

# The Evolution of Fintech: A Regulatory Approach Perspective

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## ABSTRACT

There is a long historical timeline before the idiom of fintech becomes something as popular as we know today. Fintech includes any novelty innovation on any given space at any given time if it is considered to be revolutionary or disruptive enough to change the activities in the financial sector. This article will describe the evolutionary process of fintech from the perspectival approach of “trends” that financial regulators use to encounter incoming novelty innovations. The regulatory approach is a more tangible measurement tool because just like animals will adapt to environmental changes, regulators will also adjust to upcoming innovations. The transitional shift from the brick and mortar Laissez-Faire paradigm to the adaptation of various Piloting Projects and Regulatory Sandboxes across the globe are concrete shreds of evidence that regulatory approach can be used as a standard perimeter to determine and measure the developmental milestones of Fintech History

**Keywords:** *fintech, wait and see, test and learn, Piloting Project, Regulatory Sandbox*

## I. Introduction

For some, the 2008 Global Financial Crisis (2008 GFC) is considered to be the catalyst that has started the era of fintech, and the world is currently on the second wave of the fintech transformation (Orton-Jones, s.a). For others, the first transatlantic cable marks the historical beginning of fintech, and the 2008 GFC is the pivotal moment that marks the transition of the currently ongoing fintech 3.0 period (Arner et al. 2015). In our opinion, these perspectives towards fintech history have several problems in particular.

First, it only views innovations as something that is mainly happening in the western hemisphere, and third world countries were only the last mover of digital innovation. There is no denying that early technological advancements and novelty business models mostly began in the western hemisphere. However, financial globalization has shown the world that novelty innovation, such as the legend of M-Pesa in Kenya and Yue Bao in China, can also occur in third world countries as well. (Xie & Yap 2017; Monks 2017)

Second, The emphasis on Financial Startups as the umbilical cord of Digital Innovation. This Digital era is caused by the transformation of the World Wide Web into the Internet of Things. So, in this case, putting Financial Startups as the epicenter of disruption is irrelevant, because the disruption is caused by the object, not the subject. Traditional fintech, such as Bank or Insurance Company, also adjusts into the IoT Bandwagon and digitally provides financial services.

Third, there is no clear boundaries and standard measurement to define how and when a periodical

transition occurs. Fintech 1.0 is the Analogue, Fintech 2.0 is digital, Fintech 3.0 is startups in the developed world, and Fintech 3.5 is startups in the developing world. The question remaining is, “how do we measure when the world enters Fintech 4.0”?

Regarding these issues, we believe that a regulatory approach could be a better measurement to determine the periodical timelines of fintech evolution. The main reasons are that it would view the financial sector from a more holistic world perspective, more appropriate emphasis on regtech as the object that drives the evolution, and a more tangible perimeter to determine when the world enters the next phase of fintech history.

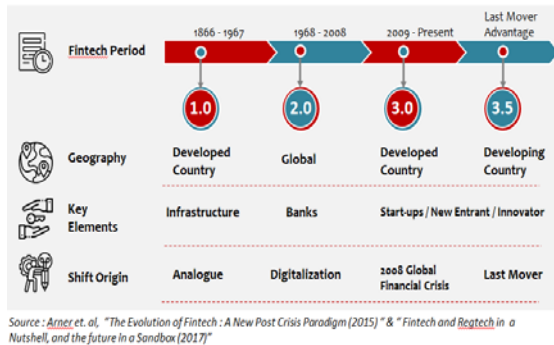
## II. Research Method

This paper is historical legal research that will be conducted under a qualitative method. It will combine the historical theory of financial technology and the theory of the regulatory approach trend toward digital financial innovation. Hopefully, at the end of this paper, there will be a more specific viewpoint to define the evolution of financial technology, not only to retrospect when the periodical transition occurs, but also to determine what financial regulator should do to address incoming and upcoming digital innovation.

## III. Periodical Characteristic Perspective

From the periodical characteristic perspective, Fintech history can be expanded into three periodical timelines. Fintech 1.0 is the period when the financial sector is still widely an analog industry, Fintech 2.0 is the period when the financial sector adopted

computational and digital technology to improve their activities, Fintech 3.0 and 3.5 is the on-going period when financial startups and big tech companies (TechFins) are the umbilical cord of digital innovation.



A. *Fintech 1.0 – Analogue Industry (1866 - 1967)*

The first period of fintech 1.0 began when the early financial globalization happened. It was marked by the first interconnection of transatlantic cable between Europe and America in 1866 until Barclays invented the first ATM Machine in 1967. During this period, The financial sector has adopted traditional analog technologies such as the telegraph, railroads, canals, and steamships, which underpinned financial interlinkages across borders, allowing rapid transmission of financial information, transactions, and payments across the world. This period also marks the first usage of the credit card as a payment instrument, which in the following decades has changed the landscape of activities in the payment industry. (Arner et al 2015).

B. *Fintech 2.0 – Digitalization (1967 - 2008)*

The invention of Barclays ATM Machine in 1967 was believed to marks the commencement of the digitalization period in the financial sector.<sup>1</sup> In the following years, rapid technological advancements majorly happened in the electronic payment systems. These innovations are manifested with the first generation of Automated Clearing Houses in the United Kingdom (1968) and the United States (1970) and the formation of the Society of Worldwide Interbank Financial Telecommunications (SWIFT) as a global financial messaging network in 1973. However, the next level of this era is the inception of the first internet banking protocols via the World Wide Web (WWW) by Wells Fargo in 1995 to create the first-ever internet banking experience for financial costumers, followed with the emergence of the first branchless banks such as ING Direct and HSBC Direct launched in the UK financial market scheme in 2005. The terms of Fintech 2.0 is being used in practice to refer to traditional FI such as Banking Conglomerates and Insurance Companies. (Arner et al. 2015; Arner et al. 2017)

C. *Fintech 3.0 and 3.5 – The Era of Startups (2008 - Now)*

The emergence of various non-bank financial startups called for a radical rethinking of the view that “Banks are the only provider of financial services.” From the aftermath of the 1997 Asian Financial Crisis (1997 AFC), various financial startups and big tech companies have started to join in the financial services bandwagon as well. These startups disruptions can be traced to the creation of the first digital wallet concept by confinity in 1999, which popularly known today as modern-day Paypal (Plotkin 1999). Over the years, various Big tech Companies, Telecommunication providers, and financial startups across the world also launched their version of digital wallets such as China Alipay in 2004, Phillipines G-Wallet in 2004, and Kenya M Pesa in 2005. In the Lending Industry, the formation of ZOPA as the UK first Peer-To-Peer Lending (P2P Lending) platform in 2005 marks the beginning of P2P Lending disruption (Akst 2005).

Regarding the developmental stages of this fintech 3.0 period, some believe that geographical location may have played a considerable role in determining the evolution phases of fintech startups. Arner et al. (2015) perceive the 2008 GFC to be the critical transition from Fintech 2.0 to Fintech 3.0 in the western hemisphere. Post-2008 GFC factors such as the decline of public perception, a more stringent regulatory agenda, and awful political-economic conditions are the main factors that drive fintech startups to pick up the slacks left behind by banking conglomerates. For instance, the disruption is manifested in the rise in the level of public trust toward fintech startups and the declining trend towards banking conglomerates in the US Market. (Medici 2015).

On the other hand, the emergence of various FinTech startups in the developing markets (Asia, Africa, and South America) have been primarily prompted by the pursuit to achieve economic driven goals and was the last mover advantage that occurs after the transition. It is believed that the third world is still a greenfield project because there is a vast population of unfeasible subprime costumers who, in the brick and mortar credit scoring criteria, are considered ineligible to receive essential financial services. The periodical timelapse of the fintech startups in third world countries are known as the fintech 3.5. (Arner et al. 2015).

4. FINANCIAL REGULATOR APPROACH TOWARD INNOVATION

Traditional Fintech wishes to maintain control over the status quo, Fintech Startups wanted to bring in new business models to the market, TechFin firms want to expand their influence into the financial market, Regtech Providers hope that their technology will improve the compliance activities in the financial sector, and the customer wanted the best financial product available. The main challenge for regulators across the globe is to contend with the conflict of

interest between their desire to regulate and Fintech desire to innovate. (Al-Maraj 2019)

Financial Regulators acknowledge that innovations may bring positive impacts in the financial sector, such as a more competitive environment, better consumer protection, and financial inclusion benefit. However, this does not mean that every innovation is risk-free. Some innovations may be “too small to care,” “too large to ignore,” or “too big to fail,” but one thing for sure is innovation can either be successful or unsuccessful. The case of an unsuccessful innovation may lead to several problems ranging from consumer protection fiasco to institutional failure, which can shake the core of financial system stability (Arner et al. 2017). Another issue to consider is that there is no 100% pure application of each approach. Some jurisdictions have been experimenting with alternatives that combine multiple approaches and that often respond to various restrictions in the legal and regulatory framework (Jenik & Lauer 2017).

To mitigate these risks, Financial Regulators conducted various regulatory approaches as an effort to minimize the consequences in case of an unsuccessful innovation occurs. There are three kinds of approaches that modern-day financial regulators may use to apprehend any innovation that will enter their market.

*a) The Formal Approach ;*

A formal approach is when a financial regulator put certain restriction for Innovation to grow independently because they do not know enough about the innovation and promptly reforms the current existing regulation or develop a new one to provide a more appropriate and balanced legal framework for both new entrants and current stakeholders. The main idea of this approach is to regulate any form of innovation (Zetzsche et al. 2017)

Usually, the regulator will use the approach for any innovation that is deemed to be too risky to grow, such as a new business model in the funding-lending industry or a sensitive issue regarding data privacy. For example, Indonesia Financial Service Authority (OJK), has formulated the new OJK Regulation No. 37/ POJK.04/ 2018 on Equity Crowdfunding in response to the growing trend of the equity crowdfunding platform (UMBRA 2019; Prabowo 2019). Another example is Bank Negara Malaysia (BNM) planned to draft a proposed framework on standardizing Open APIs in the jurisdiction rather than to give a permit for the Banks to freeing up APIs in commercial fashion. (Shi Ann & Iqbal 2019)

*b) The Wait and See Approach ;*

The wait and see approach is the most traditional approach that begins with the concept of the *Laissez-Faire* paradigm. In this approach, any innovation that is deemed to be “too small to care,” is allowed to thrive without any regulatory intervention until it reaches the tipping point when it becomes “too large

to ignore” or “too big to fail” to grow without regulatory supervision. After it reaches its peak, the regulator may create a specific legal framework design for the changes and shift to a more comprehensive regulatory approach to address the issue. As been mentioned, regulators will react to innovation when it reaches a tipping point. If innovation is on the scale of “too large to ignore,” regulators might still have a chance to regulate the innovation and mitigate the disruption risk. However, if it already reaches the scale of “too big to fail,” it might be too late and would be an arduous task for the regulator to supervise the entire industry. (Zetzsche et al. 2017; Arner et al. 2017)

The perfect jurisdiction that has manifest this approach and also experienced both consequences is China. The case of “too large to ignore” Innovation can be seen in the legend of Ant Financial - Yue Bao who pooled around US\$90 Billion in the span of 9 Months and created the fourth biggest money market fund in the world at that time (now is the biggest) by only offering the products via Alipay Digital Wallet (Tu 2014). While the case of an innovation that has reached the peak of “too big to fail,” is the story of E-Zubao 9-14% return of investment fraud (Gough 2016). The People Bank of China is often applauded for adopting the *laissez-faire* paradigm before proceeding to design a more comprehensive test and learn environment. The wait and see approach may have been beneficial for the developmental growth of china's financial inclusion, but it does not mean that there is no price to pay. The main price that China regulator has to pay is the difficulties in cracking down the practice of shadow banking, which in 2016 reached its peak and formed around 78% of china's GDP (The Economist 2018; Hsu 2016).

*c) The Test and Learn Approach ;*

In the end, proper set of regulation is needed to rule an innovation, but it is much better if the innovation can be tested first under certain circumstances, rather than letting it to run wild until it becomes “too big to fail”. Some regulators have opted to use the test and learn approach to filter any innovation that will enter their jurisdiction. Depending on the context, the regulator can either promptly experiment on a case-per-case basis (Ad hoc Testing) or design an open space framework for FI to test their innovation (Regulatory Sandbox).

- Ad hoc or Thematic Testing

In this mechanism, the regulator conducts an experimental procedure on a case-to-case basis to test any innovation subject by sticking to the prudential and conduct supervision mandate, which has been given by their government or constitution. Because the testing is performed on a case-per-case subject, there is no specific legal framework that regulates the pre-determined design of safeguards in the testing process. Regulators may issue a brick and mortar forbearance waiver instruments (such as a restricted

license or letter of no objection) or conduct an experiment under an ad hoc piloting project to test innovation that is novelty enough to create a significant impact on the financial sector. (Zetzsche et al. 2017)

Over time, the ad hoc approach has been expanded not only to comprehend the benefit and risk from a novelty innovation (Product Testing) but also to revise or construct a new regulation and standard policy as well (Policy Testing). Also, there happened to be a transitional shift from a case-per-case basis into a more thematical testing environment. (UNSGSA 2019). The ASEAN QR Code Piloting Projects are the legitimate evidence of these changes. Recently, several ASEAN central banks, have conducted a continuous and collaborative Piloting projects to test the implementation of QR codes in the front end payment system. The results of these piloting projects were aimed to create a standardized QR codes for the region front end payment transaction. (Deloitte Indonesia 2018; Young et al. s.a)

- Regulatory Sandbox

Unlike ad.hoc testing, which doesn't have standardized safeguards and conducted for a thematical or case-per-case purposes, a regulatory sandbox may have a fundamentally graded component for testing new products because the provision is put under an existing legal framework. Regulatory Sandbox provides a supervised space for fintech innovation to be tested in a live environment, without having to follow some or all legal requirements and subject to prefined restrictions (Schuffel 2017). Some may define regulatory sandbox as a different approach from the test and learn method (Economist 2018). However, in reality, it is tough to distinguish the sandbox as an independent approach. The reason is that regulatory sandbox is not an approach, but rather is an instrument.

The instrument is being used by various regulators in different manners, for different objectives, and different testing mechanisms. Factors such as Institutional Arrangement, Supervisory Purview, and Internal viewpoint have created whole different kinds of regulatory sandboxes variant across the globe. The establishment of every sandbox model may differ from one to another, and some may incorporate it with the formation of an Innovation hub to create a sustainable test and learn environment while others may opt to conduct a piloting project under their Sandbox Umbrella. A financial regulator may design their sandbox only to test new products, many include policy testing purposes as well, and others do it to push the innovation limit in their jurisdiction. (UNSGSA 2019)

Indonesia seems to be the perfect jurisdiction to describe this phenomenon since Indonesia's government separates its institutional arrangement mandate into two different regulatory agencies. *Bank Indonesia* (BI) as the payment service regulator and *Otoritas Jasa Keuangan* (OJK) as the financial

service regulator. Both BI and OJK have designed their regulatory sandbox framework perspective, but they operate it in different directives. BI Sandbox is primary objectives is to test novelty innovation in the payment system, that in the end aimed to assist product for registration or recommendation to relevant regulatory agency. On the other hand, OJK Sandbox is not only being used to test novelty innovation but also for policy testing purposes that were clustered into several pre-determined business models. (POJK IKD)

## 5. REGULATORY APPROACH PERSPECTIVE

Innovations are positive viruses created by financial institutions meant to improve the core activities in the financial sector. While innovation viruses may bring a positive impact on the overall system as a whole, there is the possibility of an unsuccessful innovation could occur in the process. To mitigate this risk, Financial Regulators will launch its antibody, known as the "approach" to address these new aliens. Some antibodies might opt to watch the virus to replicate until it reaches a certain kind of quantitative value or until it causes a distress in the system (Wait & See), some may react by conducting an experiment to understand the virus before it enters the system and determine the appropriate reaction (Test & Learn), and others just simply supervise some virus because they deem it to be too risky to grow (Formal Approach).

These antibodies didn't just abruptly appear out of nowhere. Just like innovation underwhelm an evolutionary process, the regulator will also adjust their approach over time. In the last few decades, there happened to be a transformational shift trend from the *laissez-faire* paradigm to a sustainable test and learn environment. The beginning of a new direction does not necessarily mean the death of the old standard, but rather is a new visible reaction that complements innovational changes. This paper will stretch fintech history into four periodical timelines from the perspective of "how" financial regulator addresses new incoming FI Innovation. Fintech 1.0 is The Laissez-Faire period, Fintech 2.0 is The Regulatory Arrangement Period, Fintech 3.0 is The Test and Learn Period, and Fintech 4.0 is The Regulatory Sandbox Period.

	1,0	2,0	3,0	4,0
Characteristic	Analogue Banking	Electronic Banking	Digital Banking	Open Banking
Approach Trend	Laissez-Faire	Formal Regulation	Piloting Project	Regulatory Sandbox
Key Element	Innovation is equal positive, so do not regulate	Regulation is needed to mitigate hidden risk within innovation	Test an innovation with certain safeguards before letting it enter the market	Build an innovation hub and create a sustainable test and learn environment
Shift Origin	N/A	The First Truth in lending Act 1968 in United States	Philippines Central Bank (BSP) Test Globe & PLDT e-Money concept	United Kingdom FCA Initiate Project Innovate and Launch a Regulatory Sandbox framework

a. *Fintech 1.0: The Laissez-Faire Period, Analogue Banking ( ? – 1968 )*

The Financial Sector has existed in the world for a long time, and the last thing that any governmental

agencies want to do during the Analogue era is to regulate any innovation. In the early days, Innovation was still perceived as a positive upbringing that possessed little-to-no risk and mainly occurred in the western hemisphere. Because at the time technological transfer is very low, financial services were only conducted locally. In this period, the most significant FI Innovation that has changed the landscape of financial activities in the following decades is the Invention of the credit card as a payment instrument.

Although the first concept of the credit coin, chargeplates, and paper loyalty card has been invented as early as 1865. It was the launch of the first-ever Diners Club Card by Frank McNamara in 1950 that has mark the beginning of the first-ever geographically universal credit card. In the following years, various Credit Card providers such as American Express, Visa, and MasterCard were also joining in the credit card providing bandwagon as well. The popularity of the credit card industry rapidly expanded in the 1960s and reach its peaks when Forest Perry, an IBM Engineer, invented the Magnetic Stripe Technology (Kossman 2019; MacDonald & Tompkins 2017). In 1966, Barclays became the first bank in the United Kingdom, which collaborate with Visa to create Barclaycard, the first-ever credit card issued outside of the United States jurisdiction. (Richards 2019)

*b. Fintech 2.0: Regulatory Arrangement Period, Electronic Banking ( 1968 – 2004 )*

At this period, the Financial sector has already beginning to use computational technology in its core activities. As been mentioned, the US credit card industry proliferated in the 1960s, along with the adaptation of magnetic stripe technology. The growth of the credit card industry could be considered as an Innovation that is “too large to ignore” Since several problems have floated to the surface at that point. Those problems ranging from no transparency in calculating the interest rates, various fraudulent charges, discrimination against women, and there is no “Terms and Condition” provided. For these reasons, the US Lawmakers stepped into the credit card industry and pass the Truth in Lending Act (TILA) 1968, Followed by several complementary legal frameworks such as The Unsolicited Credit Card Act 1970, The Fair Credit Billing Act 1974, and others in following years to come. (Kossman 2019)

The Formation of these legal frameworks marks a new chapter in fintech history, which change the old paradigm that any form of innovation is equally as positive. Although new technologies or novelty business model may hold the key for improving financial inclusion, that doesn’t mean there’s no risk at stake. New Invention will come along with new hidden risks. At this point, financial regulators have already realized the issue, and a proper legal framework is needed to anticipate any possibilities. Other than the expansion of the credit card industry into the worldwide market, the two most significant

innovation in this period is the development of the Electronic Banking (e-banking) System and the early development of Electronic Money (e-money).

By providing direct and virtually unlimited access to their accounts via ATM machine or other non-human interface channels, technologies have removed the necessity for depositors to be physically present at a branch to withdraw funds. Indirectly, this could facilitate electronic bank runs as the lack of physical interaction removes the friction from a withdrawal. This practice worry regulator that it will increase the stress for FI’s that has liquidity problems during a financial crisis (Arner et al. 2015). The early development of e-money has been started as early as the 1990s with the launch of Digicash, which unfortunately didn’t pan out well. It was until 1998 when Paypal launch a more universally accepted internet payment model, which then followed by its counterpart in years to come. To anticipate the impact of E-Money disruption, on 18<sup>th</sup> September 2000, the European Commission issued Directive 2000/46/EC on taking up, the pursuit of, and prudential supervision of the business of electronic money institutions. (Rogers 2011)

*c. Fintech 3.0: Test and Learn Period, Digital Banking (2004 – 2015)*

Following the 1997 Asian Financial Crisis, the adaptation of internet service protocols, and the development of the e-money design principles are rapidly being explored by various FIs. The adaptation of the Internet has undirectly reshaped the conservative paradigm that financial service is something that can only be provided by banks or insurance companies. The new millennial has shown the world that with the connection to the internet, financial services can be provided by any *rechtpersoon*, ranging from new startups to a big tech company, not limited to the old paradigm.

Regarding geographical development, this period showed that innovation is not centralized in the western hemisphere anymore but also expanded into the third world market as well. Some regulators may design a legal framework in response to encounter innovation, while others have opted to wait for a proper legal framework because they know too little about the impact. This status-quo was generally adopted in various jurisdictions until *Bangko Sentral Ng Pilipinas* (BSP) became the first regulator to use the test and learn approach to address new digital Innovation.

In 2004, two of the Philippines telecom Giants (Globe and PLDT) were tested under BSP ad-hoc piloting project, respectively, for their proposal of an independent e-money initiative. This decision was internationally unprecedented because no telecom companies had issued an e-money project without any banking affiliation. For some, this move was considered to be too risky, especially concerning the AML and CFT requirement. (Sperber 2017; Schellhase & Garcia 2019). A year later (2005), the Central Bank of Kenya (CBK) became the second

regulator to conduct a piloting test on Safari.com e-money project, M-Pesa. At first, M-pesa was designed as a microfinance-loan repayment system, which can be done by using a cellphone, but at the end of the piloting project, Safari.com realized that there's a more significant opportunity to expand the product into an independent payment service provider (Hughes and Leoni 2007). Over the years, the test and learn approach is adopted under a thematic fashion in various jurisdiction, not only for testing a new product innovation but also as a testing ground for policy-making purposes as well.

*d. Fintech 4.0: Regulatory Sandbox Period, Open Banking (2015-now)*

The formulation of an open testing environment under a legal framework was not formalized until the Financial Conduct Authority (FCA) launched Project Innovate and coined the term "regulatory sandbox" in 2015 (FCA 2015). The FCA Regulatory Sandbox was an initiative from the UK regulator in effort to address the digital innovation in London fintech scene. Throughout the years, various regulators from across the globe were also adopting the same trend, even though the implementation from each jurisdiction may vary from one another and is combined with other approaches. (Jenik & Lauer 2017)

These different sandbox models have caused different perspectives on defining the appropriate viewpoint of "what is a regulatory sandbox?" Regulators may create their sandbox framework for different objectives and incorporate it with an innovation hub. Factors such as supervisory purview, innovation volumes, and market conditions also play a determinant role for a regulator in designing their sandbox version. A tangible example is in the case of the Philippines "regulatory sandbox". For BSP, the practice that they are doing for testing innovation is a regulatory sandbox because they think thematic test and learn is also a regulatory sandbox (Schellhase & Garcia 2019). While from the law practitioner perspective, the approach that BSP is currently doing is not a regulatory sandbox but rather a structured piloting project that is conducted on a case-per-case basis (Mendoza et al. 2019). There may be no common ground to define "what is a regulatory sandbox?". But one thing for sure, vast pace of innovation is the womb that gave birth to the Regulatory Sandbox concept.

The digitalization effort may still be on process, but it's also the appropriate time to connect all the dots in the financial sector. Other than the recent emergence of cutting-edge regtech products along with new business models that have pushed the innovation volume in the financial sector to an all-time high, the effort to create open banking initiatives may set a new high in the future. (Agarwal 2019). Open Banking is a unique and secure way for customers to take control of their financial data (which are currently held by the bank), to access it, and to share it with a third party through an Application Program Interfaces (APIs).

The APIs Platform is a secured platform consisted of authorized or registered fintech ecosystems, including the FIs, regtech providers, and other non-bank entities, who, with their customer consent, can access their financial data to provide a better alternative financial solution for the customers.

At the current stage, it is too early to describe what is open banking. However, the general analogy of Open Banking was like when academics in the early days described that the internet is going to be about e-mail and Fund Transfer Protocols, which if we retrospect it has transformed into the Internet of Things (IoT). Geographically, every country will have a different form of open banking. The main reason behind this is that the political elements in every country are different from one another. The UK Government adopted a prescriptive model and mandate open banking to be constructed under a single standardized APIs. While the India government also used the prescriptive model and combine it with their phenomenal biometrics identities project. In the United States, the trend is an organic model of commercial-open banking, where individual banks are freeing up APIs and charging for it. In China, the concept is world-garden open banking, which allows consumers to connect all of their financial services under an umbrella app. What Open Banking can bring to the table remains to be seen. But one thing for sure is that open banking initiatives certainly have an untapped potential to push innovation limits to the next level (Gulamhuseinwala 2017; Thomas et al. 2018).

## 6. CONCLUSION

Every action comes with a reaction. Every innovation comes with a solution. This solution does not necessarily have to change the current condition. However, it might act as a complement to improve the situation. A new first principle design will change how society conducts its activities. But more importantly, it also determines how political power will adjust to new changes. A new form of approach does not mean that it will be generally acceptable in every jurisdiction. But it is a new visible way to see how a symptom of change occurs. In Fintech 1.0, the last thing that regulators want to do is to limit any innovation. In Fintech 2.0, regulators started to realize that proper regulation is needed to mitigate the hidden risk that comes along with innovation. In Fintech 3.0, regulators began to test innovation so they may learn from the project and provide a better product to the market. In Fintech 4.0, because the innovation volumes were too much to handle, some regulators have opted to provide an open-supervised space for innovation to thrive with less regulatory burden. Proper set of regulations is needed. But in the end, it depends on "what is the innovation?" and "how will financial regulator react to the innovation." The world is currently at the beginning of Fintech 4.0, and while the future of Fintech remains as a mystery, Open Banking Initiatives will undoubtedly push innovation limits into the next level. In a nutshell, the future of fintech is in a sandbox.

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<sup>i</sup> The first publication of Arner et al. (2015) used 1987 black Monday crash as the beginning of the fintech 2.0 period, although later publication Arner et al. (2017) revised it to the 1967 invention of the first ATM Machine by Barclays in the UK