovation’, for instance, in financial services; one of the examples for that is ‘Callable Commercial Paper’ (they are like commercial papers but it can be called back by the issuer before the end of 30 days of maturity). This additional feature in commercial paper does not change the underlying concept of commercial paper, the uses of the product also not likely to change much. The only thing which might slightly change can be the overall risk profile involved in the process. Similarly, innovation in new securitization of asset methods but the outcome/aim of the product usage remains the same.

With regards to Genuine Innovation, introduction of concept of bond or share of stock for the first time can be taken as example of such innovations. Before this the concept as whole for trading was not existing and it opened the whole new way in the financial market. Introduction of Credit Default Swaps (CDS) in recent times is also an example of Genuine Innovation. It was first of its type which allowed the investors to hedge as well as value the credit default risk of any particular company listed in the stock market (Investopedia 2010). It was certainly different from original exercise of swaps, which are commonly used to trade in different income streams.

On the other hand, the creation of Banks itself for the first time in history and establishment of Banking system, practice of ‘double book keeping’ falls under the category of Foundational Innovation. These innovations completely/fundamentally change the way/nature of interaction between the actors in the financial sector.

Another perspective to look at these innovations is ‘not’ to look at them separately but look at them as a continuum. One can always debate about whether the new product falls in the category of surface innovation or genuine innovation. The point is not to clearly categorise innovation into these categories but to realise the depth of innovation in the most approximate way because it will make regulators realise the fact that the deeper the innovation is, more profound its impact would be on the whole financial system, and it is more likely that further new products/innovation can be built upon it.

2.1.2 Innovation and Economic Regulation

To take an example, under Competition Law, which is a form of economic regulation aimed to bring efficiency in the market in terms by ensuring consumers have enough choices to choose and purchase that product/service with lowest price possible. The law prohibits anti-competitive practices and mandate Competition Commission of India (CCI) to protect market being concentrated into few players. The debate here is of which market type (competitive or concentrated) that better suits innovation to prosper in a particular sector.

Now according to the Schumpeter Model (eponym of the Economist who gave the model of bringing out the relation between market and innovation entering into it), ‘Concentrated market structure’ are most likely to favour innovation or provide breeding ground for it.

The reason given was that ‘large firms are better able to finance large research projects from their own profits and they can more easily appropriate the returns from their innovations since there are few competitors’ (OECD 2018). Therefore, in his research work, Schumpeter found out that ‘strict competition laws/policies’ may actually slow the rate of incoming innovative technologies.

Other economists, like Kenneth J. Arrow, suggest that maintaining healthy competition in the market helps to prepare a breeding ground for the innovation. They call it ‘Arrow effect’ (OECD 2018), which says that monopolist or oligopolist have little incentive to innovate because they already leader in the market and they are the one deciding the demand and supply of the product/services in the market. Other example of economic regulation lies in industries coming under the purview of compulsory regulation.

Generally, the regulatory frame for these industries are devised in terms of ‘market entry’, ‘market prices/sealing’ and ‘services’; due to the fact there is an existence of presumption that these markets promotes natural monopolies (sectors like telecommunications, trucking, railroads, natural gas, electricity, banking etc). The aim of this regulated space is to correct market failures, increase the reach of resources, and provide fair ground for market entry.

Over the years, these regulated industries also saw enormous amount of innovation coming into the market. For example, if we take telecommunication sector alone, data from US patent office and European patent office shows that their annual growth rate of patents granted was around 5% between the year of 1980 to 1993 in USA, and in Europe it was 14.6% growth rate between the year of 1980 to 1991 (OECD 2018).

Table 2.3

Increase in percentage AGR due to Fintech

	1980	1993	AGR%	1980	1991	AGR%
USA	3710	6978	5.0%	225	1005	14.6%
Japan	862	4518	13.6%	79	861	24.3%
Germany	341	482	2.7%	224	443	6.4%
France	254	409	3.7%	141	281	6.5%
UK	222	259	1.2%	44	186	14.0%

Source: OECD (1995), Communications Outlook.

2.1.3 Innovation and Social Regulation

Environment, Health and Workplace safety, Labour laws are some of the examples which comes under the purview of social regulation. Here the priority shifts from providing fair playing field for corporates and businesses to conservation of social realms and human rights. If we take environment into consideration, then the concern does not lie in deregulation of the sector or introducing more competition, but to learning how to regulate better, so that polluting by-products of industries can be controlled and compel industry owners to comply with the healthy practices recommended by the regulators.

At the same time companies argue that these regulations are sometime too imposing and prescriptive, which hamper their ability to innovate or develop new technologies, which in turn might be more efficient to address ecological problems (OECD 2018). They also question its cost effectiveness, which results in increase in their production cost.

2.2 FinTech and Its Historical Background in India

2.2.1 Financial Services Industry

A typical Financial Services Industry comprises of various variants of economic services which includes chartered accounting services, real estate financing, credit unions, etc. In a country like India, which is moving towards digitization of economy, the summation of technology with finance is upgrading the way transactional operational are handled. Its, not only brought about the efficiency they bring but the accessibility they increase is considerable. They have reduced the total time for any financial transaction drastically by making it accessible over the internet.

In India, we find Fintech started to find its place by setting its transactional application in the Banking industry. However, in last five years, Fintech has expanded

tremendously in multiple sectors including insurance and asset management companies as well. Also, technological advancement in ML (Machine Learning), AI and Blockchain technology has opened new doors and made news avenues for Fintech application. The traditional companies and emerging start-ups are looking to analyse aspirational/satisfactory factors of customers and trying to inculcate in their business model. By doing this, and with the help of technologies businesses are closer to forecast the actual demand of their services in the market. Fintech companies are using these to provide better customer experience and understand the market aspirations.

These recent development in the Indian economy is more significant and interesting to watch because India is a highly cash concentrated economy (Rubique 2018). Although, if we trace back, the first major shift that Indian economy observed in terms of digitalisation of transactions was in early 90's post LPG reforms. First one of them was EFTs (Electronics fund transfer) and ECS (Electronic Clearing System) established by RBI, they setup a centralised server for handling all the interbank and intrabank transactions happening in SCB (Scheduled Commercial Banks).

Since its inception in India, Banking sector has been constantly evolving with the help of fintech progress around them. The one very simple reason for that can be smoother back-end operations and better customer services in the which is more hassle free and saves a lot of operational time. Another recent development which is taking whole banking sector to altogether a different direction is adopting if system of storing large ledgers of data in a centralised server, commonly known as blockchain technology (Rubique 2018). Through the application of this technology, the entire gamut of data will be stored online and it will eventually change the way of lending, payments process or updating KYC documentation which will bring more efficiency into the financial system. There will no longer be a requirement of a human entering data at various points because each nodes of the storage will backtrack the history of any engagement with the help of unique data points.

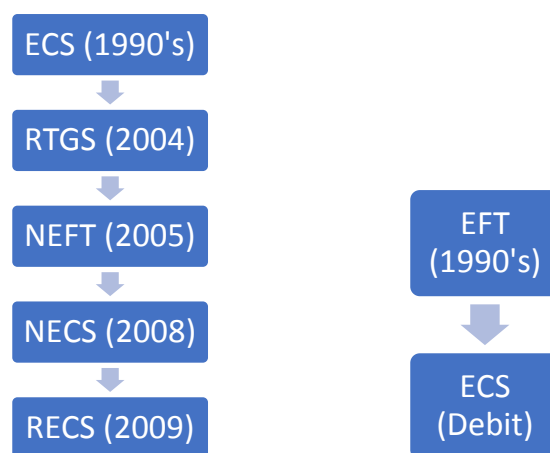
The start-up ecosystem in India has grown significantly in almost every sector of the economy, it has been a breeding ground for innovation since last decade. Given the consumer base and Government Institution's (State, Centre, and RBI) upward thrust towards financial inclusion policies, Fintech start-ups saw a great potential in the Indian

market, especially post demonetisation in 2016. The Indian market saw a sudden shift where more people started opting for digital payments, and different players emerged in the area of cashless payments, which eventually increased competition in the market. Currently, there are over 600 start-ups in the market and they are changing as well as evolving every day.

It is not easy to keep up with technologies from the regulators’ point of view and yet post demonetisation the Government quickly came up with various initiatives like UPI (Unified Payments Interface).

Let’s take an example of evolution of electronics payments systems in India as shown in Figure 3.1. The initiatives and steps taken by RBI has provided for the strong tech-based system for the seamless operation of financial transaction, reducing transactional cost drastically. The chronology of the payments are as follows –

Figure 2.2 Chronology of development of electronics payments system



Source: Compiled by the Author

Electronic Clearing Service (ECS). During 1990’s introduced by the RBI, the primary purpose of bringing ECS was to ‘handle bulk and repetitive payment like payments of companies, corporates, and institutions; dividend payments; repetitive payments like salary, interest etc’ (Rubique 2018). It allows customers’ accounts get credit on allotted date or cycle as requested by the clients. Since its inception ECS has

been a robust and efficient method for transaction in high volumes and its evolving from time to time.

National Electronic Funds Transfer (NEFT). Introduced in 2005 by RBI, the primary aim of NEFT was to facilitate specifically one to one transfer between different account especially inter-bank transfers. It processes its transaction on hourly intervals thus settling the payments between the two parties in almost on real time basis. There is ‘no minimum of maximum limit on the amount of funds that can be transferred through NEFT’ (Indiafilings 2018).

National Electronic Clearing Services (NECS). RBI setup National Clearing Cell (NCC) at Mumbai, in 2008 where the services for NECS will be provided for whole of the country. ‘It facilitates multiple credits to beneficiary accounts with the destination branches across the country against the single debit of the account of the sponsor bank’ (Indiafilings 2018). Other than pan-India service, they leverage on CBS (Core Banking Solutions) of the member banks, and the member banks can avail these services from anywhere irrespective of their geographic locations.

Real Time Gross Settlement (RTGS). ‘As the name suggests, the funds from one account to the another is transferred in ‘real time’ and on gross basis’ (Indiafilings 2018). Unlike NEFT, transaction happens in one to one basis, there is no wait time for batch disbursement of payments.

Regional ECS (RECS). It is a regional version of RECS. They are controlled and confined within the jurisdiction of regional office of RBI (Kolkata, Bengaluru, Chennai and Ahmedabad). Validation of data is uploaded to the secure bank server of RBI which contains the details of the customer whose transaction has to be done according to the format given by the RBI. RECS data centre will process these data and reach to a payment settlement where the credit/debit of amount will be done in beneficiaries account. All these processes are done by the core banking system which is been put in place by the bank.

Electronic Clearing Service (ECS) Debit. Also came into existence in the late 1990’s to enable account holders if a bank to electronically transfer funds to another account

holder. The EFT is now been into phasing out stage where they are being replaced by the NEFT system which have Core banking solution in place.

2.3 Fintech and Its Regulatory Structure in India

2.3.1 India's Fintech Regulatory Journey So Far

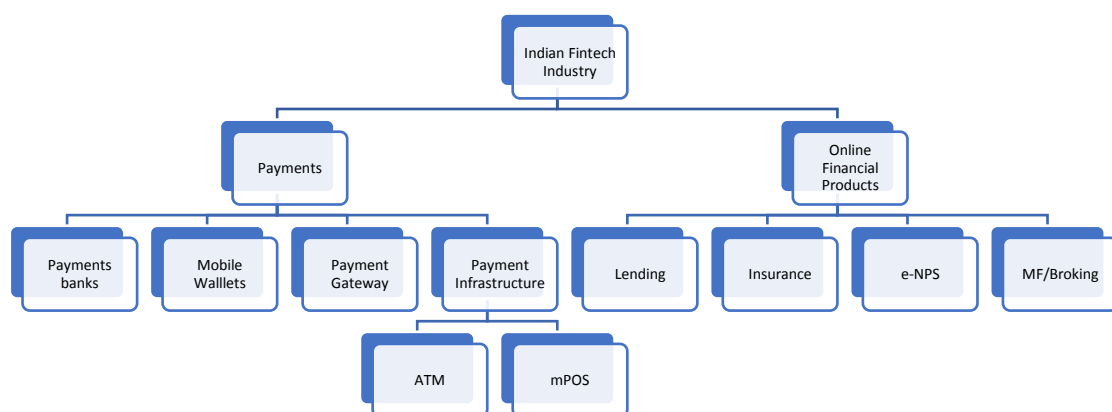
According to recent global ranking India ranks second in terms of speed at which Fintech is been adopted into the financial system with composite score of 52 percent adoption rate (Report 2018). With around 1300 start-ups working in this space, a huge market of tech services has been generated in or around the finance industry. This came as an opportunity for large investors to invest in this new age service industry of India with over a billion consumer base. From the regulators point view, RBI has taken this opportunity to fulfil its long-term pursuit of making digital/less-cash economy. Concerns regarding the safety and security of digital transaction still prevails and yet to be resolved with proper regulatory framework but this upsurge of fintech industry has certainly provided for 'enhanced convenience and accessibility', 'faster processing, interoperability, affordability and consumer reach'.

Traditionally in Indian financial services, Banks have been sitting at the pivot of payment services happening all across the economy as shown in figure 3.2. Given the recent changes 'this domain has no longer the monopoly of banks' (Das 2019). Emergence of new players in the market which is not only providing third party services for the traditional banks but also in competition with them in the same market. The challenge is to put a regulatory framework where these start-ups, basically non-bank entities, in the 'payment domain' (Das 2019). Some of the steps taken by the regulators in India for developing an updated payments infrastructure and technology like UPI, BHIM, BBPS is evidence of the fact that, they are responding to the changing nature of the financial payments market. There is a 'nine-fold increase over the last five years' (Das 2019). According to the latest data provided by RBI, NEFT system alone handles around '195 crore transactions' which is valued around '172 lakh crore rupees' which has grown around 4.9 times in terms of volume and 5.9 times in terms of value over the previous 5 years (Das 2019). Similar to this card payments (including both debit and

credit card) in 2017-18 was around 475 crores (in total) (Das 2019). Prepaid Payment Instruments or PPIs like PayTm, PhonePay, BHIM etc., has done transaction of around 1.5 lakh crore rupees in value. The total card payments in terms of volume stood at 52% of the total retail payments during the year 2017-18.

Not only in digital payments sector, but there has been lot of technological advancement in the sectors like lending, capital raising and they have the potential to change the market dynamics of traditional lenders and intermediaries present. On October 2017, RBI issued a set of directives for peer-to-peer lending business to improve the access for small and medium enterprises. Till now 11 entities have been provided with the license to carry out their businesses in the lending market. Along with that 7 licenses have been issued to purely digital players operating through mobile applications. They have also been mandated to put one physical office in place in order to deal with the customer grievances.

Figure 2.3 India’s FinTech Industry



Source: Compiled by the Author

‘Invoice Trading’ is also another nascent area of Fintech application in India (Das 2019). It is useful for the MSME which are in dire need of working capital for their business operation and cash flow on daily basis. For this service RBI has setup a regulatory structure names as ‘Trade Receivables Discounting System’ (TReDs), where with the help of technology an arrangement of providing ‘discounting bills’ and ‘invoices’ is been made. Until now around three entities have been given authorization to carry out their business in the market by RBI (RBI 2018). Similar arrangements had been made in case of ‘Account Aggregators’ (AA) by the RBI and licenses had been issued accordingly to five entities. Other matters related to the financial instruments using Fintech as their underlying way operations are under consideration of RBI and for this purpose, they have setup a committee under Mr. Nandan Nilekani.

Other than providing ease of access to financial services, Fintech has also provided with the opportunity of digital onboarding of citizens which will eventually help in long term goal of financial inclusion. The incoming investment in this sector shows a promising future for financial inclusion in India. ‘Aadhaar Ecosystem’ provided broad framework of where giving incentives for digital onboarding is been rewarded by swift and efficient service delivery of benefits and transfers given the Government.

KYC (Know Your Customer) is another significant step in terms of linking Aadhaar database with the business operations where, till now ‘more than 100 million records of KYC’ have been uploaded in the central server of KYC registration (Das 2019).

Using ‘RegTech’ (Regulatory Technology) and ‘SupTech’ (Supervisory Technology) is been used for not only making the compliance cost for regulation very low but also upgrade the regulators to supervise efficiently these technology-based financial services. This has enabled regulators to do off-site surveillance, as well as uphold the importance of maintaining the transparency in the business operation which is highly dependent on data driven approach. Efficiencies achieved through automated regulatory process will result in the streamlining the business operations as well as building a system of comparatively evolved regulatory regime with new capabilities. By using this new set of technologies for regulation data collection and analysis of the

concerned sector can be achieved, which can further used for making changes regulatory rules if required.

Some of the examples of such system setup by the RBI are ‘IDPMS (Import Data Processing and Monitoring System)’, ‘EDPMS (Export Data Processing and Monitoring System)’, and ‘CRILC (Central Repository of Information on Large Credits)’. The future of RegTech and SupTech lies, as mentioned by the RBI Governor in Fintech Conclave happened in Delhi, in ‘Big Data Analytics’, ‘Artificial Intelligence’, ‘ML’, ‘GIS’, ‘Cloud Computing’, ‘Biometrics’ etc.

Risk Analysis and forecasting it accordingly is also an important component for Fintech regulation. Concerns like unsustainable credit growth, procyclicality, lower profitability, cross border legal and regulatory issues etc.

RBI has been constantly promoting efforts where banks are entering into third party services in the field of Fintech, because it reduces the technological upgradation cost of the banks and protecting them of becoming irrelevant in market. ‘It is imperative to create an ecosystem which promotes collaboration while carefully paying attention to the implications that it has for the macroeconomy’ (Das 2019). Also, it will play an important role in realising the long-term goal of financially inclusive economy. To address the risk associated with the Fintech innovations and its regulation, RBI has constituted working group on Fintech and Digital Banking which submitted its report on November 2017, which suggested use structured experimentalism approach like Regulatory Sandboxing or Innovation Hub will help in building the regulatory framework space where during the experiments with the Fintech innovation the consequences of the failures can be contained and reasons for the failures can be analysed. Adding to this, it will also help innovations in bringing compliance with the regulatory structure and reduced launch time in the end.

Chapter 3

Methodology

The aim of this chapter is to describe actions which has been taken to investigate the research problem and the rationale for the application of specific procedures or techniques used to identify, select, process, and analyse information applied to understanding the problem, thereby, allowing the reader to critically evaluate a study's overall validity and reliability. The methodology section of this dissertation thesis aims to describe how was the facts and data collected or generated, and how was it analysed.

The central theme of this dissertation thesis revolves around the regulatory challenges which has arrived due to introduction of technology in financial services or Fintech. In order to analyse these challenges, one has to consider various factors and use different combinations to understand it from different perspective. In order to develop a framework, first we need to understand the context under which it happening in India. For many countries in the western world the factors which caused the surge of fintech in financial services can be seen as natural progression to their overall development in the sector, but for the global south the factors will be different. Charting down those factors which caused the recent development in the fintech sector in a country like India can be done by using the research work done by Dr. John Schindler.

According to the research work done by him in his paper titled 'FinTech and Financial Innovation: Drivers and Depth', there are certain supply and demand factors which has propel the growth of any innovation into the market. The favourable market conditions caused by either demand side or supply or both can lead to a situation where we can see an abrupt change in behaviour of the market operation and competition to grab the position of 'being first in the market' by the participants of the market.

In order to build this framework, we will be using the definition of Fintech as given by FSB i.e. Financial Stability Board. According to FSB, 'FinTech' is technologically enabled financial innovation that could result in new business models, applications, processes, products, or services with an associated material effect on financial markets and institutions and the provision of financial services.

Under supply side, technology frequently plays a role in financial innovations, and most famous example would be the ATM ('automated teller machine'). It was a technological development that enabled their creation during 1960s. In particular, the British government issued a 'patent' in 1966 for 'a technology that enabled a PIN code to be stored on a card'.

Regulation is another supply factor that is also very impactful. For example, in the wake of the global financial crisis, 'bank supervisors' in a number of countries encouraged their banks to 'move away from short-term funding'. At the same time, other reforms 'decreased demand by money market funds for instruments that had longer tenors', like longer term repo contracts. In response to this collateralized commercial paper were brought by the banks.

Some supply factors are more subtle. For example, it sometimes occurs that one innovation begets another innovation in a pattern that can lead to an 'innovation spiral'. In practice, this means that there can be a natural sequencing of innovations.

Changes to the financial or macroeconomic landscape can also be supply factors. For example, following the collapse of the housing market in the United States that preceded the global financial crisis, there was a significant rise in the quantity of real estate owned by banks and other financial institutions. These factors are not the exhaustive in nature but at this point of time they are being taken into consideration.

On the Demand side, regulation was listed as a supply factor, but it can also contribute to demand for new products and services. One of the examples for this kind of innovation is commercial paper which came out because of the demand for liquidity coverage ratio by the banks.

Demographics is another demand factor which helps innovation to grow. The characteristics associated to certain demography decides the success of innovation within that particular group. For example, online banking using smartphones found much more popularity among the millennials than those belonging to more senior age group. This is not the exhaustive list, but at this point of time these are considered to be demand factors

By using above information and directives provided by John Schindler's research paper, researcher intends to prepare a table of supply and demand drivers which can be used to explain why fintech is happening right now in India. Analysis is basically consequential in nature which tracks down the nature of events happening in the financial industry classified into supply and demand drivers. These events will be tracked down using secondary desk research using official sources.

This process of making the table of supply and demand drivers will be used to answer the research question 1(a), where the researcher is trying to identify the factors which has caused the growth in number of fintech firms in India in past few years.

For the second part of the research question 1, i.e. 1(b) which raises the issue about the different kinds of challenges that are faced by the regulators in terms of regulating the disruptions like fintech. For this the basic underlying principle of regulation needs to be looked at. The basic classification of regulations into traditional approaches where the question of 'Regulate or not to regulate' is been looked at. And researcher will try to place the disruption caused by fintech firms in the financial market into these traditional approaches. The question as to why these traditional approaches are not fit for the regulation of fintech and regulators are finding it difficult of regulate with the help of these approaches, will be answered with the help of research work done in this area by doing secondary desk research. This analysis will give the sense of recognition of regulatory problems attached with the disruptions caused by the innovations coming into the financial market. Once there is recognition of existing problems attached with the traditional approaches, then one can move further into the options which are available in terms of other contemporary approaches that can be adopted in terms of dealing with the regulatory issues caused by these disruptions in the market.

Now the other section of the research question 1(b), aims to throw light upon the reasons why fintech is getting such hype in India despite of the fact the technologies which are driving these fintech firms have been introduced in the market quite a while ago (like internet, mobile banking, electronic funds transfer etc). For the purpose of this enquiry, fintech firms operating in the Indian financial market is approached. A questionnaire has been constructed which was circulated among these fintech firms in order to conduct a survey and gather opinion regarding such hype. The survey will

provide an insight into the contemporary market where one can find reason why fintech innovations are more rapidly growing.

The questionnaire used for the survey, has used the approach of in-house survey using the combination of multiple-choice questions and open question questionnaires. The aim of using this combined approach was to use get the complete idea of the contemporary market situation regarding fintech innovations in the Indian financial sector.

1. In-house survey - This type of questionnaire involves the researcher visiting respondents in their houses or workplaces. The advantage of in-house survey is that more focus towards the questions can be gained from respondents. However, in-house surveys also have a range of disadvantages which include being time consuming, more expensive and respondents may not wish to have the researcher in their houses or workplaces for various reasons.
2. Multiple choice questions - Respondents are offered a set of answers they have to choose from. The downside of questionnaire with multiple choice questions is that, if there are too many answers to choose from, it makes the questionnaire, confusing and boring, and discourages the respondent to answer the questionnaire. For example, one of the question used in the questionnaire is 'Which sector do you think will be most affected and saw changes by automated financial advice tools'? With the options such as - Banking - Insurance - Securities - Asset management - Other, please specify: [text box] - None of the above.
3. Open question questionnaires - Open questions differ from other types of questions used in questionnaires in a way that open questions may produce unexpected results, which can make the research more original and valuable. However, it is difficult to analyse the results of the findings when the data is obtained through the questionnaire with open questions. For example, one of the questions used in the questionnaire is 'Describe your FinTech Proposal, and what need (or problem) it is addressing in the financial sector'.

In order to contrast and get the regulators perspectives, opinions regarding the fintech firms' growth in Indian financial market, ex officials from Government institutions

dedicated for financial sector regulation and serving officials dealing with the current issue of fintech innovation regulation was contacted to broaden the horizon of understanding in the financial market. The combined view of both the regulator and market competitors will give a comprehensive understanding about the fintech market. Also, by taking the opinion from the sectorial experts from the government will give a pathway directed towards the better understanding of regulatory challenges and how to overcome it. The questions asked to the government experts are open ended in nature.

A total of 23 fintech firms were contacted which has got the license of operation in the Indian financial market from the Reserve Bank of India. Most of them were contacted during the India's Fintech Conclave happened during the month April (2019) at New Delhi, it was organised by the NITI Aayog (Government of India). The sample includes Fintech firms dealing with digital payments or third-party payments, to fintech firms doing business in digital lending, insurance. Although fintech firms related to Artificial Intelligence and Cryptocurrency are new in the financial market, they are also considered in the survey. The funding or investment gathered by these Fintech firms are in the range of 1 million dollars to 174 million dollars.

The Fintech firms responded for the survey are - ItzCash Card, MobiKwik, Financial Software & Systems, Fino Payments Bank (Fino PayTech), Mswipe Technologies, Ezetap Mobile Solutions, Electronic Payments and Services, CCAvenue, Juspay, Instamojo, Paynear, TruPay, Capital Float, NeoGrowth Credit, IndiaLends, RedCarpet, Loan frame Technologies, SecureNow, TechServices, Easypolicy, RenewBuy, Upstox, Active.ai, and UnoCoin.

In order to understand the genetics of regulators responses towards the disruptions in the sector, one need to look into how regulators and business responded in different sector for incoming innovation in the sector. Research question 2, aims to shed light upon that. For this purpose, health sector was chosen as a sector under consideration. Like financial sector, health sector has also seen a lot of changes in terms of innovations and technology in the recent past. The health services have also undergone to phase towards quality service delivery around the patient centric businesses.

To understand how different country responded to globalised business of health services, researcher is going to use case study analysis. Basically, a case study is an in-

depth study of a particular situation rather than a sweeping statistical survey. It is a method used to narrow down a very broad field of research into one easily researchable topic, in this case of health sector one can look into the businesses that has been global in nature and made considerable impact in health service delivery globally.

Some researchers say that because a case study is such a narrow field that its results cannot be extrapolated to fit an entire question but on the other hand some argue that the case study is more realistic than the statistical argument. For the purpose of enquiry related to this dissertation thesis, using case study helps to understand the various methods that can be adopted by the businesses and regulators to accommodate changes happening in the sector and ultimately move towards quality service delivery for the customers. In order to research in such premise qualitative method of case study will be very beneficial.

For answering research question 3, Building upon the findings of above research questions, and knowledge of experts and Fintech firms operating in the Indian financial market through survey and interview, opinions were gathered regarding the possible way out for the regulators to deal with the regulatory issues caused by the fintech innovations. To make the analysis more comprehensive for Indian context, we need to look around the methods adopted by the different countries in the same context i.e. using structured experimentalism approach of regulatory sandboxing and how helpful regulatory sandboxing will be in tacking and nurturing innovations in Fintech. Also, by doing cross country comparison, one can recommend the guidelines, criteria and entry conditions for setting up regulatory sandbox in India through analysing the best suited model through observations gathered in the cross-country comparisons and expert opinions.

Therefore, in a nutshell, methodology for the purpose of this research adopted are Supply and Demand framework analysis is used to answer research questions 1(a) & 1(b), for better understanding of why FinTech is flourishing right now and what are the drivers which make it more important than the traditional innovations. In order to understand the challenges faced by the regulators, interviewing the expert from the banking sector regulation department will be approached (Chairman of IDRBT, Former

RBI and Banking Officials etc). Consultation with other experts outside formal banking sector but doing work related to Fintech.

For answering the second research question, secondary research using case study analysis for determining various types of approaches adopted by regulators to tackle with disruptions in their sector and comparing it with the ongoing disruption in financial sector especially with regards to Fintech. At the end of this the aim is to come up with what are the different options available in front of regulators to tackle and nurture innovations in Fintech.

To answer the third research question, building upon the findings of above research questions, and knowledge as well as opinion of experts doing qualitative forecasting for how helpful regulatory sandboxing will be helpful in tacking and nurturing innovations in Fintech. Also, doing cross country comparison for recommending the guidelines, criteria and entry conditions for setting up regulatory sandbox in India.

Chapter 4

Why FinTech Market is Happening Right Now

4.1 Supply and Demand Drivers

To understand why Fintech is happening right now researcher has used ‘Supply and Demand Drivers for Financial Innovation (Adopted from John Schindler’s academic work’. In order to build this framework, we will be using the definition of Fintech as given by FSB i.e. Financial Stability Board. According to FSB, ‘FinTech’ is technologically enabled financial innovation that could result in new business models, applications, processes, products, or services with an associated material effect on financial markets and institutions and the provision of financial services.

4.1.1 Supply side

Technology frequently plays a role in financial innovations, and perhaps the most famous example is the automated teller machine (ATM). The first ATMs were developed in the late 1960s, and it was a technological development that enabled their creation. In particular, the British government issued a patent in 1966 for a technology that enabled a PIN code to be stored on a card.

Regulation is another supply factor that is frequently present. For example, in the wake of the global financial crisis, bank supervisors in a number of countries encouraged their banks to move away from short-term funding. At the same time, other reforms decreased demand by money market funds for instruments that had longer tenors, like longer term repo contracts. In response, the banks created collateralized commercial paper.

Some supply factors are more subtle. For example, it sometimes occurs that one innovation begets another innovation in a pattern that can lead to an ‘innovation spiral’. In practice, this means that there can be a natural sequencing of innovations.

Changes to the financial or macroeconomic landscape can also be supply factors. For example, following the collapse of the housing market in the United States that

preceded the global financial crisis, there was a significant rise in the quantity of real estate owned by banks and other financial institutions.

4.1.2 Demand Side

Regulation was listed as a supply factor, but it can also contribute to demand for new products and services. One of the examples for this kind of innovation is commercial paper which came out because of the demand for liquidity coverage ratio by the banks.

Demographics is also another demand factor which helps innovation to grow. The characteristics associated to certain demography decides the success of innovation within that particular group. For example, online banking using smartphones found much more popularity among the millennials than those belonging to more senior age group.

Again, this is not the exhaustive list but at this point of time these are considered to be demand factors. Below is the table listing down the drivers from supply as well demand side of the innovation helping Fintech innovation to grow with rapid speed.

Table 4.1

Supply and Demand Drivers

Supply Drivers	Demand Drivers
<p>Technology –</p> <ol style="list-style-type: none"> 1. MICR (Standard Cheques Encoder) 1980s 2. ATM, Electronic Funds Transfer, Branch Connectivity, Computerization 1990s 3. IMPS RTGS NEFT NECS Online Banking, Telebanking 2000-10 4. Biometrics, Mobile Banking, Cheque Transaction 2011+ (ICMAI 2012) 	<p>Regulation –</p> <ol style="list-style-type: none"> 1. Watal Commission Report (demanding for separate regulator for payments network) 2. P2P lending Directives by RBI 3. Nandan Nilekani Committee (RBI 2018)
<p>Regulation –</p> <ol style="list-style-type: none"> 1. Section 19(c), BR Act (“Banking companies can therefore form subsidiaries for undertaking any business which supports their main business. 	<p>Demographics –</p> <p>India has one of the highest working age population according to 2011 census and also one of the biggest consumer market</p>

<p>Subsidiaries can also be formed for undertaking such other business which Reserve Bank may, with the approval of the Central Government, consider to be conducive to spread banking in India or to be otherwise useful for necessary in the public interest” (RBI 2018))</p> <p>2. Section 17 of the Payment and Settlement Systems Act (“RBI has the power to issue directions to payment systems and systems participants. there is scope for developing a legal framework that sets out the broad contours of what principles financial innovations should conform to (RBI 2018).)</p>	<p>for smartphones (phones with access to internet)</p>
<p>Innovation Spirals – Postal Banking, Remote Branches in rural areas, ATMs, Electronic Funds Transfer, Computerization of Banks, MICR, RTGS, NEFT, Automated Tele Service, Online Banking, Android Applications</p>	
<p>Changes in Macroeconomic Landscape –</p> <ol style="list-style-type: none"> 1. Increase in working population and growing disposable income will raise the demand of banking and related services. Increasing number of rural banks 2. Mobile Banking, Internet Banking and various extensions of banking facilities at ATMs will increase the operational efficiency 3. Healthy regulatory oversight because of the policies like ‘Indradhanush’ (A policy made for scheduled commercial banks, to recapitalize and revive them from bad debts) 	

Source: Compiled by the author

4.2 Situation of Fintech Market in India and Aspirations of the Fintech firms in India

In order to understand the situation of Fintech market in India, Stakeholder consultation was done involving both the private players (fintech firms operating in India) and regulatory experts working for the Government. In India all the Fintech firms get their license for operating in the Indian market from RBI.

RBI mandates them to comply with the regulatory guidelines set out by them and can penalise the operating firm if found guilty of misconduct. In case of Fintech firms operating in India has been in a constant struggle with the regulatory bodies. But at the same time India being one of the largest markets for Fintech world has not been able to capitalize on that.

To understand the Fintech market situation in India, Researcher had contacted 23 fintech start-ups operating in India and they were asked same to answer the questionnaire (see Appendix 1). The list if the Fintech firms interviewed and their category in fintech with amount of funding they got is listed below.

Table 4.2

List of Fintech Firms Consulted

Company	Subcategory	Funding (in Millions)
ItzCash Card	Payments	174
MobiKwik	Payments	161.8
Financial Software & Systems	Payments	99.5
Fino Payments Bank (Fino PayTech)	Payments	59.3
Mswipe Technologies	Payments	56
Ezetap Mobile Solutions	Payments	51
Electronic Payments and Services	Payments	40
CCAvenue	Payments	31.3
Juspay	Payments	5.8
Instamojo	Payments	3.1
Paynear	Payments	2.5
TruPay	Payments	2.3
Capital Float	Lending	88.5
NeoGrowth Credit	Lending	36.7
IndiaLends	Lending	10
RedCarpet	Lending	2.6
Loan frame Technologies	Lending	2.25

SecureNow TechServices	Insurance	3
Easypolicy	Insurance	2.2
RenewBuy	Insurance	1.5
Upstox	Online Trading Platform	4
Active.ai	AI	3.5
UnoCoin	Cryptocurrency	1.75

Source: Fintech Conclave 2019, Business Operations CatLog Provided by each Fintech Firm

In response to the questionnaire, all respondents acknowledge the fact that investors are highly interested in the Fintech market in India. Following this when they were asked about what kind of challenges they face in terms of regulation while operating in India, there was different opinion for different category of Fintech firms.

4.2.1 Payments

There was division in opinion regarding the section 19(c) of the Banking Regulation Act. All the Fintech start-ups which had comparatively higher range of funding were of the opinion that banks in India stands in advantageous position in Indian payments market and they get enough levy from the RBI. According to them this was anti-competitive practice.

On the other hand, those Fintech firms which are in the lower range of funding compared to others, were of the opinion that they are not negatively affected by the section 19(c) of the Banking Regulation Act. The reason for that can be that all these payments related fintech firms were providing services to various banks in India as a third-party service provider. Banks were the biggest clients for these Fintech firms.

4.2.2 Lending, Insurance, Online Trading, AI, Cryptocurrency

Fintech firms related to lending, insurance, online trading, AI and Cryptocurrency in India is still at the nascent stage comparatively. When they were asked about what were the challenges, they were facing in terms of regulatory setup in India. Almost all of them were of the opinion that RBI should consider them on case by case basis, because although they similar service provider like their competitors but they were very different in terms of their business models. Investors, who were interested in giving more funds for the business is now getting sceptical because of the regulatory compliance set out by the RBI.

They were of the opinion that RBI should also consider their business model and amount of reserves in terms security of transaction they have before making the regulatory frameworks. Also, as they all are using technologies and inputs from various other sectors, intersectoral recognition should also take into account. For this they want more inter-department co-ordination within the Government bodies.

Chapter 5

Tackling the disruptions by regulators: Taking a case study of Health Sector

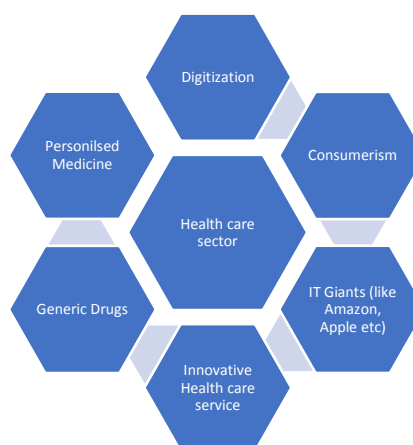
To understand the perspective of regulators regarding disruptions caused by innovations and to understand as to how these disruptions are tackled in different sectors, case study method was used by the researcher.

Health care sector globally can be seen as most volatile sector where the different variants of the sector respond very differently to the changing market. For example, if we see the alterations and discoveries happening in various life-saving drugs, medical treatments to many diseases etc, they are very often under a rapid development mode but at the same when it comes for the improvements in the service delivery of healthcare related facilities, they happen in often very slow pace.

The difficulty with the health care sector can easily be understood by seeing a medical bill which is so hard to decipher, for any common consumer which indicates that healthcare sector has to travel before it has to reach the levels of satisfactory customer experience and remote access of technology (Ciasullo and Cosimato 2017).

From the last decade six major disrupters that have been identified in the health care sector (fig 5.1) are ‘personalised medicine’, ‘Digital Revolution’, ‘Consumerism’, ‘The Amazon effect’, ‘Innovative Health Care Service’, ‘Generic Drugs’.

Figure 5.1 Various Disrupters in Health Care Sector



Source: Compiled by the Author

Amazon company in US announced that they acquired a wholesale pharmaceutical distribution license. Also, some non-traditional service sector players have been introduced themselves in the market like Samsung, Apple, Alibaba etc. The technological expertise that these IT giants brings with them is also making the potential investors in this sector interested in terms of acquiring more and more equity funds and pump it into this sector (Ciasullo and Cosimato 2017). In a complex sector like Healthcare, its challenging for the regulators to maintain fair and level playing field for all the actors in the market.

5.1 Case Study

For case study purpose, researcher has taken disruption caused by ‘Innovative Health Care Service’ provided by a global company called ‘Nephrocare’. It is private health care service provider which provides for dialysis clinics for patients suffering from chronic kidney failure. Since its inception it has grown significantly from being service provider in few states of USA to Global company. It has setup an international network of dialysis centres which have the capacity of offering all the kidney failure related healthcare services. It has also formed a central patients data repository which provides for medical history of all the patients and can be accessed through all of its centres globally. So, even if patient is travelling out from its native country can access these centres anywhere around the world and continue its treatment even while travelling.

There are now currently 880 Nephrocare clinics around the world (Nephrocare 1995), with over twenty thousand employees around the world. Their mission statement says ‘We want to help and alleviate the suffering of people affected by kidney diseases’. And achieve that they have entered into various partnerships around the world. This include Government agencies, private hospitals, civil service organisations, private individuals etc. ‘The company is also deeply committed to the empowerment of its globalized medical and not medical staff, offering them not only different online and offline learning opportunities, but also the possibility to be part of a modern cooperative

working environment. Continuous investment supports the development and the viability of this dialysis centres around the world' (Ciasullo and Cosimato 2017).

The speciality of Nephrocare services come with the fact how do they approached the regulatory regimes in different countries. Various factors which are responsible for success of Nephrocare was –

(a) Institutionalizing the existing business model by adding some changes –

Since the shift from traditional out centric to service centric approach towards innovation especially in health sector has led to opening up the field for new non-traditional players into the market. This led to the change in the service delivery of dialysis for renal failures shift towards considering the needs of patients and their families. In one such example set by 'Italian National Health Care System', by establishing a nationwide service centres for renal failures which is done under the partnership with Nephrocare and they have got the responsibility of sustaining the services all over the country. Cooperation like this with both government and private actors has led Nephrocare define the new medical standards for the renal failures related service delivery, which is more patient centric and providing convenience to patients has been kept at the top.

(b) Re-framing the service delivery approach with patient's perspective –

Nephrocare developed a new approach to providing services to patients by upgrading the medical devices and digitizing peripheral services associated with the treatment. The reports are stored in the central data repository of the head office and can easily accessed by patients from anywhere in the world. This help them to get the medical advice anytime, anywhere around the world. This also help the physicians to backtrack the performance of the treatment and derive a thorough analysis through this. They have also a network if doctors and specialists around the world who can advise on the current status of the patient. This patient centric approach has made the change in the way the patient use to get treated with regards to renal failures.

This Intra-as well as-Inter Management system which is streamlined and process driven has resulted into forming one of the largest databases of the patients suffering from same problem around the world. It has turned its business into the knowledge centre for renal failure patients.

- (c) Introducing new technology and sharing the knowledge through partnerships – The network of health care actors like physicians, specialists, nursing staff that Nephrocare has assembled under one organisational roof has allowed to delve deeper into the concept of treatment and help then to research and come out with a better way of treatment. The competencies and efficiency take a dive if we there is stagnancy in the sectors like health care because the diseases are also evolving with time and getting more immune to the drugs.

In such cases of having an updated system of has led to the upgraded clinics of treatment. The learning platforms created by the Nephrocare has created a whole new space of research for doctors around the world to learn about the kidney failure treatment and nuances related to dialysis in the treatment like highlighting the special cases came into detection etc.

- (d) Developing a new market altogether for dialysis services for kidney failures – Nephrocare through its various partnerships and customized services has developed a new service sector market standard for health care industry. This innovative idea of customizing the service delivery globally in healthcare has led to the forming of new age market of health care where patient centric issues are given priority and resources are assembled in such a way that the no inconvenience would caused due to organizational lack. This has caused other health care service variants to rethink their models.

5.2 Learnings from Nephrocare Case Study

The table 5.1 in the next page shows that, what factors can the regulators and the innovators can learn from the Nephrocare businesses case study.

Table 5.1

Learnings from Case Study

Innovation Type	Business Impact Level (Micro, Meso, or Macro)	Rethinking or Customizing	Reorganising	Restructuring	Maintenance
Business Model	All	Engagement and partnership with Govt. and private entities	Entering into multisectoral partnership and establishing hybrid-PPP model	Creating local centres (Or in other words increasing the access by increasing nodes)	Following Patient-centric management (or Turning the orientation of service delivery)
Providing Services	Meso	Framework of service delivery through multi actor contribution	Bringing in new technologies to add value to the services	Resource sharing with different actors from different sectors and integrating them with organisation	Establishing direct relation with the end consumer and build trust worthy relation
Efficiency in service delivery	Micro as well as Meso	Revamping the old age approach to well researched and updated approach	Interactive platforms of engagements with different actors in the business	Knowledge sharing through digital platforms	Sharing of competences with both actors within and actors from outside
Market	All	ecosystem for service delivery based on	Resource integration and convergence	Information system able to record and	Redefining best practices and institutionalizing

		end user feedback	of multi- sectors	create data in real time	it by cross sector participation
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Source: Compiled by the Author

From these learnings we can observe, first there should be realization of fact whether the service delivery option is at micro, meso or macro level. Then analysing what kind of changes are demanded by the patients, by doing the customer satisfaction level analysis. Then if at all the service comes to level of standardized customer satisfaction the businesses should look for expansion and partnerships which can help them accordingly. Bringing in the new technology will help them to customize the management according to the requirement of the patients (Ciasullo and Cosimato 2017). Also getting knowledge protection through intellectual property rights like patents can help the business to grow globally and bring more and more partners into the business.

Nephrocare has done that bringing some of the non-health sector partners to bring efficiency in the allied services related to renal failure and dialysis. Some of the interesting partnerships has been with the tourism department, entertainment department spread across in different countries. Nephrocare has grown the business from patient treatment to patient’s lifestyle.

Chapter 6

Different kinds of Methods Adopted by Regulators with Respect to Financial Sector Disruption

The sectorial disruptions come with a challenge of regulation. It not only changes the nature of interaction between the consumer and business operation, but also changes the regulatory interface between the regulator and business. For example, certain business which keeping records of their transaction in physical storage files decides to digitize their record keeping and start using blockchain technology instead, then the auditing task carried out by regulator also changes.

In the past there are various ways in which regulators have tackled disruptions in the financial sector. Some of the standard approaches adopted by the regulators are (Zetzsche and Buckley 2018)—

1. Traditional Approaches: To regulate or not to regulate
2. The Case-by-Case Approach: Forbearance, Restricted Licences, and Special Charters
3. Structured Experimentalism: Regulatory Sandboxes

There has been significant shift in the behaviour of regulators post 2008 crisis. Prior to that financial innovations were received very positively in the market. There was a laissez-faire deregulatory approach with respect to these innovations coming into the market. But today we see totally opposite of this where regulators are seeing these innovative financial instruments with a scepticism and they understand the need to regulate them accordingly before they enter into their market (Coffee 2012). During this period globally there has been a lot of changes happening in the regulatory regime and there also has been a rapid technological advancement in the sector. ‘Fintech embraces new start-ups, established technological and e-commerce companies or TechFins as well as incumbent financial firms’ (Ciasullo and Cosimato 2017).

Over the years, regulators have realised that they need to find out the right balance between the ‘traditional regulatory objectives’ where consumer protection and

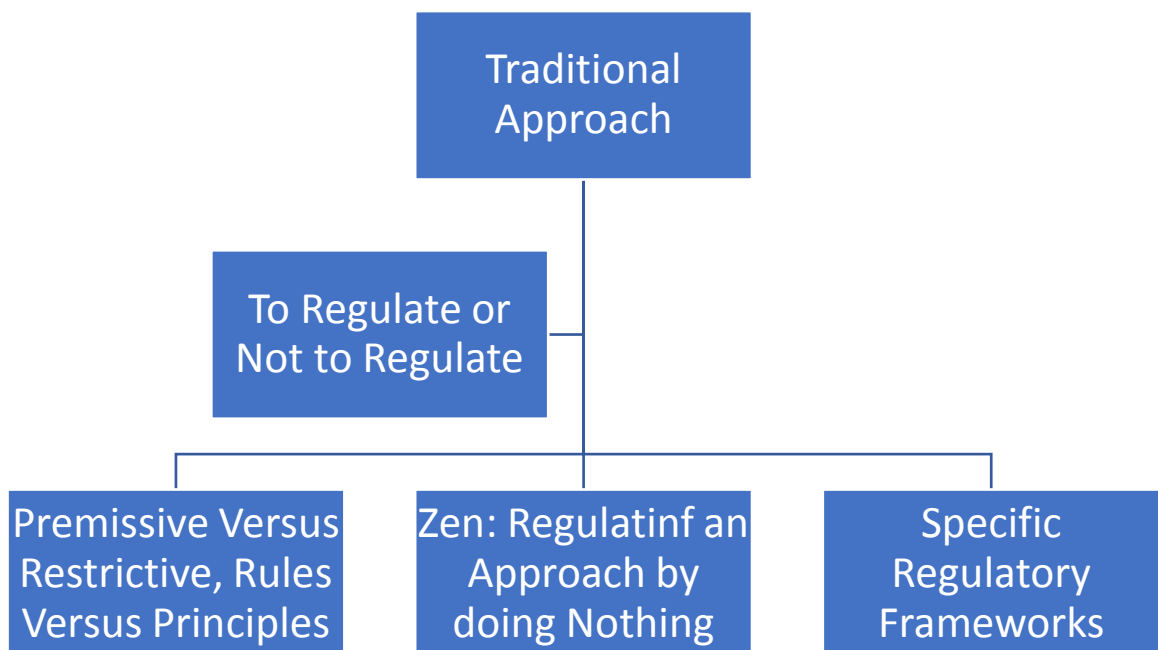
maintaining market stability especially post subprime crisis, is pivotal and promoting incoming innovations in the Fintech market.

In the financial markets around the world has become the breeding ground of the competitive innovation and it is not only exclusive characteristic of developed economies of global north but also it is seeing a rapid growth in countries from developing countries like China, India, African countries, ASEAN countries etc. The regulators around the world is trying to achieve that golden mean/right balance where they don't need to compromise the basic regulatory objectives of the sector and incubate the innovation coming in the market.

6.1 Traditional Approaches: To Regulate or Not to Regulate?

Traditionally regulators have opted to follow relatively repressive financial policy during the mid-80's. This created an anti-competitive environment for the new entrants in the market. On the other hand, post mid 80's there is also evidence of light touch approach where the regulation is carried out by the protecting the primary objective of having the regulator at place and then leaving it to the market competition.

Figure 6.1 Variants of Traditional Approach



Source: Compiled by the Author

Pre-Crisis Analytical Framework: Permissive V/S Restrictive, Rules V/S Principles

The evidence of this framework of regulation found prior to sub-prime 2008 financial crisis. The analytical framework for decision making regarding to set out the rules of the regulation was generally characterized as *restrictive* in nature. The aim of regulation was to protect the business from doing anything out of the purview of the regulatory objective. It does certainly also provided for the starting point of innovation where business tried to avoid restriction by getting out of the purview of regulation. But in overall sense this kind of frame resulted into lower levels of development of innovation.

Many research works suggested that crisis (economic) is more likely to happen in permissive set of regulation. And it does outweigh the probable benefits coming out innovation and development of technology. Therefore, many developing countries opted for having a permissive set of regulation especially in their core banking and exchange sectors.

They were successful in gathering their popularity in many economies for longer period of time because of their 'Efficient Market Hypothesis'. The innovation which do get promoted under this regulatory framework were primarily seen to have the focus on (Coffee 2012)–

- a. financial stability and consumer protection (risk based analytical regulatory frame)
- b. Adherence to market discipline
- c. Consumer protection

To achieve the balance between this restrictive regulation and permissive regulatory frame their lies the conflict between rules and principles. It is the regulatory regime in the economy to choose one over the another. This pendulum nature of regulation between these two extremes is extremely time specific in nature.

Post economic crisis of 2008

‘Regulatory discussions shifted from the pre-crisis framework of restrictive versus permissive and rules versus principles to comprehensive macro-and-micro prudential frameworks combined with much broader consumer protection efforts, with regulation moving beyond market failures and the efficient markets hypotheses, yet with a new paradigm of understanding yet to fully emerge’ (Zetzsche and Buckley 2018).

Fintech has created a significantly challenging situation in front of the regulators where pre-crisis standard approaches are no more suitable for it. And the basic underlying question remains the same which is: to regulate or no to regulate?

The Zen Approach: Regulating a Revolution by ‘doing Nothing’

This approach calls for the innovators to test their models in the market without any immediate response from the regulator. Regulator plays a role of observer during the initial phases of innovation’s initial phase of introduction into the market. One example of this approach is China, who adheres to laissez-faire approach towards the new innovations coming into the market. Post its first hand market experience they go for the comprehensive guidelines for the innovation. But recent events in the last decade has seen departure of China from this approach, especially post Alibaba Group of companies made, China fourth largest money market funds within a matter of few months and as of now is the largest among all the money market funds.

The disadvantage associated with zen approach is lack of visibility, which can be very detrimental, given the markets are so interconnected in this highly globalised world. Although the presumption of less restricted market is more favourable for innovations, but even in the absence of regulatory framework, existing regulation can also be de-motivating for the innovations.

Specific Regulatory Frameworks

With convergence of multi sectors jurisdiction involved in any regulatory framework, has led to evolving of new legislative and multi sector stakeholder regulatory frameworks. This has been seen especially with Fintech innovations. This kind of

approach was initially adopted by United Kingdom for regulating the new financial techniques coming into the market for example peer to peer lending and equity crowdfunding.

The regulators in United Kingdom found the existing regulation will not be sufficient to put a check on these innovations. Therefore, they devised a whole new set of guidelines for these innovations, here the actors who are responsible for any malfunctions or liability burden was shifted from traditional actors in the sectors. Other countries (Hong Kong, Indonesia, Australia) also adopted this approach for tackling the disruptions coming into the financial sector (Zetsche and Buckley 2018).

6.2 Case by Case Approach: Forbearance, Restricted Licenses, and Special Charters

Partial Exemption or Dispensation

Case by case approach is a midway for two extremes of ‘doing nothing’ to ‘devising completely new regulations’. Instead of choosing any one extremes regulator can carve out a getaway for innovations by designing them a frame which is very specific to the nature of the innovation. One such example of case by case approach is ‘Forbearance’ or we say taking no action at all (not for the whole segment but partially). For instance, regulators can argue that Fintech activities carried by particular firm is beyond the purview of regulation or devising regulation regarding that particular feature can lead to unnecessary action towards then innovation. But it does not mean that the principle underlying to have a regulated sector is compromised. It is more like until and unless those principles are not violated then these activities carried out by innovations are allowed.

Regulator’s Discretion

The ‘Discretion’ in rules making under the regulator’s purview lies with the nature of provision making exist in the economy. It varies from generic to special provisions based on the legal framework established by the law-making body if the state. This correlation between the extent of legal framework requirement and regulatory body’s discretion determines the degree of regulation will be applied to the innovation (Zetzsche and Buckley 2018).

Risks

The disadvantage of using this approach to the incoming innovations is that, with time when the ecosystem of that Fintech innovation grows there will be increase in the number of players trying to get that exemption from the regulator. This will be putting strain on the regulators shoulder and increasing the cost of doing case by case assessment of each innovation will add on to the pressure on regulatory efficiency. The simple reason for that it is very difficult to treat every innovation equally on case by case basis approach and it depends on the perception of the regulator how it see the potential of that innovation in the market.

Structured Experimentalism Approach: Regulatory Sandboxes

This approach abides by the rule of providing a ‘safe space’ for all the incoming innovation in the market and give them a chance to show the regulator that it is not threat to market as well as gives time to regulatory body to get acquainted with the innovation coming in the market. This safe space is provided to do test runs before entering into the formal market, with less risk for consumers as well the businesses getting penalised by regulators. Establishing a Regulatory sandbox is one such approach where it can avoid some of the downsides happening due to innovation entering into the market.

This approach also provides for predefined entry and exit conditions for any innovation entering into the test runs of the space. It provides for transparency and knowledge gaining for the probable risk which is associated with the innovation before actually letting them run in actual free market.

Chapter 7

Regulatory Sandboxing: Tackling Challenges of Fintech through Structured Experimentalism

The regulators around the world is now parting away from the traditional approaches and case by case approaches regarding the Fintech innovations coming into the financial sector market. The new age approaches to these kinds of innovations are finding its regulatory framework from structured experimentalism approach. The emergence of Regulatory Sandbox has turned out to be a breakthrough path for tackling the challenges of regulation posed by Fintech. Thus, making regulatory frame making -- a more agile, demand based, and nurturing to innovation coming into the market. Here regulator assumes the position of supervisor to innovation as well as arbitrator for those who are trying to become a part of the market.

During its operation regulator observes and analyse the incoming innovation into the market. It assumes the position of signalling also by indicating the upcoming innovations to the market. It not only authenticates and guarantees the market towards the incoming innovation into the market, but also prevent the misinformation spreading which can threaten the market stability.

Regarding the regulation in Fintech services, anachronistic control is not recommended. A proper stakeholder deliberation has always been followed regarding the regulatory frame formation. A decentralised approach involving both Government and private players is always beneficial for making a comprehensive regulation for such volatile sectors where minute changes effects the whole population at once.

Regulatory Sandbox provides for unique intermix of business advisory and regulatory initiatives. The concept of forming a cohort of innovations for testing using a regulatory sandbox was first introduced by United Kingdom's central financial regulation body called FCA. The underlying principle was very simple which is finding the place of innovation in financial sector market by using reasoning as analogy at first place. Why this innovation is required for the market? What kind of efficiency is promises to bring into the sector?

Starting with answering above questions Regulators delve deeper into the impact of these innovations in the market. Do these innovations have the potential risk of causing market failures? What will be the impact on consumers of the market and how much it will change the consumer behaviour?

Post that questions related the regulatory capacity and burden it will bring upon the regulator comes into surface, also the cost of compliance and regulation (both for innovator and regulator). These questions can be answered in the safe space environment by entering into test runs with innovations.

7.1 Cross Country Comparison

For the analysis purpose and understanding the guiding principles involved in setting up a regulatory sandbox, a cross country comparison is done by the researcher. There are two frameworks of comparison adopted for this analysis and consequently two different set of tables have been formed –

1. Understanding the Objective of setting up a regulatory sandbox and eligibility criteria put into place for any entrant to take part in test conducted by sandbox
2. What are the different kinds of regulatory relaxation are provided during the test run to the innovations (participants) by the regulators and what are the important safeguards put in place by regulators, and participants are required to maintain those safeguards?

Now for cross comparison purpose a total of 10 countries are taken into considerations

1. United Kingdom
2. Malaysia
3. Bahrain
4. Sierra Leone
5. Singapore
6. Bermuda
7. Canada
8. Indonesia

9. Thailand

10. Australia

Reason for Choosing Such Sample

In the cross-country analysis for the purpose of first framework, United Kingdom (a developed country and fairly advance in Fintech regulation) was the first one to bring the concept of regulatory sandboxing. Other countries are developing countries and fairly lagging behind in terms of regulatory capacity for the Fintech services.

For the purpose of second framework of cross-country analysis, all those countries which have given detailed guidelines for regulatory relaxation and safeguards are taken into consideration. It contains both the mix of developed and developing economies.

Framework under which the comparison between the sampled countries has been done is including the factors which tells about the priorities based on the objectives of creating a regulatory sandbox for the fintech market. By doing this kind of analysis, regulators can find a way to deal with the dogma regarding conventional set of regulation which is finding it difficult to tackle the disruption caused by the fintech firms in the financial market.

Element of analysis taken into consideration for first framework of cross comparison – Objective of creating regulator in the sector, Objectives of setting up a sandbox, Eligibility criteria for entering into the sandbox. Now the reason for taking these factors is to understand what the regulator of the respective country wants to achieve by setting up the regulatory sandbox. And according to them, suiting to their financial market, what should be the eligibility criteria that each fintech firm intending to take part in the sandbox needs to fulfil. By doing this kind of analysis we can understand what are the contemporary concerns and checks regulators are being putting to protect their market stability.

Post these kinds of analysis we will be able to put India's financial market under the same frame and set our own priorities by taking it as a point of reference. By doing this, we can reach closer to estimating the market expectation regarding the regulation that are required for the disruptions caused by the innovation in the financial market.

Element of analysis taken into consideration for second framework of cross-country comparison – List of regulatory relaxation provided for the participants by the central regulatory authority, Safeguards kept in place by the regulator (Mandatory provisions) and to be maintained by the participants. Now after the estimation of eligibility criteria for getting to enter the sandbox testing, it is necessary to define the boundary conditions of the sandbox.

As it is the testing ground for new fintech start-up coming into the market, it is pivotal to determine the what are different kinds of changes that can be allowed in the regulatory regime for the testing period and to what degree. Also, these regulatory relaxations are being determine with respect to the state (in this case regulatory institutions) capacity. In other words what kind of relaxations which have to be given to the participants of the sandbox test is highly dependent upon the market shock absorbing capacity of the regulators. It will also depend upon the market size, economy strength and stability.

Basic Factors

If we closely look at the countries (see appendix (ii)) that have adopted the regulatory sandbox for tackling the disruptions caused by the fintech in the financial industries, one thing which is common to all is to achieve the optimal balance which not only ensures nurturing ground for the innovation but also take care of financial stability and consumer protection.

It is seen many countries that a feasibility assessment is been done prior to setting up a sandbox. Cost to benefit analysis should be done by the regulators in order to understand the mix of the risk and benefits involved in the test run as well as, it should also consider how much of a benefit will feasible threshold that will justify the setting up a sandbox (Zetsche and Buckley 2018). For this purpose some factors which can be taken into consideration are, first determine whether a sandbox is needed and is a proper fit for a jurisdiction; consider whether a sandbox can be effectively implemented and under what circumstances, identifying barriers to success; contemplate design and feature set; compare results with sandbox alternatives while also considering efforts necessary to implement a regulatory sandbox (Zetsche and Buckley 2018).

For the purpose of making a benchmark for the comparison the most experienced and oldest of all sandbox model should be considered and with accordance to the economic stability and situation considerable modulation should be done to suit their own financial market. Oldest of them all is FCA (UK central regulatory authority for financial market) and it is currently most active also (FCA, Regulatory Sandbox in UK 2015). “Differences can be more pronounced where the legal mandates of the regulator and available resources are at a variance. Frameworks are tailored to fit the specific needs, priorities, laws, mandates and resources of a jurisdiction and the sandbox operator” (Zetsche and Buckley 2018).

Framework

Typically, each sandbox involves four basic steps which comprises of application process, selection process, testing process, and finally exit from the sandbox. The changes in the framework of the sandbox happens in the field of guidelines which are used for the applying the process at different stages of the sandbox. So, the main considerations for any regulator lies in determining these guidelines. As previously mentioned, the main aim of this cross-country comparison is to throw a light in the path of framing guidelines for regulatory sandbox in India. By doing the comparison with the developed and the developing countries one can get an idea of ways that have been adopted by the regulators to tackle any kind of risk and ensure smooth operation of the test run.

Objectives

“A primary purpose of regulatory sandboxes is to responsibly facilitate the advancement of beneficial innovation through regulatory gaps where uncertainty and incompatibility exist. Sandbox function and scope are limited to what is enumerated within the regulator’s mandate, the sandbox framework and as may be set forth by law” (FCA, Regulatory Sandbox in UK 2015). This presumption ensure the autonomy of the regulator in framing the conditionalities that any innovation has to fulfil before entering the test run. This method ensures that regulators take an informed decision before permitting any fintech firm enter the sandbox cohort.

Upon comparison (see appendix (ii)) it is usually seen that the mandates which are been framed by the countries are often include references to consumer protection, financial integrity and financial stability, market development and promotion of competition (may not be the case with developing countries in terms of competition).

Eligibility

The eligibility criteria or evaluation criteria are in consonance with the objectives or we can say directly derived from that. The firms applying in the sandbox should be under the purview of the regulator's authority and can meet the published entry requirements. One often repeated term which was found all the sampled countries was 'genuine' in terms innovation applying for the sandbox as a entry condition for the sandbox. Another such conditions were; "the innovation provides identifiable benefits to customers/consumers and is technically sound"; "the innovation provides improvements in accessibility and efficiency of services"; "the applicant is ready and able to begin sandbox testing and afford the entire cost; the applicant plans to deploy the innovation in/to benefit the jurisdiction"; "conditions to include or exclude incumbents and/or start-ups"; "justification for needing a sandbox, such as identification of legal or regulatory uncertainty and/or incompatibility and/or the need to use live participants for testing" (see appendix (ii))

Safeguards

Many countries have put a necessary presentation of plan by the applicant which adequately protects consumers. The presentation pf plan should include the factors like revelation of marketplace, risk mitigation plan, safeguarding procedures, reporting of any mishaps or incidents, dispute resolution and redress mechanisms (such as a fund for victim compensation) (see appendix (ii)). The applicant must also have a testing plan identifying key performance indicators, milestones and details of the composition of a final report determining whether key objectives were met and the test resulted in a success or failure (MAS, Fintech Regulatory Sandbox Guidelines 2016).

Regulatory Sandbox in Developing Countries

As the matter of fact, the concept of regulatory sandbox was originated in high income, comparatively stable financial market. But due to globalisation of financial markets and

post 2008 crisis, regulators around the world have become more cautious in terms of innovations coming into the market. They are also opted to setup regulatory sandboxes which can be used for regulators to understand the impact of these innovations before they allow them to enter into the market.

Now in the beginning of the chapter we discussed the two frameworks which is been used to do the cross-country comparison of the sampled countries. Consequently, two tables have been constructed under these two frameworks (see appendix (ii)).

In the first framework, (see appendix (ii)) we see that when it comes for the eligibility of fintech forms entering into the sandbox in case of developed country like U.K., they give priority to genuine innovation that improves the customer service delivery and they must fall under the least threshold criteria set by them. But on the other hand, if we see the developing economies like Malaysia, Sierra Leone they have the priority towards their adaptability in the market and requires the necessary expertise backing with the innovation which intends to take part in the sandbox.

Developing economies also aspires for the credible management team which have some experience in the financial market prior to taking party in the sandbox testing. But in the developed economies like UK, if the threshold conditions of the prior requirements are fulfilled then even if they don't have any experience with financial market, they can take part in the sandbox testing.

Regulatory sandboxes have a short operating history and are evolving, only recently emerging in least developing countries. They present an important opportunity to foster valuable information and knowledge sharing between regulators and innovators, national and internationally, and to substantially increase regulatory capacity and a deeper understanding of FinTech innovation. Over time and by way of the learning experience, the sandbox framework can and should be improved, enhanced and refined so that they may reach their potential. Therefore, most of the developing economies are very cautious in terms of adopting these technologies into their market, hence we see a more stringent eligibility criteria for entering into these sandboxes.

Relaxations and Mandatory Provisions

we can see that relaxations provided for the fintech firms (see appendix) participating in the sandbox testing countries like Canada and Singapore has provided the relaxations with regards to the auditing of the companies and asset requirements which is in generally required in order to operate in the market. But on the other hand, they have the mandatory provisions with regards to the customers protection and their KYC provisions which should be strictly followed during the entire run of the test.

In terms of developing countries similar mandatory provisions are found but most these economies are giving relaxation in terms of auditing and reserve capital requirements only. Most of these economies are still not digitally equipped in terms of the regulation, therefore they are more cautious in terms of financial transactions involved during the test run. Therefor the upper cap limit of the financial transactions has put under mandatory conditions by most of these developing economies, where customers and market should be kept at minimum risk.

For the developing economies their priority is more tilted towards market stability than nurturing innovations coming into the market. But on the other hand developed economies are also cautious about their market stability but they have stronger financial backing which act as safety cushions for the regulators, so that they can provide for more elasticity for innovations which are going for the sandbox test.

Chapter 8

Conclusions and Recommendations for Design Criteria and Entry Condition for Regulatory Sandbox

Regulatory Sandbox design should be principally as such that it should not provide for free pass away for the innovations that are going to effect negatively to the underlying principle of regulating a market altogether. Regulators around the world has been of opinion to set certain kind of qualification barriers for innovation coming for a test run inside the sandbox. Whether the business model of the innovation is ethical or not according to the regulation principles set out by the regulating body. This degree varies from country to country and also from kind of innovations coming into place. If an innovation is challenging the core principles or its just an upgraded version of existing financial services. These entry conditions are very necessary in terms of protecting the market as well as making the test runs cost effective.

8.1 Entry Conditions/Qualifications

1. Ideally every entrant should have the innovation which is actually going to contribute in the service delivery applications of financial sector services (FCA, Fintech in UK 2017).
2. The willing entrant should be able to demonstrate that the innovation is genuine. In other words, it is introducing a new solution to existing problem or problem which might be happening in future (Zetsche and Buckley 2018).
3. Also, it should be able to demarcate how using their innovative idea consumer will be beneficiary and sectoral efficiency will increase.

For any regulator, to decide whether the innovation is suitable for the market or not in first attempt is very difficult task to ask. Because regulators are also getting introduced by these innovations for the first time. In order to avoid that, before getting reaching any decisions with regards to the suitability of innovation to the market, regulators to should do risk analysis.

Risk analysis will tell the regulators will equip regulators to take more informed decision. The factors which needs to be considered for risk analysis are as follows

1. Innovation's probable effect on the market stability (Zetzsche and Buckley 2018).
2. Maintaining transparency in the market operations.
3. Safeguards and grievance redressal measures present in the business model in order to protect clients, consumer, etc.

After the entry conditions are satisfied, and participation is confirmed by the regulator then comes the question of 'scope of coverage' of the sandbox.

8.2 Scope

For every regulatory sandbox setup, the scope of coverage varies differently. These variations can be –

1. Sectorial Restrictions (Zetzsche and Buckley 2018)

Countries like Australia, UK, Malaysia put no restrictions over the convergence of sectors while conducting a test run in the sandbox. While countries like Thailand, Hongkong restricts for inter sector convergence in the test run.

Researcher argues for maintaining the sectorial restrictions in the sandbox because it provides for better chance of regulators to analyse the innovation based on the sectoral expertise and experience, they have regarding the financial market concerned.

2. Participation of Existing Regulated Entities

While some regulators prefer to provide opportunity to new firms by giving them exemptions or restricted licensing (Australia, UK, Singapore). On the other hand some regulators prefer to restrict licensed or authorised institutions only for coming up with their innovations in a test run. The researcher argues for providing access to the non-licensed entities and new firms also in the test run.

3. Target Consumer (Zetzsche and Buckley 2018)

While Australia's regulatory authority provides for case by case basis waiver for the innovations and it is totally under its own discretion. Other regulatory authorities

like Singapore's MAS allows participant innovation to choose any type of customers. Researcher argues for having Australian type case by case waiver to avoid the probability of collusion.

4. Time and Size of Regulatory Sandbox Test

UK provided for generally six months of time for a test run, with exceptions are provided on case by case basis. While countries like Australia, Malaysia, and Thailand provides for twelve month of time period with extensions provided on case to case basis.

8.3 Mandatory Provisions Which is needed to Maintained by the Participant

With regards mandatory/minimum level which is needed to be maintained by the participant during the test run varies from case to case basis. But at the same time some of the safeguards should be provided by the regulator in order to ensure there is no mishap during the test runs.

Researchers recommends following mandatory provisions for any participants during the test run –

- a. Confidentiality of customer information
- b. Fit and proper criteria particularly on honesty and integrity
- c. Handling of customer's moneys and assets by intermediaries
- d. KYC requirements

Removing the Privilege of Regulatory due to Extra Ordinary Circumstances

If the test run reach to a stage where it is costing more to regulator than benefitting, or there is a case of non-compliance of mandatory provision by the participant and the purpose of participating in sandbox is no more seem to be successful, then termination of participant's test run should be in effect.

8.4 Conclusion

In India, Fintech has the potential to provide workable solutions to the problems faced by the traditional financial institutions in terms of low penetration, scarce credit history and cash driven transaction economy. If a collaborative participation from all the stakeholders, viz., regulators, market players and investors can be harnessed, Indian banking and financial services sector could be changed dramatically. Fintech service firms are currently redefining the way companies and consumers conduct transactions on a daily basis.

Some of the major fintech products and services currently used in the market place are Peer to Peer (P2P) lending platforms, crowd funding, block chain technology, distributed ledgers technology, Big Data, smart contracts, Robo advisors, E-aggregators, etc. These fintech products bring together the lenders and borrowers, seekers and providers of information, with or without a nodal intermediation agency.

Financial institutions are seeking to increase their knowledge in relation to technological innovation, both through partnerships with tech companies and by investing in or acquiring such companies. Despite this, there are wide differences in the preparedness of market participants for these changes in practice.

RBI in their report has expressed their concern with respect to fintech development in country. The multiplicity of firms and a mosaic of business models complicate the classification of the various types of activities, products and transactions covered under the fintech spectrum. Currently in India right now fintech risks are being looked at more in terms of its association with the traditional IT systems, such as cyber-security risks. While the IT related risks are no doubt multiplying manifold under fintech, the whole gamut of issues under the fintech umbrella, particularly those of regulatory concern, have to be responded to on priority. It is, therefore, necessary to examine these issues and outline the contours of an appropriate regulatory strategy. RBI in its report on fintech and digital banking has recognized the potential benefit of using regulatory sandbox.

Among the various benefits of a Regulatory Sandboxing - enhanced communication, kick-starting innovation and competition, and assessing innovation and its risk would surely provide an upper hand to regulators over innovations in future.

APPENDIX

(i) Questionnaire for Fintech Firms

1. How familiar the consumer market has become with automated financial advice tools (e.g. robo advisers)?

- Very familiar - Somewhat familiar - Somewhat unfamiliar - Not at all familiar

2. Which sector do you think will be most affected and saw changes by automated financial advice tools?

- Banking - Insurance - Securities - Asset management - Other, please specify: [text box] - None of the above

3. How attracted investors are with respect to automated financial advice and Fintech tools?

- Mass affluent - High net worth - Ultra-high net worth - Institutional - Other

• Positively affected • Negatively affected • Not affected • No opinion

4. How will the provision of automated financial advice and Fintech tools affect consumers, if at all?

- Costs - Access to advice - Product choice - Quality of service - Incidence of market fraud / mis-selling

• Positively affected • Negatively affected • Not affected • No opinion

5. To what extent do you think automated financial advice will replace engagement with human advisors for the following types of investors? (1 means not at all, 7 means entirely)

Scale: 1 (Not at all) to 7 (Entirely); Not sure

- Mass affluent investors - High net worth investors - Ultra-high net worth investors - Institutional investors

6. What do you consider to be the biggest risk, if any, that could be introduced from Fintech tools?

- Mis-selling of financial advice - Flaws in the automated financial algorithms - Privacy and data protection concerns - Other, please specify: [text box] - None of the above - Not sure

7. Which technology do you see as having the greatest impact on the financial services industry 1 year from now?

- Robo-advisers - Blockchain technology - Crowdfunding - Marketplace / Peer-to-Peer lending - Other, please specify: [text box] - Not sure

8. Which technology do you see as having the greatest impact on the financial services industry 5 years from now?

- Robo-advisers - Blockchain technology - Crowdfunding - Marketplace / Peer-to-Peer lending - Other, please specify: [text box] - Not sure

9. What impact, if any, will blockchain technology have on the following aspects of financial services? (1 = No impact at all, 7 = Significant impact) - Commercial banking (e.g. payments systems) - Asset management - Asset servicing (e.g. custody, securities financing) - Fund administration (e.g. record keeping) - Clearing and

settlement - Real estate - Alternative currencies - Capital markets infrastructure -

Other banking, please specify: [text box]

- 1 – No impact at all
- 2
- 7 – Significant impact
- Not sure

10. Do existing crowdfunding and/or peer-to-peer lending marketplaces have the right balance between ease of access and investor protection? - Yes - No - Not sure Please explain your response: [text box]

11. Please share any additional comments or opinions you have regarding Financial Technology (FinTech): [open comment box]

Describe the FinTech Proposal, and what need (or problem) it is addressing in the financial sector.

Describe the technology adopted for the FinTech Proposal and how the FinTech Proposal is innovative and advantageous / superior compared with other competitors / solutions in the market

Describe the benefits of the FinTech Proposal, including how it may: • promote growth, efficiency, or competition in the financial sector; • promote better risk management solutions and regulatory outcomes for the financial industry; or • improve the choices and welfare of consumers

Questionnaire for experts in the field from Government

What is your view of fintech (including insurtech) innovation and digital disruption?

What are the greatest benefits you expect in financial market to see from financial technology in the next 12 months?

Does Regulators are required to widen the skill set within risk and compliance functions to accommodate developments in fintech, insurtech and regtech innovation and digital disruption?

Are you in favour of developing regtech (dealing with Fintech challenges) solutions in-house or are we should be looking at best practices followed globally?

Which global practice in your opinion will be most helpful to the cause?

Practical instances of the Basel Committee's Principles for Sound Management of Operational Risk (PSMOR) Applied to Fintech. To what extent we are equipped in ensuring that?

(ii) Cross Country Comparison Tables

Comparison Chart for Sampled Countries Regulatory Sandboxes (First Framework)

Country	Objectives/Mission	Sandbox Objective	Eligibility
United Kingdom [FCA]	<p>Mission:</p> <ul style="list-style-type: none"> - Protect consumers; - enhance the integrity of the UK financial system; - effective competition in interest of consumers. 	<ul style="list-style-type: none"> - effective competition promotion to test innovative products, services and business models in a live market environment in the interests of consumers, while ensuring that appropriate safeguards are in place. - supporting disruptive innovation - Deliver more effective competition in the interests of consumers by: <ul style="list-style-type: none"> (i) “reducing time and potentially 	<ul style="list-style-type: none"> - In scope: innovation dedicated for country; - Genuine in nature: significantly different than other market products; - directly or indirectly, the innovation promotes competition and includes risk mitigation; - Needs a sandbox: “innovation is incompatible or difficult fit with regulation, full authorization impractical”, - Ready for testing: plan is developed, all/partial testing performed, sufficient resources for sandbox testing, adequate

		<p>cost of getting innovative idea to market”;</p> <p>(ii) “enabling greater access to finance for innovators; enabling more product testing prior to market and allowing FCA to work with innovators to ensure adequate consumer protection safeguards are implemented”.</p>	<p>safeguards are/can be established for consumer protection;</p> <p>- Qualification with threshold conditions.</p>
<p>Malaysia [FTEG] [BNM]</p>	<p>BNM: ‘...excellence in promoting monetary and financial system stability and fostering a sound and progressive financial sector, to achieve sustained economic growth.’</p>	<p>‘... to provide a regulatory environment that is conducive for the deployment of fintech.’ ‘... to enable innovation of fintech to be deployed and tested in a live</p>	<p>- Innovation must (i) improve efficiency, accessibility, security, quality in financial services; (ii) enhance efficiency and effectiveness of domestic financial institutions risk management; or (iii)</p>

	<p>FTEG: Support innovations that will improve the quality, efficiency, accessibility of financial services;</p> <p>- Formulate and enhance regulatory policies to facilitate adoption of technological innovations in the financial services industry.</p>	<p>environment, within specified parameters and timeframes.’</p>	<p>address gaps, open financing or investments in the economy;</p> <p>- Adequate assessment performed</p> <p>- Necessary resources and expertise to test and mitigate potential risks;</p> <p>- Realistic plan to deploy in Malaysia;</p> <p>- Innovation is wholly/partially incompatible with law, regulations or standards issued by BNM;</p> <p>- Credible management team.</p> <p>- Companies collaborating with financial institutions or create high value jobs are assessed more favourably.</p>
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<p>Bahrain [CBB]</p>	<p>Objectives</p> <ul style="list-style-type: none"> - implement and frame credit, monetary, financial policy; - central bank functioning; - Protect customers and investors in financial markets; - Develop the financial sector; - Ensure credibility of the financial centre; - national currency issuance and validation; - Licensing, supervision, and regulation of regulated financial services; - Manage country's gold and foreign assets 	<p>'...effective competition, embrace new technology, encourage financial inclusion and improve customer experience.'</p>	<ul style="list-style-type: none"> - Innovation: genuine, significantly different from existing technology; - benefits customer: directly or indirectly identifiable; - Technical Testing for existing Solution: prior tested or have external validation; - due diligence performed, risk mitigation, reporting - Intent to function in country: proposed exit strategy
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<p>Sierra Leone [BSL]</p>	<p>BSL Objectives: Bank of Sierra Leone Act 2011</p> <ul style="list-style-type: none"> - Achieve and maintain price stability; - implement as well as formulate policy, financial operations and prudential standards; - “Act as banker, adviser, fiscal agent of Government”; - Formulate, implement the foreign exchange policy; - Conduct foreign exchange operations; - “Own, hold and maintain the official international reserves including gold reserves”; - Issue and manage the currency; - Establish, promote, license and oversee sound and efficient 	<ul style="list-style-type: none"> - “Provide regulatory environment conducive for deployment of new and innovative FinTech and business models domestically; - Enable testing innovations in live environment before deployment”; - Framing guidelines for incoming innovation in market, “support evidence-based approaches to regulation that advance the goals of financial inclusion”, market stability, integrity and consumer protection. - “Foster responsible 	<ul style="list-style-type: none"> - Registered business under BSL’s norms - 10% or more ownership of applicant by a citizen - Fintech firms can take part in cohort, on rolling basis (innovation should be incompatible with existing law / regulation. <p>Evaluation of the cohorts organised:</p> <ul style="list-style-type: none"> - Potentiality for advancing financial inclusion - due diligence with law - Ready for testing - Sufficient resources to participate - Clear business plan and exit strategy - Fit and proper management and leadership
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	<p>payment and securities settlement systems;</p> <ul style="list-style-type: none"> - License, register, regulate and supervise financial institutions per BSL Act or other enactment; - Depository for funds from international organizations. 	<p>innovation that benefits consumers in Sierra Leone by improving the quality of and access to financial products and services”.</p>	
Singapore	<ul style="list-style-type: none"> - “Promoting sustained non-inflationary economic growth and a sound/progressive financial centre”. - Central bank, conduct of monetary policy, issuance of currency, oversee payment systems, serve as banker / financial agent of Government; - Conduct integrated supervision of financial services and 	<ul style="list-style-type: none"> - Grow smart financial centre, encourage adoption of innovative, safe technology in financial sector; - Enhance value, increase efficiency, better manage risks; - Create new opportunities, improve lives of people/residents - Encourage FinTech 	<p>Evaluation criteria include:</p> <ul style="list-style-type: none"> - Innovation: not similar to existing offering unless new technology offered or used in a different manner; - Due diligence performed: legal and regulatory; - Benefits to consumers/industry; - Intended deployment in Singapore, adequate exit and transition strategy;

	<p>financial stability surveillance;</p> <ul style="list-style-type: none"> - Manage official foreign reserves of Singapore; - Develop Singapore international financial centre. 	<p>experimentation of promising innovations</p>	<ul style="list-style-type: none"> - Defined testing plan and outcomes; - Risk assessment and mitigation plans.
<p>Bermuda [BMA]</p>	<p>The Bermuda Monetary Authority released an Information Bulletin outlining what documentation is required when submitting an application for a digital asset business (DAB) license.</p> <ul style="list-style-type: none"> -The Digital Asset Business Act 2018 makes provision for DAB licenses. -There is also an insurance sandbox in progress. 	<p>Framework built to ensure that core objectives of financial regulation are respected, that is: protecting consumers, ensuring stability of our institutions and maintaining the integrity and confidence in financial markets – with a focus on maintaining the highest standards of AML/ATF.</p>	<ul style="list-style-type: none"> - Requires annual returns and broad disclosure data

	<p>-Two classes of DAB licenses are available; Class F (full) and Class M (modified). Modified licensees will operate in a sandbox environment (similar to, but separate from the Authority’s Insurance Regulatory Sandbox) before graduating to become full licensees, where applicable.</p> <p>-To supplement the Act, the Digital Asset Business (Cybersecurity) Rules 2018, Digital Asset Business (Client Disclosure) Rules 2018, and Digital Asset Business (Prudential Standards) (Annual Return) Rules 2018 are also in effect.</p> <p>- Requires annual returns and broad disclosure data</p>		
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Sources: -- United Kingdom: -The mission statement for UK’s FCA is taken from document ‘Our Mission 2017 (FCA, Our Mission 2017), and details related to the objectives and eligibility for sandbox is taken from FCA’s Fintech report and Regulatory Sandbox report (FCA, Fintech in UK 2017) (FCA, Regulatory Sandbox in UK 2015); Malaysia: - Objectives are taken from Mission statement Malaysia 2014 document available in their website (Malaysia, Mission Statement 2014), Eligibility for firm is taken from their regulatory sandbox framework (Malaysia, Financial Technology Regulatory Sandbox Framework 2016); Bahrain: - Objectives from their official website (CBB, Objectives 2006), Eligibility from their Fintech and innovation report (CBB, FinTech and Innovation 2018); Sierra Leon – Objectives are from official website of BSL (BSL, Bank of Sierra Leone 2010), Official report on framing their regulatory sandbox program (BSL, Sandbox Program 2018); Singapore – Objectives are from official website of MAS (MAS, Monetary Policy 2000), Official report on Fintech Regulatory Sandbox Program (MAS, Fintech Regulatory Sandbox Guidelines 2016); Bermuda - Objectives are from official website of BMA (BMA, About Bermuda Monetary Authority 2014), Official report on Fintech Regulatory Sandbox and innovation hub (BMA, Regulatory Sandbox and innovation hub 2018)

Regulatory Relaxation and Maintenance Provided during Cohort in Sampled Country

Country	Regulator	Relaxations Available to Participants by Regulators	Mandatory Provisions
Singapore	Monetary Authority of Singapore	<ul style="list-style-type: none"> ● Asset maintenance requirement ● Board composition ● Cash balances ● Credit rating 	<ul style="list-style-type: none"> ● Confidentiality of customer information ● Fit and proper criteria particularly on honesty and integrity

		<ul style="list-style-type: none"> ● Financial soundness ● Fund solvency and capital adequacy ● License fees ● Management experience ● MAS Guidelines, such as technology risk management guidelines and outsourcing guidelines ● Minimum liquid assets ● Minimum paid-up capital ● Relative size ● Reputation ● Track record 	<ul style="list-style-type: none"> ● Handling of customer's moneys and assets by intermediaries ● Prevention of money laundering and countering the financing of terrorism
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Bahrain	Central Bank of Bahrain	Depending on the case of the Applicant, the CBB will determine which requirements will be relaxed and to what extent. For example, in Bahrain, cryptocurrency exchanges are being provided sandbox licenses in order to study and define rules to regulate them.	<ul style="list-style-type: none"> ● Confidentiality of customer information ● KYC ● AML/CFT
Canada	Canadian Securities Administrators Sandbox	<ul style="list-style-type: none"> ● Applicants have previously been granted relief related to: <ul style="list-style-type: none"> ○ audit requirement regarding financial statements 	<ul style="list-style-type: none"> ● KYC requirements for initial coin offerings

		<ul style="list-style-type: none"> ○ know-your-client requirements ○ suitability requirements ○ dispute resolution requirements ○ certain disclosure and reporting requirements ○ the requirement to issue and distribute a prospectus 	
Indonesia	Bank of Indonesia	Bank Indonesia will determine the testing scenario for products, services, technology, and/or business models and submit a letter to the Financial	<ul style="list-style-type: none"> ● Consumer protection ● Risk management

		Technology Operator after the Financial Technology Operator declares their undertaking to enact the testing scenario.	
Malaysia	Bank Negara Malaysia	<p>Applicants need to identify the legal or regulatory requirements that are incompatible with the proposed product, service or solution and the regulatory flexibilities needed to undertake the test. For example:</p> <ul style="list-style-type: none"> • Risk management or outsourcing requirements when 	<ul style="list-style-type: none"> • Regulated activities under the purview of the Securities Commission Malaysia (e.g. fund management, peer-to-peer lending, equity crowd funding) • Bank will give due regard to: <ul style="list-style-type: none"> ○ preserving sound financial and business practices consistent with monetary and financial

		<p>collaborating with emerging technology and software companies</p> <ul style="list-style-type: none"> ● Conduct of Business rules that do not apply neatly to AI or big data applications ● Licensing requirements such as track record or capital resources requirements 	<p>stability; ○ enforcing sufficient consumer protection measures; ○ establishing proper procedures for anti-money laundering and countering terrorism financing; ○ protecting the confidentiality of customer information; ○ promoting the safety, reliability and efficiency of payment systems and payment instruments;</p> <p>○ having sufficient risk management systems including IT and cyber security</p>
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			<ul style="list-style-type: none"> ○ ensuring innovative solutions for Islamic financial services are consistent with prevailing Shariah standards; and ○ encouraging healthy competition for financial products and services.
Sierra Leone	Bank of Sierra Leone	<ul style="list-style-type: none"> ● BSL will determine the specific regulatory requirements it is prepared to temporarily modify during a Sandbox test on a case-by-case basis. 	<ul style="list-style-type: none"> ● Character and fitness requirements for the Applicant, its founders and directors ● Suitability requirements pertaining to business premises

			<ul style="list-style-type: none"> ● AML/CFT regulation
Thailand	Bank of Thailand	<ul style="list-style-type: none"> ● Participants in the sandbox may test their financial products or services in a live but limited environment, without being fully subject to all licensing/ supervision requirements that normally would be applicable. 	<ul style="list-style-type: none"> ● Not exempt from having to apply for any applicable licenses that are necessary to conduct their intended businesses ● Regulations related to electronic transactions ● Customer's information and secret protection ● Customer's money and asset management ● Security of work system and information, Integrity of work system and information,

			Availability of work system. <ul style="list-style-type: none"> ● Protection of money laundry and terrorism financing
Australia	Australian Securities and Investment Commission	ASICs provides regulatory sandbox licenses that allows eligible firms that are not currently authorized to provide services covered by the exemption to test these services for 12 months without an AFS or credit license.	<ul style="list-style-type: none"> ● Consumer protection ● Dispute resolution ● Compensation arrangements

Sources: Singapore – Regulatory Relaxations and Mandatory Provisions are taken from their official Fintech Regulatory Guidelines (MAS, Fintech Regulatory Sandbox Guidelines 2016); Bahrain - Regulatory Relaxations and Mandatory Provisions are taken from their official Fintech Regulatory Guidelines (CBB, FinTech and Innovation 2018); Canada - Regulatory Relaxations and Mandatory Provisions are taken from their official Fintech Regulatory Guidelines (CSA 2017); Indonesia - Regulatory Relaxations and Mandatory Provisions are taken from their official Fintech Regulatory Guidelines (Indonesia 2018); Malaysia - Regulatory Relaxations and Mandatory Provisions are taken from their official Fintech Regulatory Guidelines (Malaysia, Financial Technology Regulatory Sandbox Framework 2016); Sierra Leon - Regulatory Relaxations and Mandatory Provisions are taken from their official Fintech Regulatory Guidelines (BSL, Sandbox Program 2018); Thailand – Regulatory Relaxations and Mandatory Provisions are taken from their official Fintech Regulatory

Guidelines (Mackenzie 2017); Australia - Regulatory Relaxations and Mandatory Provisions are taken from their official Fintech Regulatory Guidelines (Treasury 2017)

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