FinTech Regulation and RegTech

Douglas W. Arner
Kerry Holdings Professor in Law
University of Hong Kong
douglas.arner@hku.hk

Janos Barberis
Founder, SuperCharger
janos@fintech.hk

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Overview

- Introduction
- FinTech and the challenge of regulation
- Regulatory responses
- RegTech
- The RegTech ecosystem
- Building better financial and regulatory systems
- Sandboxes
- Smart regulation and regulatory design

Definition: FinTech

The term's origin can be traced to the early 1990s with the "Financial Services Technology Consortium", a project initiated by Citigroup in order to facilitate technological cooperation efforts. However, it is only since 2014 that the sector has attracted the focused attention of regulators, consumers and investors.

Google Search Trend: Interest Over Time

Implications

Main current concerns of policymakers and industry arise not from the technology itself but from the question of *who* is applying technology to finance along with the *speed* of development.

An evolutionary approach to create a framework of understanding is necessary to understand the implications for established financial institutions, IT companies, start-ups and regulators alike.

FinTech Evolution and Typology

Evolution

FinTech is often seen today as the new marriage of financial services and information technology. However, this interlinkage has a long history and has evolved over three distinct time periods.

Date	**1866 - 1967**	**1967 - 2008**	**2008 - Current**	
Era	FinTech **1.0**	FinTech **2.0**	FinTech **3.0**	FinTech **3.5**
Geography	Global / Developed	Global / Developed	Developed	Emerging / Developing
Key elements	Infrastructure / computerisation	Traditional / internet	Mobile / Start-ups / New entrants	
Shift Origin	Linkages	Digitalization	2008 financial crisis / smartphone	Last mover advantage

FinTech 1.0 (1866 – 1967)

In the late 19th century finance and technology combined to produce the first period of financial globalization.

> **"The inhabitant of London could order by telephone, sipping his morning tea in bed, the various products of the whole earth, in such quantity as he might see fit, and reasonably expect their early delivery upon his door-step; he could at the same moment and by the same means adventure his wealth in the natural resources and new enterprises of any quarter of the world, and share, without exertion or even trouble."**

John Maynard Keynes (1920)

Timeline:

- **1866-1933**: First age of financial globalization – first transatlantic cable (1866), Fedwire (1918)
- **1945-1967**: Early post-war period – Diner's Club (1950), telex (1966)

FinTech 2.0 (1967 – 2008)

Analogue to digital, led by traditional financial institutions:

"The most important financial innovation that I have seen the past 20 years is the automatic teller machine, that really helps people and prevents visits to the bank and it is a real convenience."

Paul Volcker (2009)

- **1967**: First ATM (Barclays), handheld calculator (Texas Instruments)
- **1968, 1970**: BACS, CHIPS
- **1971:** NASDAQ
- **1973**: SWIFT
- **1981**: Bloomberg
- **1983**: Mobile phone
- **1987**: Program trading
- **1983/1985**: Online banking (NBS, WF). By 2001, 8 banks in the US have 1m+ online banking customers
- **1986**: Big Bang, Single European Act
- **1990s**: Quantitative risk management / VaR
- **1999**: Internet / Dot.Com Bubble
- **2008**: Global Financial Crisis

FinTech 3.0 (2008 – Present)

Emergence of new players (*eg start-ups*) alongside existing large companies already in the space (*eg core banking vendors*).

> **“Silicon Valley is coming: There are hundreds of startups with a lot of brains and money working on various alternatives to traditional banking […] They are very good at reducing the “pain points” in that they can make loans in minutes, which might take banks weeks.**
>
> **Jamie Dimon**
> **CEO, JP Morgan**

<u>**Examples**</u>:

- **2007**: iPhone launched
- **2008**: Wealthfront is founded and provides automated investment services
- **2009**: BitCoin launch. Square is created, providing mobile payments solutions
- **2009:** Kickstarter introduced a reward-based crowdfunding platform
- **2011:** P2P money transfer service Transferwise is created

2008: A Game Changer?

The 2008 GFC had a catalysing effect on the growth of the FinTech sector due to:

- **Post-crisis regulatory reforms**
- **Financing gap**: Contraction of the interbank market (*eg trust issues*) and increase in regulatory capital to be held against loan portfolio (*eg additional +US$150bn set aside*)
- **Operational cost reduction**: Downsizing teams (*eg IT & back/middle office*) plus using technology to reduce costs (*e.g. straight-trough processing*)
- **Public perception**: Growing distrust of formal financial institutions from the public allowed new entrants to emerge (eg *UK challenger banks, P2P or FX platforms*)
- **Technology:** Smartphone penetration, directly providing Point of Sales (POS) and stored value systems to individuals, solving infrastructure mismatch

Comparison

Because FinTech is a contraction of the words "Financial" and "Technology" it encompasses a range of actors which can all be classified as FinTech companies.

Rank	FinTech 2.0		FinTech 3.0 & 3.5
	Banks by market cap (2014)	**IT Companies** by revenue (2014)	**Start-ups** by valuation (2015)
1st	Wells Fargo & Co (US)	FIS (US)	LuFax (CN)
2nd	ICBC (CN)	Tata (IN)	Square (US)
3rd	JP Morgan (US)	Fiserv (US)	Markit (US)
4th	CCB (CN)	Cognizant (US)	Stripe (US)
5th	Bank of America (US)	NCR Corp (US)	Lending Club (US)

Typology (1)

Financing	Payments & Infrastructure	Operations & Risk Management	Data Security & Monetisation	Customer Interface
LendingClub	八達通 OCTOPUS	Wolters Kluwer	atcipher	Pay
MONEXO Lend GROW. Borrow GROW	Faster Payments	Infosys	ROOK SECURITY	facebook
AMP CREDIT TECHNOLOGIES	支付宝 Alipay.com	credissimo	AXTRIA	mi 小米 xiaomi.com

ADB

Typology (2)

Finance and investment

- Alternative financing: crowdfunding, p2p etc
- Digitalization of financing

Operations and risk management

- Pre-crisis
- Post-crisis

Payments and infrastructure

- Traditional
- New

Data security and monetization

- Analytics and monetization
- Security

Customer interface

Plus: **RegTech**

FinTech 3.5 (2008 – Present)

Africa and emerging Asia: Recent FinTech developments primarily prompted by pursuit of financial inclusion and economic development:

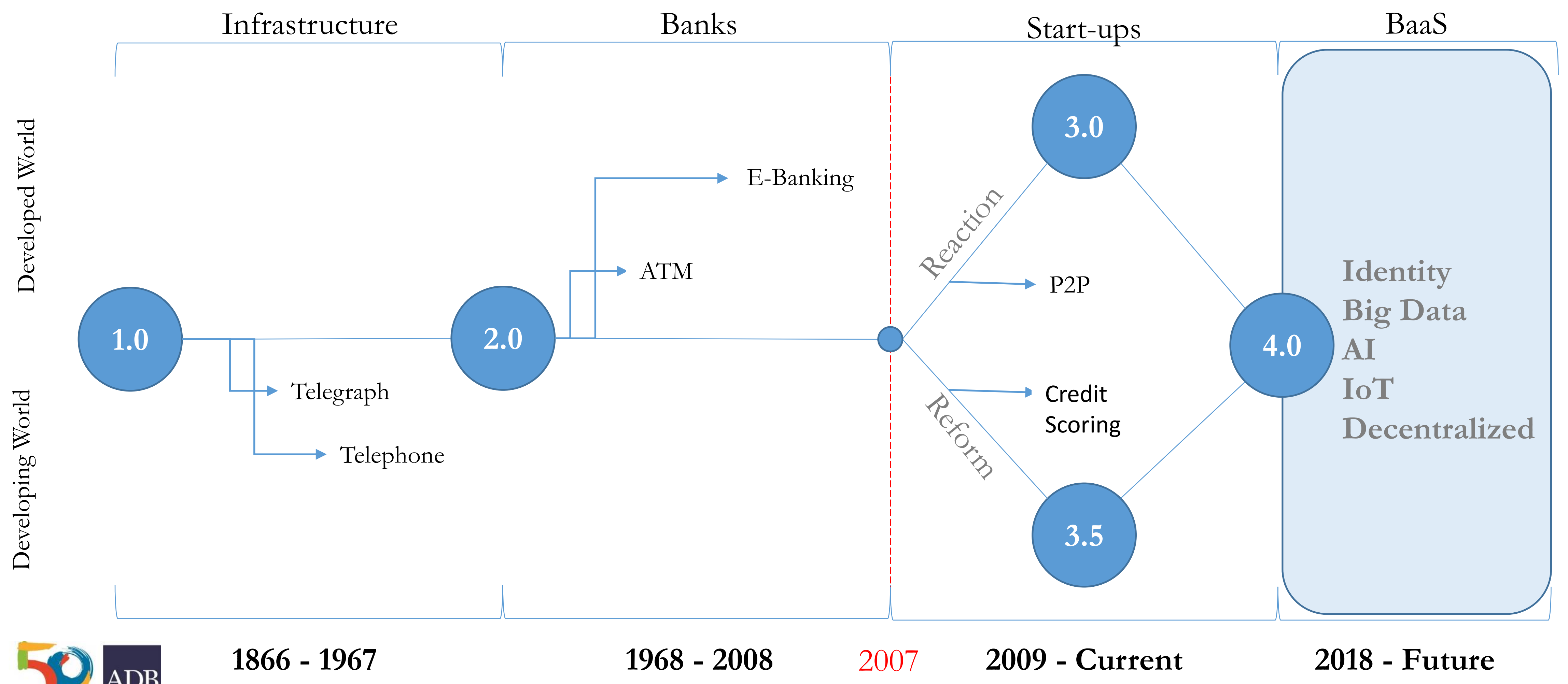
> **"There are two big opportunities in future financial industry. One is online banking, all financial institutions go online; the other one is internet finance, which is purely led by outsiders"**
>
> **Jack Ma**
> **CEO, Alibaba**

<u>Examples</u>:

- **2007:** M-Pesa introduced in Kenya, by Vodafone for Safaricom
- **2010**: Alibaba introduces loans to SMEs on its e-commerce platform
- **2011**: LuFax, an online Internet finance market place, is created
- **2015:** India announces the creation 11 new payment banks (eg Fino PayTech)
- **2015**: MyBank and WeBank, two new Chinese private banks

The Evolution of FinTech:

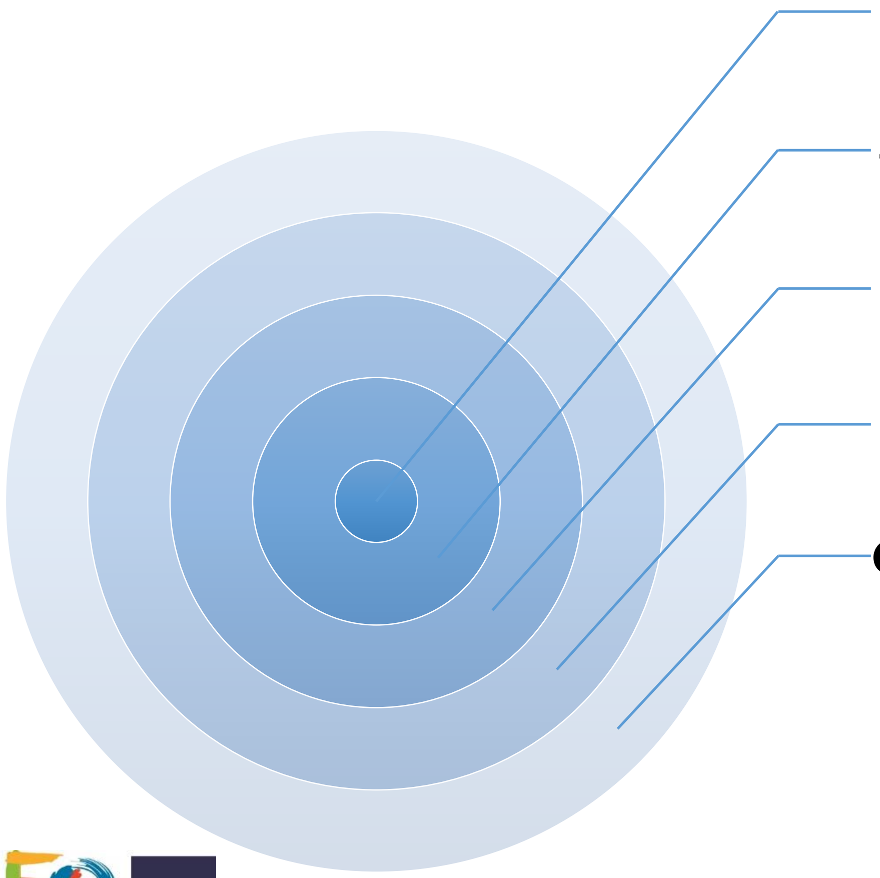
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2676553



FinTech 3.5

FinTech in Emerging Markets: Asian Leadership

Market Development Trends

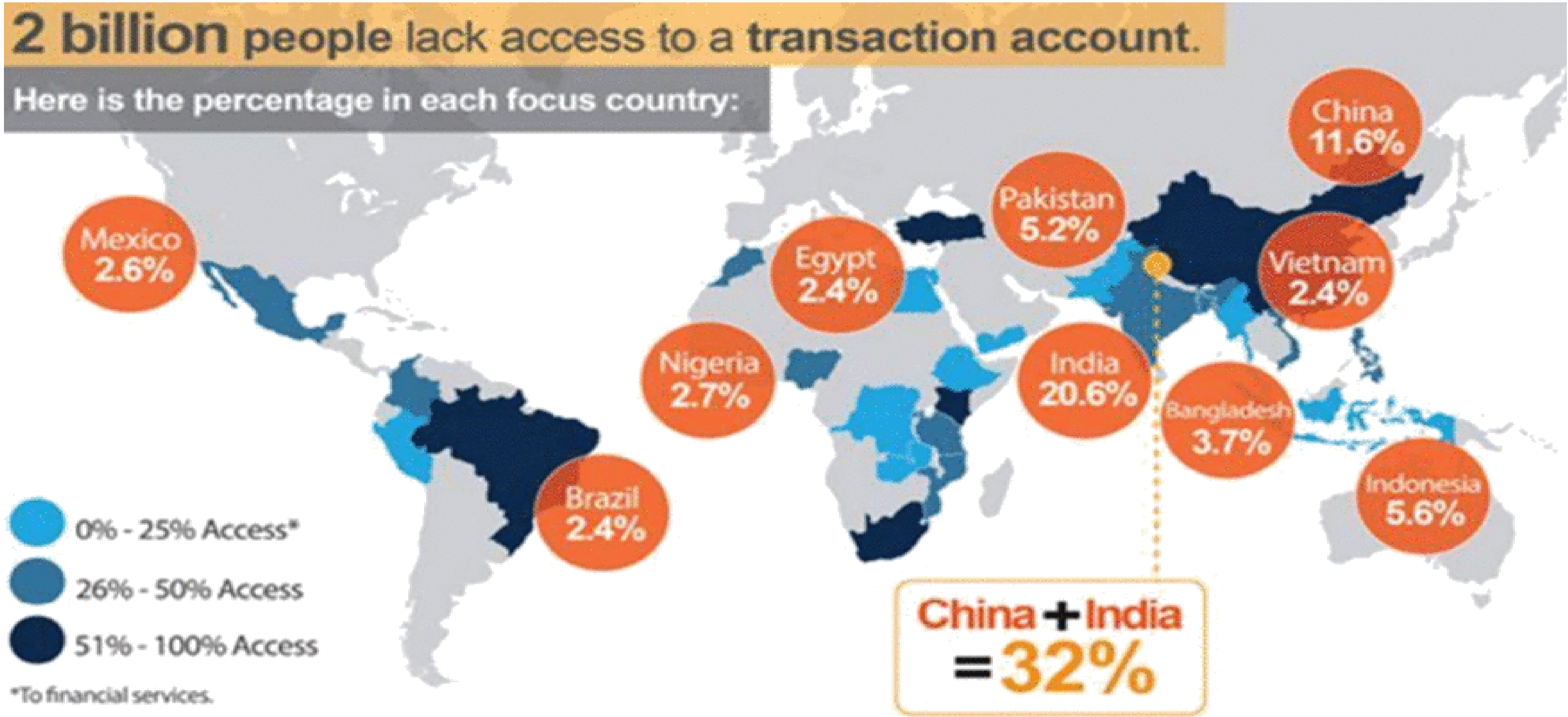


- **1.2bn** Unbanked **73% in India & China Alone**
- **4.3m** HNWIs **+ 13% p.a**
- **600m** Digital Bank Customers **+ 300% by 2020**
- **28%** World middle class **66% by 2030**
- **Government Support across the region**

Applicability

- SME Financing
- Credit Scoring
- Financial Identity
- Investments

Financial Inclusion



Source of graphs: Global Findex 2014 – IMF Financial Access Survey

Mobile Vs Banking Penetration

Within developing parts of Asia, mobile phone ownership is more wide-spread than Bank account registration:

China
Population: 1.35bn
Formally Banked: 63%
Mobile Phone: 89%

India
Population: 1.25bn
Formally Banked: 35%
Mobile Phone: 71%

Malaysia
Population: 29.7m
Formally Banked: 66%
Mobile Phone: 131%

Australia
Population: 23.1m
Formally Banked: 99%
Mobile Phone: 107%

South Korea
Population: 50.2m
Formally Banked: 93%
Mobile Phone: 111%

Japan
Population: 127.3m
Formally Banked: 96%
Mobile Phone: 115%

Vietnam
Population: 89.7m
Formally Banked: 21%
Mobile Phone: 131%

New Zealand
Population: 4.47m
Formally Banked: 99%
Mobile Phone: 106%

FinTech in Emerging Markets

Recent FinTech developments primarily prompted by pursuit of financial inclusion and economic development:

> **"There are two big opportunities in future financial industry. One is online banking, all financial institutions go online; the other one is internet finance, which is purely led by outsiders"**
>
> **Jack Ma**
> **CEO, Alibaba**

From FinTech to TechFin:

SSRN: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2959925

Regulatory challenges

New emerging FinTech companies often have limited track records regarding their business (*eg risk management, liquidity and profitability*) and difficulty identifying their obligations (*eg applicable regulations or licences*).

For regulators, these early-stage companies represent a limited prudential & consumer risk. However, exponential company growth can create “risk blind spots”. Additionally, frequent failures or fraud can impact market or investor confidence.

Too Small to Care — **Tacit acceptance** — Too Large to Ignore — **Licensing obligation** — Too Big to Fail

Options

Traditional framework: permissive / restrictive, rules / principles, risk-based

Pre and Post-Crisis environment: innovation and Volcker

Doing nothing: permissive / restrictive, intentional / unintentional

Cautious exploration: forebearance / leniency

Structured experimentation: sandboxes

Regulatory design: payments, crowdfunding

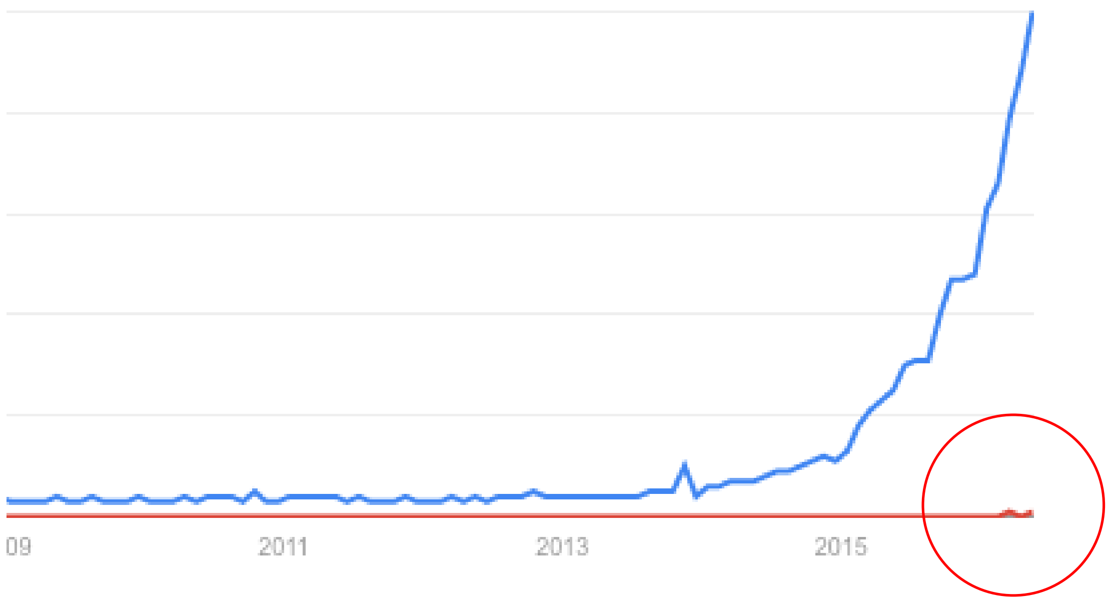
Regulation of DFS in China: http://ssrn.com/abstract=2660050

From Regulatory Sandboxes to Smart Regulation:
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3018534

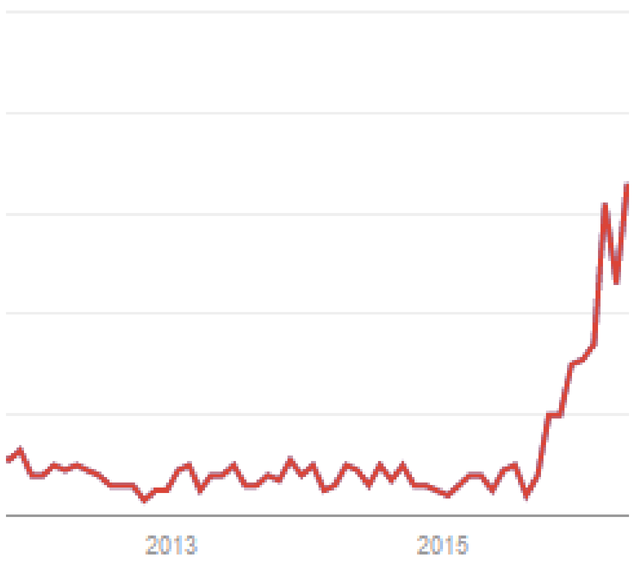
Trends

Comparatively to Fintech, RegTech has been growing very rapidly within the last 12 months raising the necessity to define the topic and its scope of applicability

FinTech vs RegTech



RegTech



Definitions

RegTech (contraction of 'regulatory' and 'technology'): the use of technology to address regulatory and compliance requirements more effectively and efficiently

Examples:

- Electronic KYC
- Fraud monitoring
- Automatic Clearing Registry

Rationale

Compliance Costs in the Financial Services Industry

- Between 2012-2014 JP Morgan has added **13’000 employees** in compliance
- Deutsche Bank spent **US$1.8 Billion** extra for compliance purposes in 2014
- UBS spent an extra **US$ 946 million** on regulatory demands
- Fines and settlement increased by **45x** since 2010 reaching **US$300 billion**
- For 87% of CEO’s regulatory changes represents a disruption to their business

RegTech and the Reconceptualisation of Financial Regulation

RegTech digital disruption is not just about greater efficiency in existing processes but new processes altogether.

SSRN: http://ssrn.com/abstract=2847806

Sectors: Not Only Finance

FINANCE	HEALTH CARE
MANUFACTURING	RENEWABLE
ARTS	…..

Evolution of RegTech

1987 - 2008	2008 – Present	Looking Forward
RegTech 1.0	**RegTech 2.0**	**RegTech 3.0**
• Analysing exchange-based activities • Quantitative risk management / Basel II	• 2 stages: 1. facilitate compliance 2. improve supervision and regulation	• From KYC to KYD • RegTech to reconceptualize finance and financial regulation

The financial system is on the edge of moving from being based on Know-Your-Customer (KYC) principles to a Know-Your-Data (KYD) approach.

RegTech encompasses industry and regulators

Financial institutions and industry

- Major drivers of RegTech development
- Demand efficient tools to deal with regulatory and compliance demands
- Global firms developing centralized risk management

Regulators

- Lag in regulator adoption relative to private sector
- Yet need to develop systems to deal with rivers of new data and cybersecurity

Start-ups

- Incentives to trade off-data for faster market entry
- Automation of reporting and compliance more aligned with lean business model

Compliance Costs

Reliance on compliance officers rather than technology diverts capital away from profitable activities

UBS

Invested **US$946M** in meeting new regulatory demands (2014) – with **US$473M** being **permanent cost**

J.P.Morgan

Hired **13,000** employees at cost of **US$2B** (2012-2014) and spent **US$600M** on regulatory and control technology (2014)

Deutsche Bank

Invested **1.3B EUR** in meeting new regulatory requirements (2014)

Difference

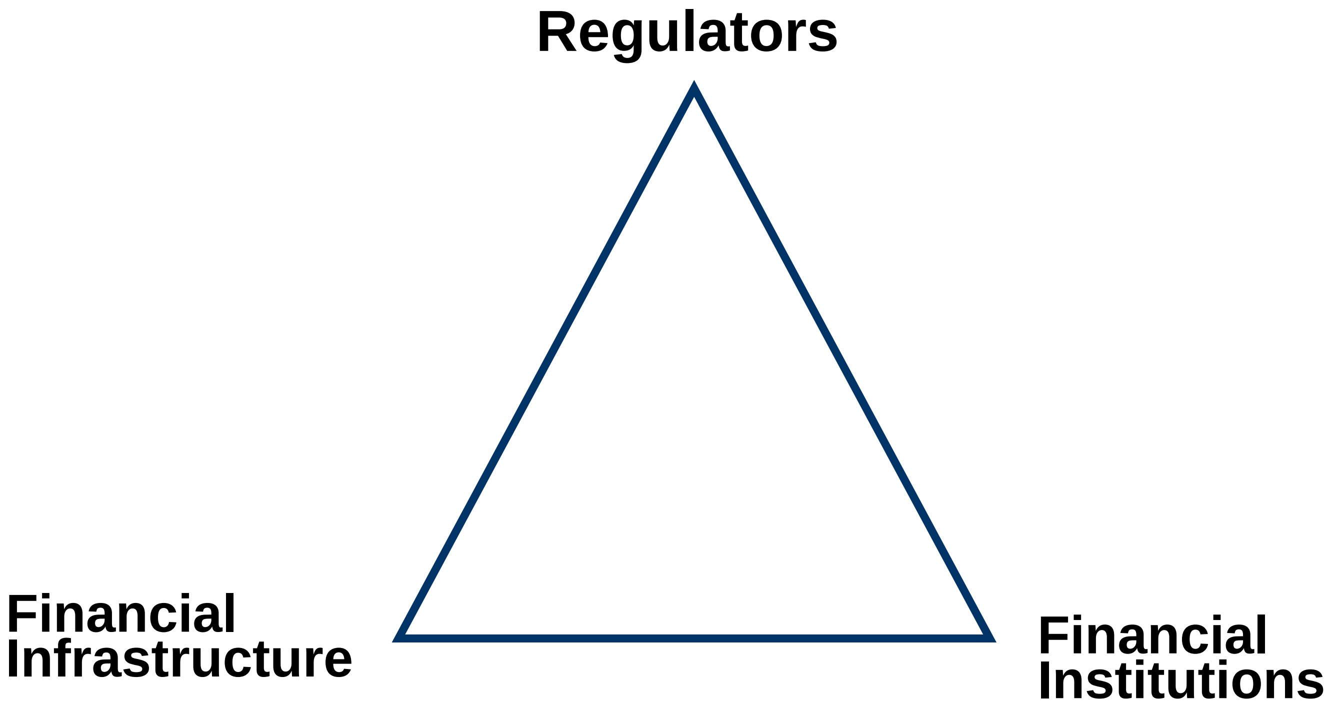
FinTech:

Reaction for Sympton of 2007 Crisis?

RegTech:

Problem Solving to prevent the next crisis?

Beneficiaries



Shift

Reg 1.0

Know Your Customer:

- ✓ Consumer Protection
- ✓ Prudential Regulation
- ✓ Financial Stability
- ✓ Prevent Bad Behavior
- ✓ Re-Active
- ✓ Reporting (Push) Compliance
- ✓ Licenses = Barriers

Regulatory Principle

VS

Reg 2.0

Know Your Data:

- ✓ Data Privacy
- ✓ Algorithm Compliance
- ✓ Financial Networks
- ✓ Promote good behaviors
- ✓ Pro – Active
- ✓ API (Pull) Compliance
- ✓ Deep Learning = Barriers

No Agreed Definition

Bank of England

“Regulatory Technology allows for a **real time** and **proportionate** regulation that **identifies risk** and enable more **efficient compliance**”

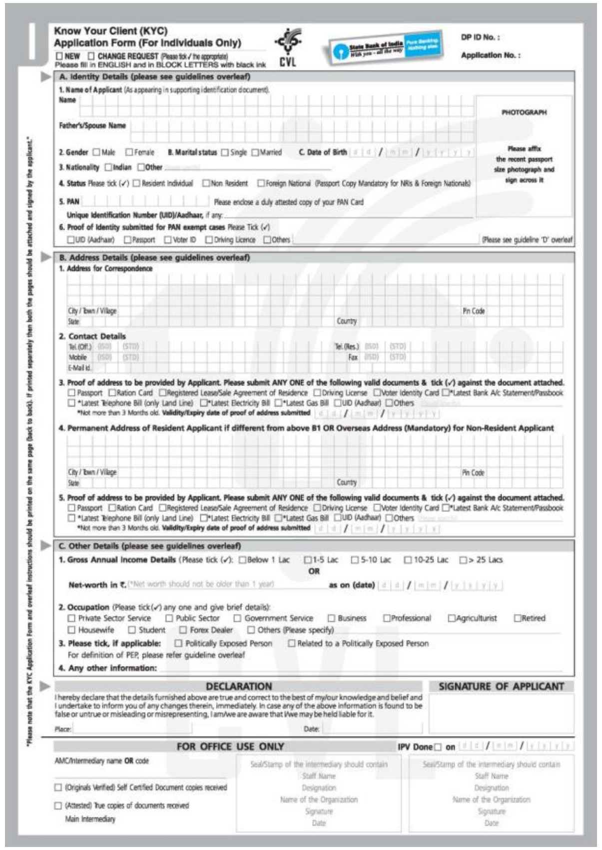
Financial Conduct Authority

“RegTech is a **sub-set of FinTech** that focuses on technologies that may facilitate the delivery of regulatory requirements more efficiently and effectively than existing capabilities”

4 reasons for RegTech

Increasing Compliance Cost	**Supporting Regulatory Function**
Demand from Start-ups	**Post Crisis Reform**

You Know about it



Know Your Client (KYC)
Application Form (For Individuals Only)
☐ NEW ☐ CHANGE REQUEST (Please tick ✓ the appropriate)
Please fill in ENGLISH and in BLOCK LETTERS with black ink
CVL
State Bank of India
DP ID No. :
Application No. :

A. Identity Details (please see guidelines overleaf)
1. Name of Applicant (As appearing in supporting identification document).
Name
Father's/Spouse Name
PHOTOGRAPH
Please affix the recent passport size photograph and sign across it
2. Gender ☐ Male ☐ Female B. Marital status ☐ Single ☐ Married C. Date of Birth d d / m m / y y y y
3. Nationality ☐ Indian ☐ Other
4. Status Please tick (✓) ☐ Resident Individual ☐ Non Resident ☐ Foreign National (Passport Copy Mandatory for NRIs & Foreign Nationals)
5. PAN Please enclose a duly attested copy of your PAN Card
Unique Identification Number (UID)/Aadhaar, if any:
6. Proof of Identity submitted for PAN exempt cases Please Tick (✓)
☐ UID (Aadhaar) ☐ Passport ☐ Voter ID ☐ Driving Licence ☐ Others (Please see guideline 'D' overleaf

B. Address Details (please see guidelines overleaf)
1. Address for Correspondence
City / Town / Village Pin Code
State Country
2. Contact Details
Tel. (Off.) (ISD) (STD) Tel. (Res.) (ISD) (STD)
Mobile (ISD) (STD) Fax (ISD) (STD)
E-Mail Id.
3. Proof of address to be provided by Applicant. Please submit ANY ONE of the following valid documents & tick (✓) against the document attached.
☐ Passport ☐ Ration Card ☐ Registered Lease/Sale Agreement of Residence ☐ Driving License ☐ Voter Identity Card ☐ *Latest Bank A/c Statement/Passbook
☐ *Latest Telephone Bill (only Land Line) ☐ *Latest Electricity Bill ☐ *Latest Gas Bill ☐ UID (Aadhaar) ☐ Others
*Not more than 3 Months old. Validity/Expiry date of proof of address submitted d d / m m / y y y y
4. Permanent Address of Resident Applicant if different from above B1 OR Overseas Address (Mandatory) for Non-Resident Applicant
City / Town / Village Pin Code
State Country
5. Proof of address to be provided by Applicant. Please submit ANY ONE of the following valid documents & tick (✓) against the document attached.
☐ Passport ☐ Ration Card ☐ Registered Lease/Sale Agreement of Residence ☐ Driving License ☐ Voter Identity Card ☐ *Latest Bank A/c Statement/Passbook
☐ *Latest Telephone Bill (only Land Line) ☐ *Latest Electricity Bill ☐ *Latest Gas Bill ☐ UID (Aadhaar) ☐ Others
*Not more than 3 Months old. Validity/Expiry date of proof of address submitted d d / m m / y y y y

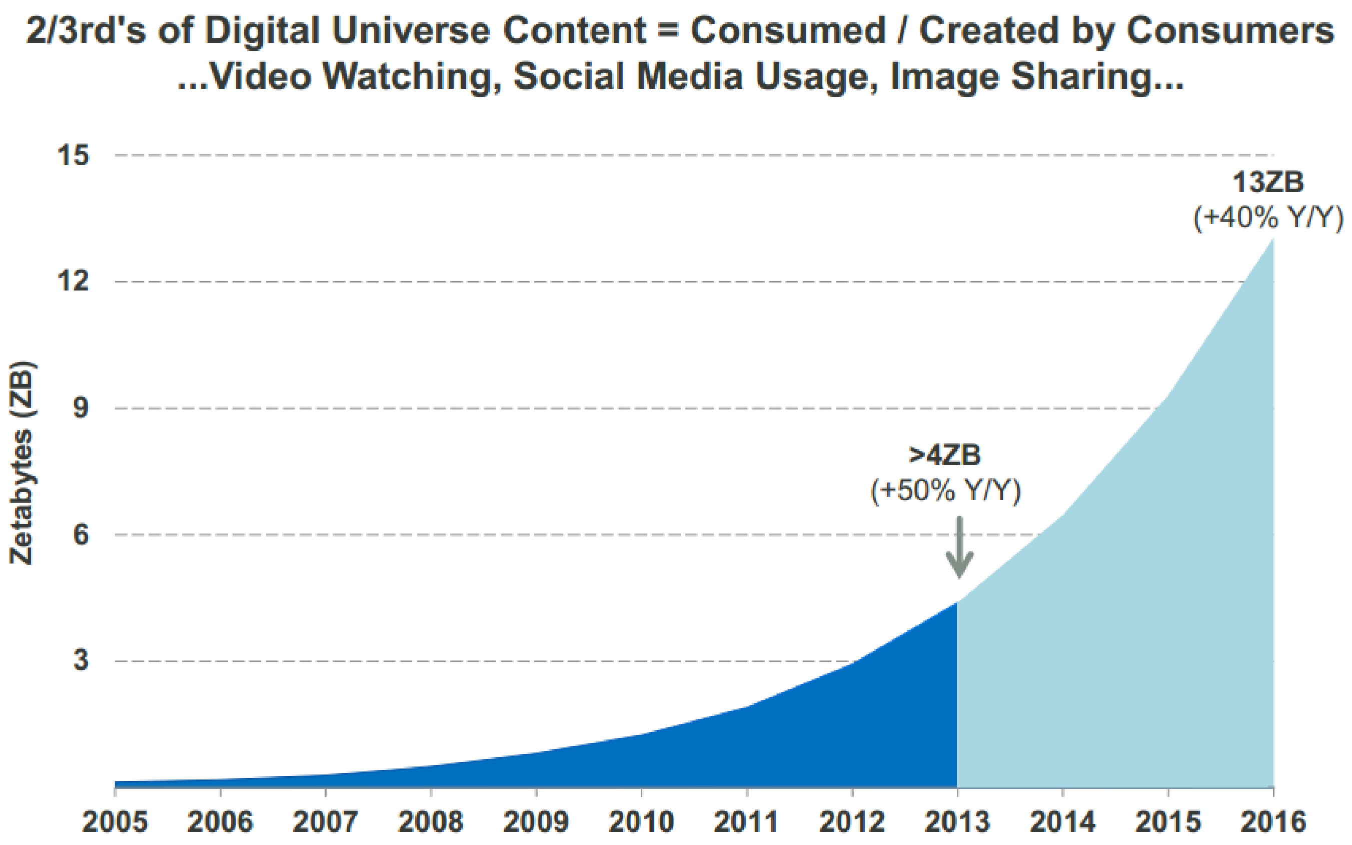
C. Other Details (please see guidelines overleaf)
1. Gross Annual Income Details (Please tick (✓): ☐ Below 1 Lac ☐ 1-5 Lac ☐ 5-10 Lac ☐ 10-25 Lac ☐ > 25 Lacs
OR
Net-worth in ₹. (*Net worth should not be older than 1 year) as on (date) d d / m m / y y y y
2. Occupation (Please tick (✓) any one and give brief details):
☐ Private Sector Service ☐ Public Sector ☐ Government Service ☐ Business ☐ Professional ☐ Agriculturist ☐ Retired
☐ Housewife ☐ Student ☐ Forex Dealer ☐ Others (Please specify)
3. Please tick, if applicable: ☐ Politically Exposed Person ☐ Related to a Politically Exposed Person
For definition of PEP, please refer guideline overleaf
4. Any other information:

DECLARATION
I hereby declare that the details furnished above are true and correct to the best of my/our knowledge and belief and I undertake to inform you of any changes therein, immediately. In case any of the above information is found to be false or untrue or misleading or misrepresenting, I am/we are aware that I/we may be held liable for it.
Place: Date:
SIGNATURE OF APPLICANT

FOR OFFICE USE ONLY
IPV Done ☐ on d d / m m / y y y y
AMC/Intermediary name OR code
☐ (Originals Verified) Self Certified Document copies received
☐ (Attested) True copies of documents received
Main Intermediary
Seal/Stamp of the intermediary should contain
Staff Name
Designation
Name of the Organization
Signature
Date
Seal/Stamp of the intermediary should contain
Staff Name
Designation
Name of the Organization
Signature
Date

Please note that the KYC Application Form and overleaf instructions should be printed on the same page (back to back). If printed separately then both the pages should be attached and signed by the applicant.

From KYC to KYD



Overview: Difference

FinTech:

Reaction for Sympton of 2007 Crisis?

RegTech:

Problem Solving to prevent the next crisis?

How to Monitor Tomorrow's CEO

Banks

Start-ups

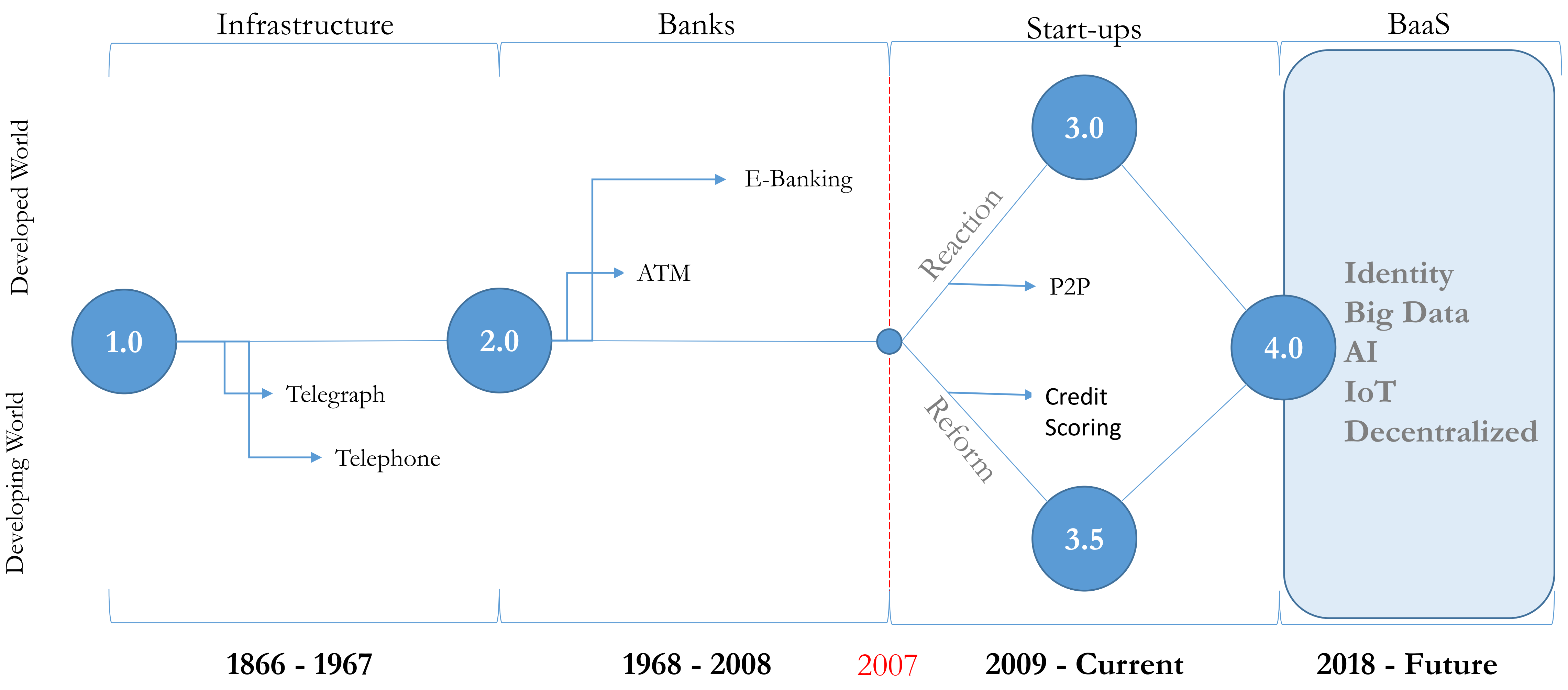
Shorter Cycles

FinTech 1.0:
100 years

FinTech 2.0:
40 years

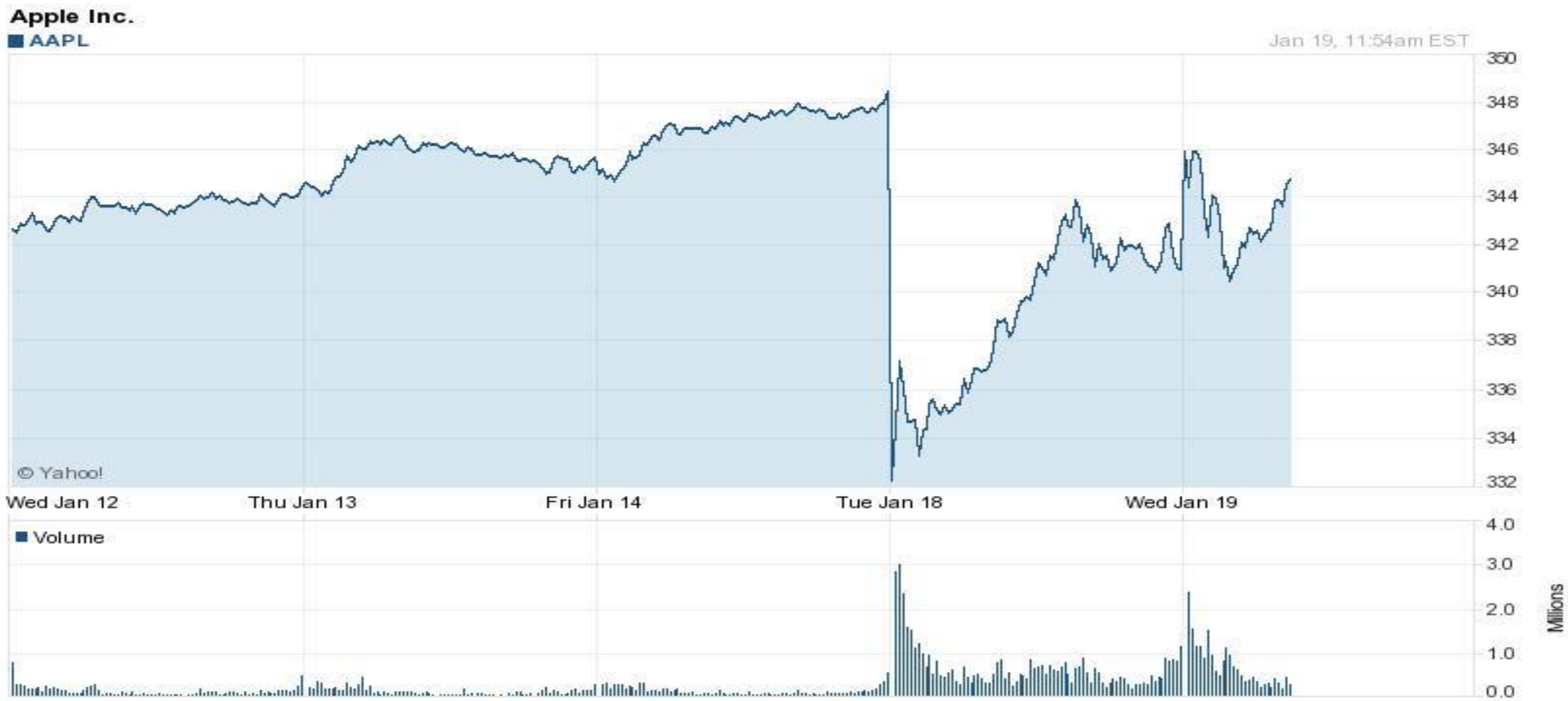
FinTech 3.0:
12 years

Timeline: Future 4.0



Application: For Banks – MFID 2

Application: For Regulators



Regulators in detail

Big Data

- Need to develop IT capabilities and systems to monitor and analyze new regulatory datasets
- Opportunity for collaboration between regulators and academia

Cybersecurity

- Digital transformation of finance industry has made it more vulnerable to attack, theft and fraud
- Data abundance may not create the right incentive for firms to enhance their cybersecurity
- Clear example of how FinTech demands RegTech

Macroprudential policy

- Seeks to use massive amounts of data to identify patterns and reduce severity of financial cycle
- Greatest potential for RegTech

Moving towards a paradigm shift

Over the past 50 years the application of technology within regulation has changed dramatically. The transformative potential of technology will only be fully captured by a **new and different regulatory framework.**

We argue that RegTech:

- Cannot be seen as a mere subset of FinTech – as broader than finance
- Is more than an efficiency tool
- Will play a critical role in the impending paradigm shift in regulation
- Has potential for application in a wide range of contexts, such as environmental compliance, in oyster farming for example.

Dream

"I have a dream. It is futuristic, but realistic. It involves a Star Trek chair and a bank of monitors. It would involve tracking the global flow of funds in close to real time (from a Star Trek chair using a bank of monitors), in much the same way as happens with global weather systems and global internet traffic. Its centerpiece would be a global map of financial flows, charting spill-overs and correlations."

Andy Haldane. *Chief Economist Bank of England*

FinTech requires RegTech

- Digitisation and datafication of compliance, risk management and regulation
- Building a new framework requires a sequenced approach:

1. Focus on building 21st century **infrastructure** to support market functions
2. Develop **appropriate regulatory responses** to FinTech innovation
   - Need to apply graduated regulatory requirements to firms based on their level of risk
3. Consider **regulatory sandboxes** as an opportunity to test new approaches

Challenges: **Distributed Ledger Technology and Distributed Liability:**
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3018214

Application for China: AI Monitoring of P2P

Across The Border *by* Laura He

PBOC considers new tactics in battle to regulate fintech

Proposals have included the use of artificial intelligence and other innovative regulatory technologies that can help monitor and screen for fraud

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UPDATED : Tuesday, 20 June, 2017, 10:37pm

News

Home > News

China's fintech boom a wake-up call for regulatory tech

Updated: 2017-07-13
(chinadaily.com.cn)

An Alipay logo is seen at a train station in Shanghai, February 9, 2015. [Photo/Agencies]

A deadline is looming for China's internet finance industry, as a one-year grace period for the fast-growing online lending market to comply with new rules expires in mid-August.

Application: For public E-KYC

RegTech+ : Smart Regulation

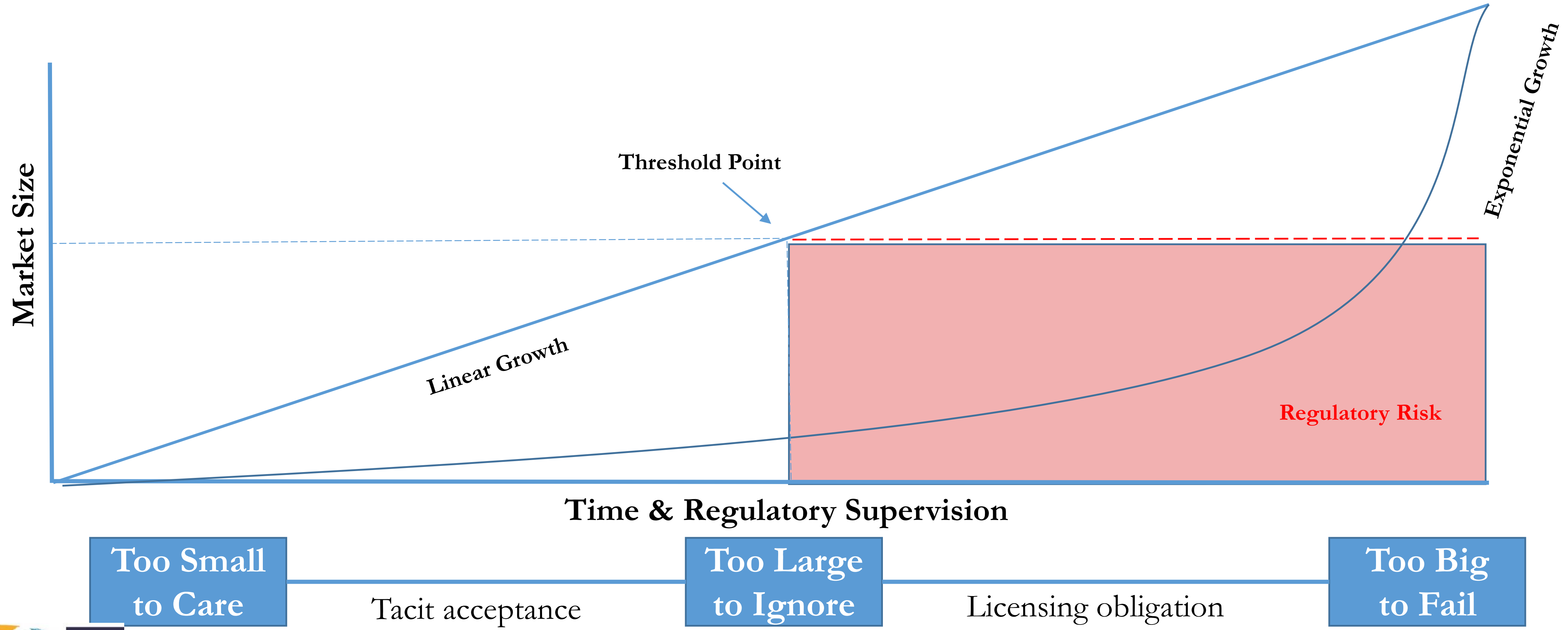
Information and monitoring – FSB (2017)

Systems design

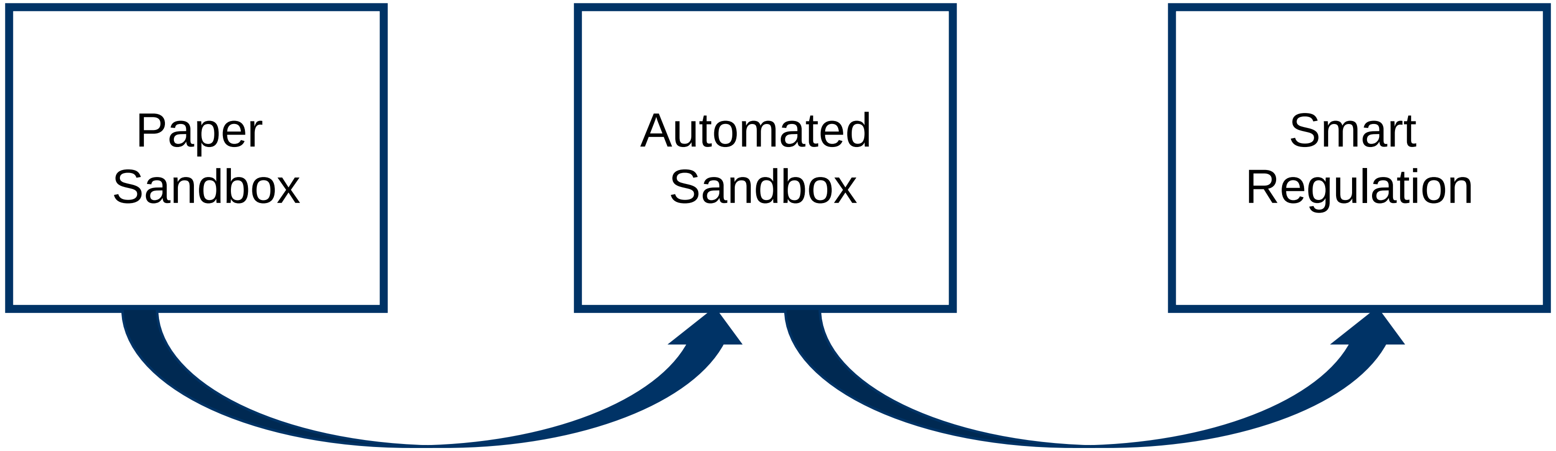
Digitisation

Datification

Sandbox Rational



Case Study: Sandbox Sequencing



BUT:

- Pro-Active Regulators
- B2C market

Case Study: India Stack

VISION

Presence-Less

Unique digital biometric identity

Paper-Less

Electronic documentation protected by digital signature and storage

Cash-Less

Single interface to all interconnected payments platform

Consent

Consent-enabled data sharing framework

IMPACT

1,000% Efficiency Gain for end-to-end account creation :

	Bank	Prepaid Card Issuer
Days	14- 30 days	1 – 2 days
Time	70 – 91 min	6 – 20 min
Costs (USD)	US$ 5.2 – 8.7	US$ 0.34 – 1.6

Re-aligns economic viability of financial inclusion delivery

Human Capital

Being “technologically neutral” has lead regulators to distance themselves from the necessity to understand new technological innovation.

Creates a knowledge gap in the consequences in the use of new processes & algorithms

Questions to Ask:

1. Should FinTech Regulatory Framework be:
Rule based
Principle based
Self-regulated

2. Who should FinTech Regulation Target?
New participants
Existing participants
Both
Outside players

3. Should we regulate:
Institutions
Processes
People

4. How do you accommodate new players
New regulation
Old framework

5. At what level should we regulate?
Regulate the firm
Regulate the network

6. How long does fintech reg framework last
Temporary
Permanent

7, At what level should you regulate
Supra-national
Local
Competing

8. Who can regulate:
The current staff of regulator
New people but should they know:
Tech? Legal? Finance?

9. What role do Sandbox play
Cultural Change
FinTech Promotion
RegTech Reform

10. Which mandate should regulator promote
Consumer protection
Financial stability
Prudential regulation
Competition

10
Steps Analytical
Framework for
FinTech Regulation

Thanks You

Douglas W. Arner
Kerry Holdings Professor in Law
University of Hong Kong
douglas.arner@hku.hk

Janos Barberis
Phd Candidate,
Founder, SuperCharger
janos@fintech.hk

Cited Academic Paper:

The Evolution of FinTech:
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2676553

RegTech and the Reconceptualization of financial regulation
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2847806

From FinTech to TechFin:
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2959925

From Regulatory Sandboxes to Smart Regulation:
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3018534

Regulation of DFS in China:
http://ssrn.com/abstract=2660050

Distributed Ledger Technology and Distributed Liability:
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3018214