

**150 Years of Fintech: An  
Evolutionary Analysis  
(UNSW)**

**21<sup>st</sup> Melbourne Money and  
Finance Conference**

***“Fintech and Financial Innovation”***

Mon 18<sup>th</sup> and Tues 19<sup>th</sup> July 2016

*Thought Leadership  
in the Financial Sector*

# 150 YEARS OF FINTECH: AN EVOLUTIONARY ANALYSIS

DOUGLAS W. ARNER<sup>\*</sup>  
JÁNOS BARBERIS<sup>†</sup>  
ROSS P. BUCKLEY<sup>‡</sup>

## I. INTRODUCTION

“Financial technology,” or “FinTech,” refers to the use of technology to deliver financial solutions. The term can be traced to the early 1990s,<sup>1</sup> and now refers to a very rapidly growing industry.<sup>2</sup> However, the sector has attracted the focused attention of regulators, industry participants, consumers, and academics only since 2014.

## II. FINTECH 1.0 (1866-1967): NEW TERM FOR AN OLD RELATIONSHIP

FinTech is not novel. The laying of the transatlantic telegraph cable in 1866 provided the fundamental infrastructure for the period of strong financial globalization from 1866 to 1913.

It is important to distinguish three main eras of FinTech evolution. From around 1866 to 1967, the financial services industry, while heavily interlinked with technology, remained largely analogue; we characterize this period as FinTech 1.0. From 1967 to 2008, the development of digital technology for communications and transactions increasingly digitalized finance; we characterize this period as FinTech 2.0. Since 2008, in the period we characterize as FinTech 3.0, new start-ups and established technology companies have begun to deliver financial products and services directly to businesses and the public as well as to banks.<sup>3</sup>

### A. *FinTech 1.0: From Analogue to Digital*

---

<sup>\*</sup> Professor of Law, Co-Director, Duke-HKU Asia America Institute in Transnational Law, and Member, Board of Management, Asian Institute of International Financial Law, University of Hong Kong.

<sup>†</sup> Senior Research Fellow, Asian Institute of International Financial Law, Faculty of Law, University of Hong Kong, Founder, FinTech HK and Co-Editor of The FINTECH Book.

<sup>‡</sup> CIFR King & Wood Mallesons Chair of International Financial Law, Scientia Professor, and Member, Centre for Law, Markets & Regulation, UNSW Australia. Honorary Fellow, Asian Institute of International Financial Law, University of Hong Kong.

This paper was presented at the 21<sup>st</sup> Melbourne Money & Finance Conference, July 18 & 19, 2016, and the authors are grateful for the insights of participants at that event, and for Lawrence Baxter’s very useful comments. The authors also gratefully acknowledge the financial support of the Hong Kong Research Grants Council Theme-based Research Scheme (Enhancing Hong Kong’s Future as a Leading International Financial Centre) and the Australian Research Council Linkage Grant Scheme (Regulating a Revolution: A New Regulatory Model for Digital Finance) and the invaluable research assistance of Jessica Chapman. This article is a summary of a very much longer, and more detailed, analysis that is forthcoming in the *Georgetown Journal of International Law*, entitled “The Evolution of FinTech: A New Post-Crisis Paradigm?”. Responsibility for the content is the authors.

<sup>1</sup> Marc Hochstein, *Fintech (the Word, That Is) Evolves*, AMERICAN BANKER (Oct. 5, 2015), <http://www.americanbanker.com/bankthink/fintech-the-word-that-is-evolves-1077098-1.html>.

<sup>2</sup> Chloe Wang, *Financial technology booms as digital wave hits banks, insurance firms*, CHANNEL NEWS ASIA (May 28, 2015), <http://www.channelnewsasia.com/news/business/singapore/financial-technology/1875644.html>. Gareth Lodge, Hua Zhang & Jacob Jegher, *IT Spending in Banking: A Global Perspective*, CELENT (Feb. 5, 2015), <http://www.celent.com/reports/it-spending-banking-global-perspective-2>.

<sup>3</sup> David Gyori, *FinTech is the future itself*, THE FINTECH BOOK 265 (2016).

From their earliest stages, finance and technology have been interlinked and mutually reinforcing. Finance originated in the state administrative systems that were necessary to transition from hunter-gatherer groups to settled agricultural states. Money is a technology evidencing transferable values, and additionally, the emergence of early calculation technologies like the abacus greatly facilitated financial transactions. Finance evolved alongside trade, and double entry accounting emerged from this in the late Middle Ages and Renaissance. Many historians share the view that the European financial revolution in the late 1600s involving joint stock companies, insurance, and banking—all based on double entry accounting—was essential to the Industrial Revolution.<sup>4</sup> Thus, the relationship between finance and technology laid the foundations for the modern period.

In the late 19th century, technologies such as the telegraph, railroads and steamships underpinned financial interconnections across borders. Then, post-World War I technological developments proceeded rapidly. By this time, a global telex network was in place, providing the communications foundation on which the next stage of FinTech could develop.<sup>5</sup>

### III. FINTECH 2.0 (1967-2008): DIGITALISATION OF TRADITIONAL FINANCIAL SERVICES

In the late 1960s and 1970s, electronic payment systems advanced rapidly. The Inter-Computer Bureau was established in the UK in 1968, forming the basis of today's Bankers' Automated Clearing Services. The US Clearing House Interbank Payments System was established in 1970, and Fedwire became an electronic system in the early 1970s. Reflecting the need to interconnect domestic payments systems, the Society of Worldwide Interbank Financial Telecommunications was established in 1973, followed soon after by the collapse of Herstatt Bank in 1974, which highlighted the risks of increasing international financial interlinkages. This crisis triggered the first major regulatory focus on FinTech, with the establishment of the Basel Committee on Banking Supervision of the Bank for International Settlements in 1975, leading to a series of international soft law agreements.<sup>6</sup>

In 1987, the stock market crashed on "Black Monday." The effects of the crash were a clear indicator that global markets were technologically interlinked.<sup>7</sup> The reaction led to the introduction of "circuit breakers" to control the speed of price changes, and led securities regulators worldwide to create mechanisms to support cooperation. In addition, the Single European Act of 1986, the Big Bang financial liberalization process in the UK in 1986, and the 1992 Maastricht Treaty set the baseline for the full interconnection of EU financial markets by the early 21st century.

The advances through the mid-1990s showed the initial risks in complex computerized risk management systems, with the collapse of Long-term Capital Management after the Asian and Russian financial crises of 1997-1998.<sup>8</sup> However, the next level of development began in 1995 when Wells Fargo began providing online consumer banking. By 2001, eight US banks had at least one million customers online. The internet was to prove to be the foundational change in the late 1990s that was to make FinTech 3.0 possible a decade later. Not only e-banking, but all of the developments of FinTech 3.0, were built upon the basis of the internet.

---

<sup>4</sup> CHARLES MOORE, UNDERSTANDING THE INDUSTRIAL REVOLUTION 36 (2000).

<sup>5</sup> *The History of Fax: from 1843 to Present Day*, FAX AUTHORITY, <http://faxauthority.com/fax-history/>.

<sup>6</sup> "History of the Basel Committee and its Membership" in <http://www.bis.org/bcbs/history.pdf>.

<sup>7</sup> Richard Bookstaber, (2007). *A Demon Of Our Own Design*. USA: John Wiley & Sons. pp. 7–32.

<sup>8</sup> PHILIPPE JORION, RISK MANAGEMENT LESSONS FROM LONG-TERM CAPITAL MANAGEMENT (2000), <http://merage.uci.edu/~jorion/papers%5Cltcm.pdf>.

The regulatory view during FinTech 2.0 was that while e-banking was a digital version of the traditional model, it did create new risks. Technology removed the need for depositors to be physically present at a branch, and could thus indirectly facilitate electronic bank runs. In turn, instant withdrawal could increase the stress on a financial institution.<sup>9</sup> Regulators also identified that online banking creates new credit risks.<sup>10</sup> The expectation was also that e-banking providers would be authorized financial institutions, which are usually the only entities allowed to describe themselves as “banks”.<sup>11</sup> However, FinTech 3.0 changed this.

#### IV. FINTECH 3.0 (2008 – PRESENT) IN DEVELOPED COUNTRIES

A number of factors came together around 2007 and 2008 to provide the impetus for FinTech 3.0 in developed countries.

At this time, the brand image of banks, especially in the UK and US, was severely shaken. A 2015 survey reported that Americans trusts technology firms more than banks to handle their finances.<sup>12</sup> The same phenomena appears to exist in China where over 2000 P2P lending platforms operate outside a clear regulatory framework and yet this does not deter millions of lenders and borrowers, due to the cheaper cost, apparently better potential return, and increased convenience.<sup>13</sup>

Post-crisis regulation increased banks’ compliance obligations and costs, and restricted credit. Ring-fencing obligations and increased regulatory capital for banks changed their incentive or capacity to originate low-value loans.<sup>14</sup> The new requirements to prepare Recovery and Resolution Plans and conduct stress tests further added to bank costs.<sup>15</sup> Furthermore, the 2008 global financial crisis (‘GFC’) saw many finance professionals made redundant, and seeking new outlets for their skills.

Furthermore, FinTech 3.0 would almost certainly not have flowed from the GFC had the crisis occurred five years earlier. Two technological developments needed to occur to deliver the consumer interface and the interoperability among applications and services, and these were the advent of the smartphone and the growth in sophistication of application programming interfaces (APIs).<sup>16</sup>

The critical difference in FinTech 3.0 lies in, first, *who* is providing financial services, with start-ups and technology firms supplanting banks in providing niche services to the public, business and the banks themselves, and second, the *speed* of development. There has been in

---

<sup>9</sup> David Carse, *Keynote: The regulatory framework of e-banking*, HONG KONG MONETARY AUTHORITY 4 (Oct. 8, 1999), <http://www.bis.org/review/r991012c.pdf>.

<sup>10</sup> Janos Barberis, *The 2007 Meltdown: A Legal Phenomenon*, UNIVERSITY OF BIRMINGHAM 22 (Jun, 2012)

<sup>11</sup> *Incorporation and names*, UK GOVERNMENT COMPANIES HOUSE 33 (Mar., 2015), [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/418150/GP1\\_Incorporation\\_names\\_v5\\_4-ver0.29-4.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/418150/GP1_Incorporation_names_v5_4-ver0.29-4.pdf).

<sup>12</sup> *Survey Shows Americans Trust Technology Firms More Than Banks and Retailers*, LET’S TALK PAYMENTS (Jun. 25, 2015), <http://letstalkpayments.com/survey-shows-americans-trust-technology-firms-more-than-banks-and-retailers/>.

<sup>13</sup> JD Alois, *China Release Draft Peer to Peer Lending Rules. Asks for Comments*, CROWDFUND INSIDER (Dec. 28, 2015) <http://www.crowdfundinsider.com/2015/12/79400-china-releases-draft-peer-to-peer-lending-rules-asks-for-comment/>

<sup>14</sup> Roberto Ferrari, *The end of Universal bank model?*, THE FINTECH BOOK (May 3, 2015), <https://medium.com/the-fintech-book/the-end-of-universal-bank-model-a52964b21d48>.

<sup>15</sup> JANOS NATHAN BARBERIS, *THE 2007 METLDOWN: A LEGAL PHENOMENON* 60 (2012).

<sup>16</sup> Thanks to David Link for making the point that sophisticated APIs were necessary to underpin much FinTech 3.0 activity: Melbourne Money & Finance Conference, July 18, 2016.

many markets a shift in customer mindset as to *who* has the resources and legitimacy to provide financial services combined with an entirely new *speed* of evolution, particularly in emerging markets.

#### A. *The FinTech Industry Today in Developed Countries*

FinTech today comprises five major areas, explored below.

Finance and investment: FinTech extends beyond alternative financing mechanisms like P2P lending to include the financing of technology itself (e.g. via crowd funding) as well as the use of technology in financial transactions such as algorithmic trading. FinTech is also increasingly involved in areas such as robo-advisory services.<sup>17</sup>

Internal financial operations and risk management: These have been core drivers of IT spending by financial institutions, as they have built better compliance systems. For example, approximately one-third of Goldman Sachs' 33,000 staff are engineers.<sup>18</sup>

Payments and infrastructure: Payments have been an area of great regulatory attention since the 1970s, resulting in the development of both domestic and cross-border electronic payment systems. Likewise, infrastructure for securities trading and settlement and OTC derivatives trading is central, and IT and telecommunications companies are seeking opportunities to disintermediate traditional institutions here.

Data security and monetization: The digitization of the financial industry means it is particularly vulnerable to cybercrime and espionage. This will remain a major concern for governments, policy-makers, regulators, industry participants, and customers. Nonetheless, FinTech innovation is clearly present in the use of “big data” to enhance the efficiency and availability of financial services.

Consumer interface: The consumer interface offers the greatest scope for competition with the traditional financial sector, as tech companies can leverage off their pre-existing customer bases to roll out new financial products. Interestingly, it may be in developing countries where this area comes to the forefront.

### V. FINTECH 3.5 IN EMERGING MARKETS: THE EXAMPLES OF ASIA AND AFRICA

In Asia and Africa, recent FinTech developments have been primarily prompted by deliberate government policy choices in the pursuit of economic development. We characterize the era in these regions as FinTech 3.5.

The “reputational” factors that encourage the perception that only banks can offer banking services are irrelevant in these regions for over 1.2 billion unbanked individuals, because to them, banking can be provided by any institution, whether regulated or not: “banking is necessary, banks are not”.<sup>19</sup>

---

<sup>17</sup> *Investment Advisory: The Rise of Robots?* CHAPPUIS HALDER & C (Jun 2015)

<http://investglass.com/images/press/Investment-Advisory-The-rise-of-the-Robots-Chappuis-Halder-InvestGlass.pdf>

<sup>18</sup> Jonathan Marino, *Goldman Sachs is a tech company*, BUSINESS INSIDER AUSTRALIA (Apr. 13, 2015, 04:20 AM), <http://www.businessinsider.com/goldman-sachs-has-more-engineers-than-facebook-2015-4>.

<sup>19</sup> Richard Kovacevich, quoted in Bethany McLean, *Is This Guy The Best Banker In America?*, FORTUNE (Jul. 6, 1998), [http://archive.fortune.com/magazines/fortune/fortune\\_archive/1998/07/06/244842/index.htm](http://archive.fortune.com/magazines/fortune/fortune_archive/1998/07/06/244842/index.htm).

### A. Africa: Greenfield Opportunities for FinTech

FinTech in Africa emerged at the beginning of the 21st century largely on the back of two factors: the underdeveloped level of banking and financial services; and the rapid spread of mobile telephones.

At most, twenty percent of African households have access to formal or semi-formal financial services compared to sixty percent of Asian households.<sup>20</sup> As a result, telecommunications companies have taken the lead in FinTech developments. Mobile money—the provision of basic payment and savings services through e-money recorded on a mobile phone—has achieved its greatest success in Kenya and, more recently, Tanzania.<sup>21</sup> Mobile money has significantly spurred economic development by providing customers with a means to save funds, remit money safely to their families, pay bills, and receive government payments securely. The most well-known success story in Africa is that of M-Pesa, launched in 2007.<sup>22</sup> In under five years, payments made through M-Pesa surpassed forty-three percent of Kenya's GDP.<sup>23</sup>

### B. FinTech Opportunities and Limitations in the Asia-Pacific Region

The growth of the APAC FinTech market is attributable to various factors: slower IT spending by APAC traditional banks;<sup>24</sup> public distrust of the state-owned banking system (due to corruption and inefficiency); limited branch network distribution; and very high mobile telephone, particularly smartphone, penetration rates.

Numerous FinTech accelerators for start-ups have been established in Hong Kong and Singapore, as well as Brisbane, Sydney and Melbourne, and these are set to open in Korea. Most Asian regulators have also initiated a FinTech strategy.<sup>25</sup> For China, this trend is supported by its market reforms moving from a mono-banking model to a largely commercialized financial system. Since 2009, over 2000 P2P lending platforms have emerged in China, and we should not expect this growth to slow, especially with the government's Internet Finance Guidelines issued in July 2015.<sup>26</sup>

FinTech 3.5 is supported by a strong underlying rationale, including the following characteristics: (1) young digitally-savvy populations equipped with mobile devices; (2) a fast-growing middle class; (3) inefficient financial and capital markets creating opportunities for

---

<sup>20</sup> *Financial Services in Africa*, KPMG 4 (2013), <https://www.kpmg.com/Africa/en/IssuesAndInsights/Articles-Publications/Documents/KPMG%20Financial%20Services%20in%20Africa.pdf>.

<sup>21</sup> CGAP, *Infographic: Tanzania's Mobile Money Revolution*, CGAP (2014), <http://www.cgap.org/data/infographic-tanzanias-mobile-money-revolution>.

<sup>22</sup> See *M-Pesa Timeline*, SAFARICOM (2016) [http://www.safaricom.co.ke/mpesa\\_timeline/timeline.html](http://www.safaricom.co.ke/mpesa_timeline/timeline.html)

<sup>23</sup> Daniel Runde, *M-Pesa And The Rise Of The Global Mobile Money Market*, FORBES (Aug. 12, 2015), <http://www.forbes.com/sites/danielrunde/2015/08/12/m-pesa-and-the-rise-of-the-global-mobile-money-market/>.

<sup>24</sup> Keiichi Aritomo, Driek Desmet & Andy Holley, *More bank for your IT buck*, MCKINSEY & COMPANY (June 2014), [http://www.mckinsey.com/insights/business\\_technology/more\\_bank\\_for\\_your\\_it\\_buck](http://www.mckinsey.com/insights/business_technology/more_bank_for_your_it_buck).

<sup>25</sup> Ray Chan, *Asian regulators seek fintech balance*, FINANCE ASIA (Sep. 4, 2015), <http://www.financeasia.com/News/401588,asian-regulators-seek-fintech-balance.aspx>.

<sup>26</sup> *Guan Yu Cu Jin Hu Lian Wang Jin Rong Jian Kang Fa Zhan De Zhi Dao Yi Jian* (Guideline on the Promotion of the Healthy Development of Internet Finance), promulgated on 18 July 2015: *Guideline on the Promotion of the Healthy Development of Internet Finance*, MINISTRY OF THE FINANCE OF THE PEOPLE'S REPUBLIC OF CHINA (Jul. 20, 2015), [http://www.mof.gov.cn/zhengwuxinxi/zhengcefabu/201507/t20150720\\_1332370.htm](http://www.mof.gov.cn/zhengwuxinxi/zhengcefabu/201507/t20150720_1332370.htm); W Zhou, D Arner and RP Buckley, "Regulation of Digital Financial Services in China: Last Mover Advantage" (2015) 8 (1) *Tsinghua China Law Review* 25.

informal alternatives; (4) a shortage of physical banking infrastructure; (5) a behavioral predisposition in favor of convenience over trust; (6) untapped market opportunities; and (7) less stringent data protection and competition. In addition, particularly in India and China, there are very large numbers of engineering and technology graduates.<sup>27</sup>

Though opportunity in the APAC region is great, it is tempered by specific challenges. Investors, networks and financial engineering in APAC are less sophisticated than in the EU and US, leading to information asymmetries and constraints for FinTech companies. Financing is also not readily attainable, with high barriers to entry to retail banking. Furthermore, as companies scale, the fragmented regulatory regime puts Business-to-Consumer FinTech companies at a disadvantage compared with Business-to-Business (B2B) companies, as B2B partially shift the compliance burden to their client.<sup>28</sup> The fragmentation in APAC, consisting of twenty-four countries, is also apparent when compared to the harmonized European market.

### C. China: Transitioning its Financial Market for the 21st Century

In China, technology has already blurred customer perceptions of who can deliver a financial service. AliPay processes over one million transactions each day by means that resemble a traditional bank,<sup>29</sup> without being a bank. Alibaba has also fulfilled two main government policy objectives by creating 2.87 million direct and indirect job opportunities, and providing over 400,000 SMEs with loans ranging from \$3000 to \$5000.<sup>30</sup> In the interests of a level playing field, banks should be allowed to respond to these competitive challenges posed by less regulated companies that can gain significant market share by offering close substitutes for services.

There is a unique opportunity in China's technology-driven financial transition. In addition to learning from Western regulatory mistakes, China could leapfrog financial regulation standards by establishing a regulatory framework that promotes and controls FinTech and internet finance companies.<sup>31</sup> In many ways China's leadership is already manifest. For example, AliPay's introduction of facial recognition payment in March 2015<sup>32</sup> was followed by MasterCard in July 2015.<sup>33</sup> Similarly, SME lending by Alibaba in 2010 using alternative credit-scoring data is now used in the US and Japan, and by Amazon in Europe.<sup>34</sup>

---

<sup>27</sup> OECD, *China and India to produce 40% of global graduates by 2020* (Jul 16 2012),

<http://monitor.icef.com/2012/07/china-and-india-to-produce-40-of-global-graduates-by-2020/>

<sup>28</sup> Douglas W. Arner & Janos Barberis, *Regulating FinTech Innovation: A Balancing Act*, ASIAN INSTITUTE OF INTERNATIONAL FINANCIAL LAW (Apr. 1, 2015), <http://www.law.hku.hk/aiifl/regulating-fintech-innovation-a-balancing-act-1-april-1230-130-pm/>.

<sup>29</sup> John Foley, *Lend and pretend*, BREAKING VIEWS (Feb. 12, 2014), <http://www.breakingviews.com/alibaba-tests-the-limits-of-non-bank-banking/21131591.article>.

<sup>30</sup> Leesa Shrader & Eric Duflos, *China: A New Paradigm in Branchless Banking?*, CONSULTATIVE GROUP TO ASSIST THE POOR 37, 42 (Mar., 2014), [http://www.cgap.org/sites/default/files/Working-Paper-China-A-New-Paradigm-in-Branchless-Banking-March-2014\\_0.pdf](http://www.cgap.org/sites/default/files/Working-Paper-China-A-New-Paradigm-in-Branchless-Banking-March-2014_0.pdf).

<sup>31</sup> Weihuan Zhou, Douglas W. Arner & Ross P. Buckley, *Regulation of Digital Financial Services in China: Last Mover Advantage?*, 8(1) TSINGHUA CHINA LAW REVIEW 25 (2015).

<sup>32</sup> Geoffrey Smith, *Alibaba's Jack Ma shows off new 'pay with a selfie' technology*, FORTUNE (Mar. 17, 2015) <http://fortune.com/2015/03/17/alibabas-jack-ma-shows-off-new-pay-with-a-selfie-technology/>.

<sup>33</sup> Jose Pagliery, *MasterCard will approve purchases by scanning your face*, CNN (Jul. 1, 2015), <http://money.cnn.com/2015/07/01/technology/mastercard-facial-scan/>.

<sup>34</sup> Oliver Smith, *Looking for a UK business loan? Amazon might be the answer*, THE MEMO (Jun. 29, 2015), <http://www.thememo.com/2015/06/29/looking-for-a-uk-business-loan-amazon-might-be-the-answer/>.

Certain characteristics of the Chinese market make it particularly fertile ground for FinTech: in particular its limited physical banking infrastructure and high technology penetration. Over the past three years, there have been 111 million new internet banking customers, a nineteen percent increase in new personal bank accounts, and a twenty-four percent increase in online payments.<sup>35</sup> It is expected that by 2020 there will be 900 million digital banking customers,<sup>36</sup> and by 2017 over 900 million Chinese will be credit-scored using alternative data points.<sup>37</sup>

To support this digital transition, banks should compete equally in terms of regulatory burden with start-ups that offer close substitutes for regulated products. At the same time, start-ups should operate within a regulatory framework that allows them to develop their business before becoming subject to expensive compliance costs. Thus, the way forward may lie in establishing threshold levels for when institutions must comply with regulation.

It seems that China's current guidelines are pointing towards a two-tiered market, defined by transaction values.<sup>38</sup> This is an imperfect solution because it caps the growth of internet finance providers, but it also may introduce some regulatory harmony between banks and start-ups.

## VI. REGULATORY INNOVATION AND THE IMPORTANCE OF REGTECH

Established financial actors, technology companies, and regulators work well together to develop regulations through market consultation, however, new FinTech 3.0 players are entering the industry without a financial compliance culture, and with limited pre-existing interaction with financial regulators. Right now, in many countries, uncertainty abounds as to the laws and procedures applicable to new FinTech companies.

Technology needs time to find its final use and applicability, and the market may need to settle before regulatory intervention: deciding *when* to regulate can be as important as deciding *what* to regulate. There may be a strong benefit in regulation *not* influencing market innovation, and remaining technology-neutral.<sup>39</sup> In practice, this means regulators need to understand a technology's applicability.

For example, fingerprint scanning raises issues of "biometric data theft" where a fingerprint can be replicated using a high-resolution photograph.<sup>40</sup> A case can thus be made against using fingerprints due to the security risk. However, the decision to allow or ban a technology is perhaps best not left to regulators, because until a technology becomes widely used, risks like this are limited. Instead, a wait-and-see approach allows the technology to evolve

---

<sup>35</sup> *The Everyday Bank: A New Vision for the Digital Age*, ACCENTURE 3 (2015), [http://www.accenture.com/t20150714T065456\\_w\\_/sk-en/acnmedia/Accenture/Conversion-Assets/DotCom/Documents/Global/PDF/Strategy\\_6/Accenture-The-Everyday-Bank-A-New-Vision-for-the-Digital-Age.pdf](http://www.accenture.com/t20150714T065456_w_/sk-en/acnmedia/Accenture/Conversion-Assets/DotCom/Documents/Global/PDF/Strategy_6/Accenture-The-Everyday-Bank-A-New-Vision-for-the-Digital-Age.pdf).

<sup>36</sup> Sonia Barquin & Vinayak H.V., *Capitalizing on Asia's digital-banking boom*, MCKINSEY & COMPANY (Mar., 2015), [http://www.mckinsey.com/insights/financial\\_services/capitalizing\\_on\\_asias\\_digital-banking\\_boom](http://www.mckinsey.com/insights/financial_services/capitalizing_on_asias_digital-banking_boom).

<sup>37</sup> Andrew Foxwell, *Asia loses out as fintech start-ups head to the West*, ASIAN INVESTOR (Jun. 2, 2015), <http://www.asianinvestor.net/News/397928,asia-loses-out-as-fintech-start-ups-head-to-the-west.aspx>.

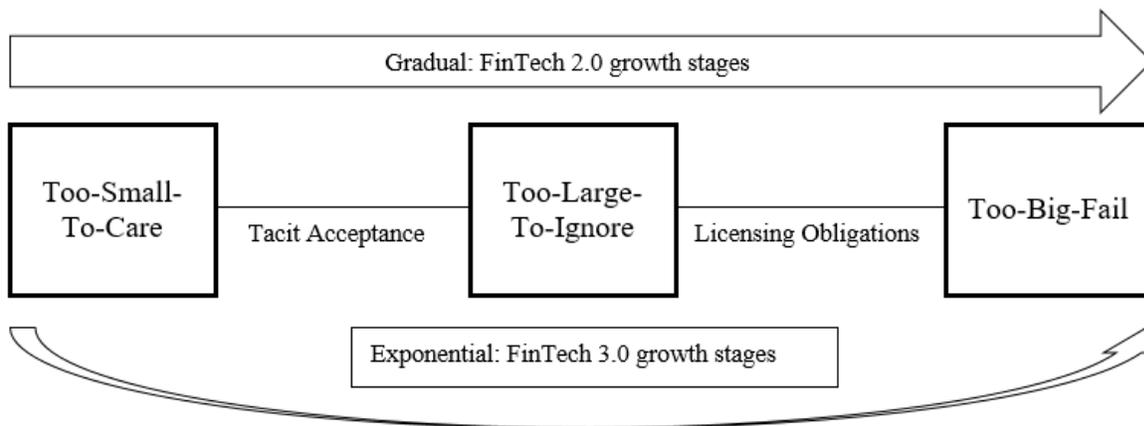
<sup>38</sup> *China Headlines: New regulation on third-party payments stirs controversy*, XINHUA FINANCE AGENCY (Aug. 3, 2015), <http://en.xinfinance.com/html/Industries/Finance/2015/125158.shtml>.

<sup>39</sup> Norman Chan, *Risk based and technology neutral - The HKMA's supervisory approach to financial technology*, HKMA (Mar. 21, 2016) <http://www.hkma.gov.hk/eng/key-information/insight/20160321.shtml>

<sup>40</sup> David Alexander, *5.6 million fingerprints stolen in US personnel data hack: government*, REUTERS (Sep. 23, 2015), <http://www.reuters.com/article/2015/09/23/us-usa-cybersecurity-fingerprints-idUSKCN0RN1V820150923>.

and the regulator to learn whether the technology will be adopted and draw on historical data as to risks.

This efficiency-based analysis highlights the benefits of supervising only large players. Money market funds (MMF) offer an example. Three of the largest players in this sector are Vanguard, Fidelity, and Schwab, established in 1975, 1946, and 1963, respectively. In 2014, Alibaba started to offer an MMF that was fully online and available to its pre-existing customers. Within nine months, Yu'E Bao became the world's fourth largest MMF,<sup>41</sup> showing how a non-traditional financial institution can move quickly from “too-small-to-care” to “too-big-to-fail.” This exponential growth represents a direct challenge to gradual regulation, because it has skipped the “too-large-to-ignore” phase when regulators would have started to request compliance.



**Figure 1:** Regulatory threshold approaches compared to growth models<sup>42</sup>

If primarily regulating actors with a significant impact on financial markets remains the correct approach, what needs to change in extraordinary cases is the methods used to identify future systemically important actors.

#### A. Adapting Regulatory Methods in a Digital Age

The differences between FinTech 2.0 and FinTech 3.0 players create distinct expectations and needs for industry supervision. For start-ups, the high cost of regulation is incompatible with their typically lean business model.<sup>43</sup> They prefer the more flexible compliance obligations of a principle-based regulatory regime, under which the spirit of regulation is preferred to “box ticking.” In contrast, rule-based regimes create clear rules and processes. However, the flexibility of a principle-based model creates some uncertainty as to compliance expectations, and the clearness of a rule-based model can limit the incentive to do *more*.

<sup>41</sup> Bill Powell, *Alibaba: The \$200 Billion ‘Open Sesame’*, NEWS WEEK (Sep. 8, 2014), <http://www.newsweek.com/2014/09/19/alibaba-200-billion-open-sesame-268937.html>.

<sup>42</sup> Arner and Barberis: “FinTech Regulation Recent Developments and Outlook” (1 April 2015) AIFL.

<sup>43</sup> Chris Brummer & Daniel Gorfine, *FinTech: Building a 21<sup>st</sup>-Century Regulator’s Toolkit*, MILKEN INSTITUTE 7 (Oct., 2014), <http://assets1c.milkeninstitute.org/assets/Publication/Viewpoint/PDF/3.14-FinTech-Reg-Toolkit-NEW.pdf>.

The solution may lie in going beyond an “either-or” attitude between rule-based or principle-based. Regulatory obligations should be dynamic in adapting to the size and activity of a business as it grows. In the case of start-ups, investors may prefer the regulatory certainty of the rule-based model.<sup>44</sup> The higher compliance costs may then be balanced against the start-up being more attractive to investors. However, rule-based regulatory approaches are more likely to create a barrier to entry, and FinTech 3.0 thus needs a framework that is both balanced and dynamic.

### B. A Case for the Development of RegTech

The increased use of technology within the financial services industry gives regulatory bodies an opportunity to access a level of granularity in risk assessments that did not previously exist. Since 2007 there has been increased focus on using market data to better regulate financial markets.<sup>45</sup>

Regulatory interest in the FinTech sector represents a turning point. Regulators are forward-looking rather than retrospective, looking to support market developments while maintaining financial stability. There are benefits for a regulator to interact early with new FinTech start-ups, even if not yet significant. For example, the UK’s Financial Conduct Authority initiated a consultation to understand the regulatory hurdles faced by FinTech 3.0 companies and created an innovation hub to support start-ups from a nascent stage.<sup>46</sup> This awareness phase is also seen in Asia.<sup>47</sup>

The increasingly data-driven aspects of FinTech 3.0, and the fact that young companies rely on new and transparent IT systems, allows regulators to explore new compliance mechanisms.<sup>48</sup> For example, real-time compliance systems could be requested as part of the licensing process. This would provide regulators and the company with a way to monitor in quasi-real time the actions of its staff and identify any non-compliant behavior. Regulatory models where access to real-time data is traded off for regulatory capital could provide a more appropriate cost of market entry for new companies, as their level of regulatory scrutiny could gradually increase with their growth.

## VII. CONCLUSION

This article has illustrated the evolution of FinTech through three major eras, culminating in today’s FinTech 3.0. In developed markets, this shift has emerged out of the GFC of 2008 and been driven by public expectations, technology companies moving into the financial world, and political demands for a diversified banking system. In developing countries FinTech 3.5 has been

---

<sup>44</sup> *Project Innovate: Call for input*, FINANCIAL CONDUCT AUTHORITY (Oct., 2014), <https://www.fca.org.uk/static/documents/feedback-statements/fs-14-2.pdf>.

<sup>45</sup> BBVA Digital Regulation Unit, *RegTech, The New Magic Word in FinTech*, BBVA (Feb., 2016), [https://www.bbvarsearch.com/wp-content/uploads/2016/02/DEO\\_Feb16-EN\\_Cap1.pdf](https://www.bbvarsearch.com/wp-content/uploads/2016/02/DEO_Feb16-EN_Cap1.pdf).

<sup>46</sup> Martin Wheatley, *Innovation: The regulatory opportunity*, FINANCIAL CONDUCT AUTHORITY (Oct. 28, 2014), <http://www.fca.org.uk/news/innovation-the-regulatory-opportunity>.

<sup>47</sup> *Steering Group on Fintech established*, HONG KONG GOVERNMENT NEWS (Mar. 30, 2015), <http://www.info.gov.hk/gia/general/201503/30/P201503300535.htm>; J.D. Alois, *Malaysia is First ASEAN Country with Crowdfunding Laws*, CROWDFUND INSIDER (Jul. 1, 2015), <http://www.crowdfundinsider.com/2015/07/70514-malaysia-is-first-asean-country-with-crowdfunding-laws/>.

<sup>48</sup> Douglas Arner & Janos Barberis, *FinTech in China: From Shadow Banking to P2P Lending*, in *BANKING BEYOND BANKS & MONEY* (forthcoming 2015).

driven by inefficiencies in the existing financial system, deliberate government policy choices and the rapid introduction of new technology.

In both cases, the FinTech sector is attracting the interest of regulators. The challenge lies in resolving the tension between a forward-looking framework that promotes innovation, and a sufficiently rigorous framework that maintains market confidence. A common international approach could possibly begin a new era in FinTech, however, in our view, more experimentation and innovation is needed in regulatory approaches and RegTech before the time will be ripe to seek their standardization. It is too early, today, to seek international regulatory harmonization in this space.