

FinTech Developments & Their Consequences for the Financial Industry in Asia

By Roy Teo



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In 2015, a common narrative on FinTech was: FinTech companies are eating big banks' lunches. The disruptors versus the incumbent, David versus Goliath — a plot that is so often repeated. Once a provocative quote, "Banking is necessary, banks are not" was revived after more than 20 years, and the notion that banks are dinosaurs that can be bypassed. At the launch of the Singapore FinTech Festival in April 2016, Deputy Prime Minister of Singapore and Chairman of the Monetary Authority of Singapore (MAS) Tharman Shanmugaratnam said, "When FinTech companies first came to global prominence, it was tempting to cast this as a battle between new, innovative and responsive players and lumbering, flat-footed banks and other financial institutions."

Indeed, over the years, technology advancements have resulted in companies being replaced or traditional business models being disrupted — bookshops replaced by Amazon, music stores replaced by iTunes and Spotify: a phenomenon often described as the "Uber Moment". But financial services seem to have avoided the massacre. No major financial institution has gone out of business because of FinTech. Dinosaurs have escaped extinction.

However, we cannot totally give all the credit to the incumbents. The financial sector is after all a heavily regulated industry. Nevertheless, the real picture is more nuanced. This was also partly because the incumbents have not been sitting still. Goliaths of the financial world have become more nimble-footed, and are both competing with and partnering the Davids.

FinTech Developments

FinTech is a portmanteau of financial technology. To put it simply, it is to use technology to deliver financial services. But technology has always played a key role in financial services, from ATMs in the 1960s to Internet banking in the 1990s. Bloomberg, founded in 1981, was probably one of the first few FinTech companies and remains successful today.

Many attributed the sprouting of FinTech companies to the global financial crisis of 2008. After the crisis, there was a lack of trust in banks. With higher capital adequacy requirement for banks, it was more difficult for people and businesses to obtain loans from financial institutions. Financial institutions were simply pre-occupied with complying with new regulations and recovering from the aftermath of the crisis. Engaging with their customers and investing in new technology were certainly not their top priorities.

Such an environment gave rise to the first wave of the new generation of FinTech companies — mostly start-ups. The introduction of smart devices and app stores further propelled their growth. And also because of the financial crisis, these new FinTech companies are predominantly payments and lending companies based in the United States and Europe. But that should not define what FinTech is or restrict the potential of FinTech.

FinTech Transforming as Well as Disrupting Financial Industry

For many of us, the smartphone is becoming our bank, our insurance broker, and our investment adviser. Digital payments are becoming more widespread, propelled by advances in near-field communications, identity authentication, and biometrics. Internet-enabled distribution platforms are emerging that make financial products directly available, e.g. peer-to-peer lending, crowd-funding, and pay-as-you-use insurance models. Blockchains or distributed ledger systems are being tested for a variety of financial operations — to settle interbank payments, to reconcile trade finance documentation, to execute performance contracts. In March 2017, MAS announced the successful conclusion of a proof-of-concept project to conduct domestic interbank payments using distributed ledger technology (DLT). The project has achieved the objectives of producing a digital representation of the Singapore dollar for interbank settlement, testing methods of connecting bank systems to a DLT, and making the MAS

Photo: Monetary Authority of Singapore



Ravi Menon, managing director of the Monetary Authority of Singapore, at the Singapore FinTech Festival 2016

Electronic Payment System (MEPS+) interoperate with the DLT for automated collateral management.

Cloud technology is being used to store large volumes of data at low cost and retrieve them on demand, while big data — aggregating and analyzing large data sets, including through the use of sensor networks and natural language processing — is being used in many areas of finance: to gain richer insights into customer needs, to detect fraud in financial transactions, and to sharpen surveillance of market trends.

Building a Global Smart Financial Center

Financial centers around the world are looking at how they can tap these emerging technologies to remain attractive and competitive. After all, these technologies are removing physical boundaries and a digital financial center can extend beyond its physical borders. As part of a larger plan for Singapore to be a Smart Nation, MAS has set a vision to build a Smart Financial Centre — one that increases efficiency, creates new opportunities, manages risks better, and improves people's lives. MAS' strategy is not to choose between financial institutions and FinTech players, but to provide the optimal environment for both to innovate, compete, and collaborate. It aims to achieve this through a two-prong approach: (1) encouraging innovation through developmental initiatives, and (2) creating a regulatory environment that is conducive for innovation.

MAS created a blueprint for a Smart Financial Centre, emphasizing that FinTech can improve everyone's lives — from individuals to small and medium enterprises to large corporates. Technology innovation

will benefit the whole spectrum of financial services, including consumer banking, corporate banking, insurance, and financial markets. It also identified key technologies in the FinTech ecosystem — digital payments, advanced sensors, blockchains and distributed ledgers, learning machines, big data, cloud computing, and authentication and biometrics. These are supported by application programming interface (API) infrastructure with strong cyber security. It was deliberate to focus on the underlying technologies rather than specify solutions such as robo-advisory, P2P lending, and cryptocurrency.

For digital transformation to be successful there is a need for the public sector to be involved, as some services cannot be efficiently and effectively implemented. Singapore, being a smaller nation, has the benefit of creating public sector enablers quickly.

One example is in the area of identity and authentication. The combination of SingPass and MyInfo has allowed financial institutions to identify and authenticate customers digitally, without the need to visit a bank branch or meet a bank representative. MyInfo is a Singapore government-led digital vault containing Singapore residents' data. The collection of new customer data is required as part of financial institutions' Know-Your-Customer (KYC) process. Traditionally, the process requires multiple manual interventions to verify customers' information. The process is digitized through SingPass, a government authentication gateway, and MyInfo and marks the start of an eKYC implementation. The provision of government-verified data is one huge step to a comprehensive eKYC infrastructure. It is important to note that the release of personal data

IMAGE 1



Source: Monetary Authority of Singapore

to private institutions requires the consent of the individual. Consent is given when the individual is authenticated through SingPass.

Another example is the payment infrastructure. Payments require interoperability and a closed loop payment system may not always work. It will also not be efficient for Singapore to have multiple fragmented payment systems or mobile wallets. The private sector understood this and came together to develop PayNow — the central addressing system for payments that was launched in June 2017. Individuals can now pay each other using phone numbers or other proxies, across banks, without the need for a bank account number.

A third example of public sector enablers is funding and investment in innovation activities. These are critical as entrepreneurship is very much a risk-taking process. A few will succeed and many won't. In 2016, Singapore announced a record S\$19 billion science and technology research budget. This is part of the Research, Innovation, and Enterprise Plan till 2020. MAS had in 2015 announced S\$225 million funding under the Financial Sector Technology and Innovation Scheme. These schemes have paid off. The number of FinTech companies has grown significantly from less than 100 in 2015 to more than 300 by the end of 2016. Innovation labs that are dedicated to financial services grew from just a few to more than 30 in less than three years. Multiple impactful experiments have taken place and the ASEAN partnership has grown stronger with the two recent collaborations with the United Nations Capital Development Fund and the World Bank-International Finance Corporation (IFC).

Triple-A Regulatory Response

Most regulators do not have a financial sector developmental

mandate and are focused on financial stability. They are therefore concerned about the risks of financial system instability that FinTech companies may bring about. Yet there is no doubt that innovation needs to take place in the financial industry. Some have started to think about how to engage the FinTech ecosystem with the aim of finding the right balance between innovation and regulation. Regulators, perhaps, should position themselves as triple-A rated regulators — be Aware, Agile, and Automated.

Aware: Understand the Technologies

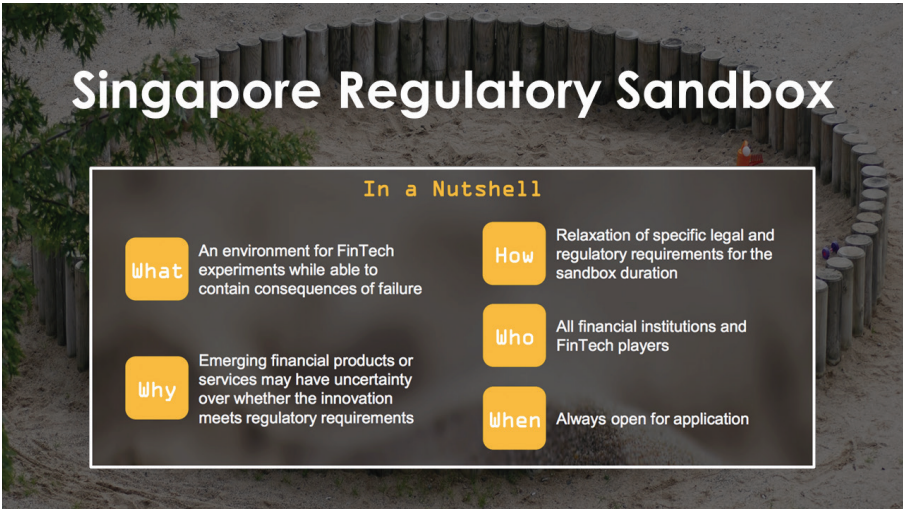
Financial regulators should develop a deep understanding of these emerging technologies as well as the risks and opportunities they present. Regulators should not be afraid to work collaboratively with financial institutions or even FinTech companies. MAS did not understand the risks and benefits of cloud technologies until it started to work directly with cloud service providers. Such collaboration helped MAS to develop guidelines on cloud computing that facilitated its adoption by industry.

Take another example — blockchains. MAS participated directly in proof-of-concept trials together with industry players to test the application of this technology to interbank payments. Much was learnt from the exercise and learning points are then shared with the industry.

Agile: Regulatory Sandbox

Regulation must not front-run innovation. Introducing regulation prematurely may stifle innovation and potentially derail the adoption of useful technology. MAS' approach is to apply a materiality or

IMAGE 2



Source: Monetary Authority of Singapore

proportionality test. This means regulation kicks in only when the risk posed by the new technology becomes material or crosses a set threshold. The weight of regulation must be proportionate to the risk posed.

Regulators need to allow experimentation to facilitate FinTech innovation while limiting its risks to consumers and the financial system should these innovations fail. The regulatory sandbox is a useful device to test new ideas in a confined environment. Several jurisdictions have introduced regulatory sandboxes over the last 18 months. Singapore was among the earliest. But not all sandboxes work the same way. Some, mostly in Europe, use sandboxes as a way to hand-hold the company till the company obtains a license to operate. It also means that they are targeted at non-licensed entities and many companies can be in the sandbox at the same time.

Singapore's regulatory sandbox works quite differently:

- The sandbox is available to both regulated financial institutions and unregulated FinTech players to test innovative products and new technologies.
- Firms entering the sandbox do not need to meet all the relevant regulatory requirements at the outset.
- To ensure that the consequences of any failure are contained, the experiments are conducted within agreed boundaries, such as the number of clients, scope of the activity, etc.
- The experiment is time-bound.
- If successful, the entity must exit the sandbox and fully comply with all relevant regulations if it wants to roll out the innovative product to the broader market.
- If the experiment fails, well, we all learn something.

Regulatory sandboxes not only encourage FinTech innovation by providing a safe space for experimentation, they also give regulators an opportunity to learn the risks associated with new technologies and right-size regulation accordingly. In fact, the sandbox is an experiment not only for firms but for regulators as well.

Automated — RegTech: Harnessing Technology to Manage Risk

Regulators must also look to harnessing FinTech to better regulate and supervise financial institutions and help them manage their risks. From a regulatory perspective, among the more promising applications of technology is in what is called “*RegTech*”, aimed at enhancing the efficiency and effectiveness of financial firms’ risk management and compliance. RegTech is advancing in several areas. *Predictive analytics* is being used in stress testing — to assess the ability of large, complex financial institutions to withstand a variety of stresses affecting different parts of the business in different

geographies. *Cognitive computing* and *behavioral algorithms* are being used to monitor and detect suspicious trading and possible misconduct in financial institutions. Machine learning capabilities can help to identify subtle patterns in behavior, which are hard to detect using traditional data analysis.

In the future, financial regulators will increasingly harness big data to detect and prosecute misconduct, and to identify weaknesses to focus on. In a recent case, the US Securities and Exchange Commission obtained a settlement against a broker-dealer for its failure to adequately train its representatives when they were selling certain complex debt instruments. Custom analytics tools, instead of traditional investigative techniques, were used to sift through millions of trading records. They helped identify over 8,000 retail customers for whom investment in the debt instruments was inappropriate. This is what 21st century regulation and supervision should look like.

Strengthening Cyber Security

As financial services increasingly move online and FinTech becomes more pervasive, the key risk that financial institutions and regulators have to deal with is likely to be in cyber space. Since financial technology isn't new, why the nervousness amongst regulators about FinTech?

It isn't about the technology, but who's using it. Many FinTech start-ups are focusing on growth and may not have the resources to focus on cyber security. Yet cyber risk is already a clear and present threat. The frequency, scale, and complexity of cyber attacks are worrisome.

- In February 2016, cyber-attackers gained access to the Bangladesh Central Bank's payment transfer credentials and used it to steal US\$81 million from the bank. Subsequently it was found that several other central banks had been targeted in the same way since 2013.
- In February 2017, malware was uploaded to the Polish and Mexican financial regulators' websites. These websites were then used to infect financial institutions' IT systems whenever the regulators' websites were accessed. Dozens of banks were affected in this manner.
- More recently in May 2017, the ransomware and worm “WannaCry” was perhaps the largest cyber attack in history. The worm infected organizations in more than 150 countries, all within a day.

Even more alarming is how long it takes to detect successful cyber penetrations. According to one study (Bryce Boland, “*M-Trends Asia Pacific*”, Aug. 24, 2016, https://www.fireeye.com/blog/threat-research/2016/08/m-trends_asia_pacifi.html), the median time it takes to discover a cyber attack is 146 days. This means that of all the cyber

attacks in the world happening in July, more than half of them will not be detected until after Christmas Day in December. It is not inconceivable that a future financial crisis could be precipitated by a cyber attack.

The regulatory and supervisory framework for cyber risk management is still evolving. Two areas are likely to figure prominently. Some *common risk management standards in cyber defence are needed*.

- Given how inter-connected systems across the global financial industry are, common standards for the swift recovery of critical functions disrupted by a cyber attack will help reduce systemic vulnerabilities.
- Given how often cyber incidents stem from compromised user IDs and passwords, a global minimum standard for robust authentication for online financial services is worth considering.

Sharing of cyber intelligence within the financial industry is not only encouraged but necessary. This will heighten the industry's collective situational awareness, so that it can respond more quickly and more effectively to impending cyber threats. Regulators can help to establish common infrastructure, processes and protocols to facilitate this. A good example is the US Financial Services — Information Sharing and Analysis Center (FS-ISAC). And with support from MAS, the FS-ISAC is in the process of setting up in Singapore its Asia-Pacific cyber intelligence center.

Similarly, *sharing of cyber intelligence among financial regulators is*

critical. Cyber threats do not respect sovereign boundaries. Cyber attacks in one country can have serious spillover effects on other countries. Regulators need mechanisms to share cyber intelligence efficiently in real-time.

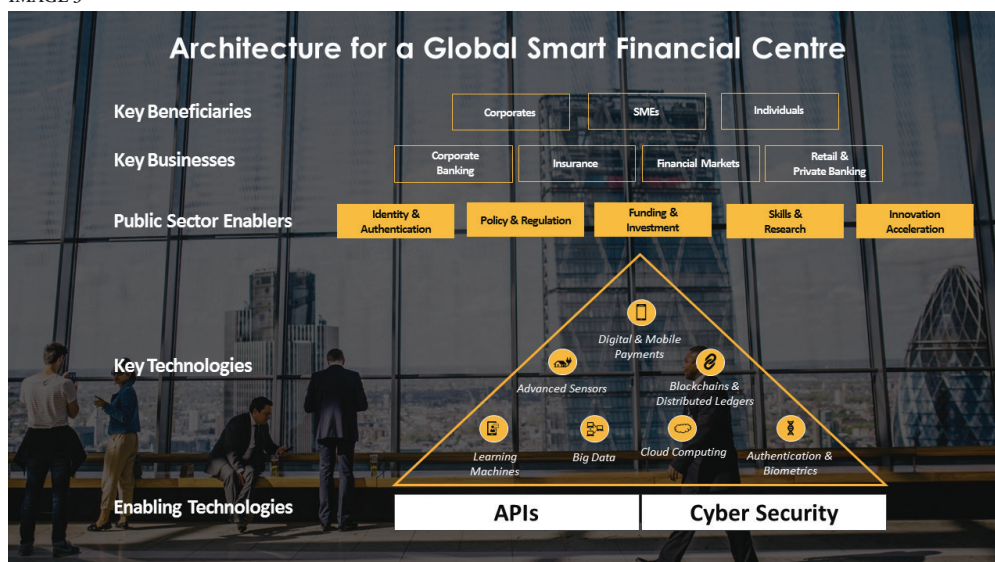
There are already informal, bilateral arrangements for such information-sharing. But more can be done. There is a need to identify and reduce the barriers inhibiting cyber threat information sharing, such as legal, confidentiality, and operational constraints. Cyber risk management is likely to emerge as the new frontier for global regulatory harmonization and supervisory co-operation.

FinTech for Financial Inclusion

A 2015 World Bank study (*“Measuring Financial Inclusion around the World”*) found that of the 2 billion adults on the planet with no bank accounts, more than half were in East and South Asia. A more recent study by the Asian Development Bank (*“Accelerating Financial Inclusion in South-East Asia with Digital Finance”*, 2017) covering Cambodia, Indonesia, Myanmar and the Philippines found significant gaps between demand and supply in several financial services, including payments, savings, and credit. Interestingly, the studies estimated that using digital finance to enhance financial inclusion would boost GDP by 9-14% in large economies such as Indonesia and the Philippines, and up to as much as 32% in Cambodia.

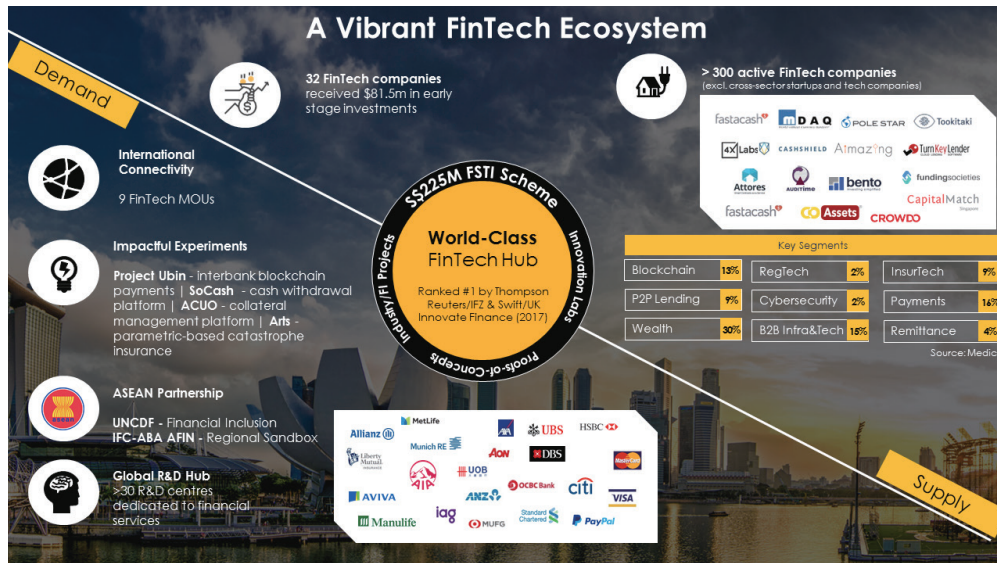
Innovation and digital technology can play a decisive role in enhancing financial access for a wider population. Vivek Pathak, the IFC's director for East Asia and the Pacific, said, “In today's world it is

IMAGE 3



Source: Monetary Authority of Singapore

IMAGE 4



Source: Monetary Authority of Singapore

feasible to reach these segments of the population at a fraction of the cost and at a speed that was not feasible earlier. New business models resulting from digital transformation of financial services and FinTech adoption in the region can create new markets that will lead to a higher level of prosperity. The end desired state is for financial institutions to be able to embrace innovation and collaboration more easily, and for innovations to spread more easily across the region.”

The IFC and MAS are working with the ASEAN banks to develop an ASEAN Financial Innovation Network (AFIN). The AFIN will enable banks, microfinance institutions, and other financial services providers to innovate across channels, products, and processes. Such innovation can unlock opportunities to better serve their clients, address unmet needs in their markets, and achieve sustainability through lower costs and more efficient service delivery. The challenge in providing last mile financial services requires multiple partnerships and innovations.

Globalizing FinTech — Bundling the Unbundled

Indeed partnerships are key for the future of financial services. The Goliaths and Davids are building strong relationships instead of competing with each other. It's a now sumptuous potluck instead of someone stealing another's lunch.

After all, there is a natural synergy between financial institutions and FinTech companies. One has the trust, expertise, security, risk management capability, and infrastructure; the other is client-centric, agile, and has innovative ideas. FinTech solutions present financial

institutions with opportunities to enhance their product offerings, while collaboration with financial institutions enables FinTech players to broaden their reach.

It would be naïve to think that financial institutions are not capable of being innovative. Many of them are investing heavily in technology to streamline and optimize entire swathes of operations. For example, several initiatives are underway among banks to tap into DLT to achieve swift, seamless and secure trade settlement. Several financial institutions have set up in-house FinTech units to replicate the start-up culture. They are also collaborating with and, in some instances, buying over promising FinTech companies.

At the same time, not many technology companies aspire to become financial institutions. Complying with regulations, submitting to supervision, and churning out disclosure documents for the markets is not always an appealing prospect.

Traditional financial institutions have the advantage of scale and a reputation among customers. But those that fail to keep up with technology will see part or all of their business models disrupted. On the other hand, many FinTech start-ups will also fail. It is in the nature of innovation that few new ideas and technologies will develop scale, sustain funding and end up as winners in the market.

One thing is for sure: consumers will emerge as the biggest winners. **JS**

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