



02

FINTECH

Technology application
in the Financial Product
Ecosystem

Concept and history of 'Fintech'

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Recent success in the technology sector has witnessed the transformation of start-up companies with relatively small or no seed capital into billion-dollar companies within a very short-space of time. From the advent of taxi-hailing apps (aka Uber, Lyft and Grabcar) to accommodation (eg. Airbnb), smartphone applications and web-based platforms provide the evidence of this growing phenomena. The application of technology in the financial sector has 'disrupted' the traditional 'brick-and-mortar' style distribution channels and if not embraced, would cause the current financial sector to lose a substantial portion of their businesses (estimated between 20 to 40%) to firms using 'fintech'.

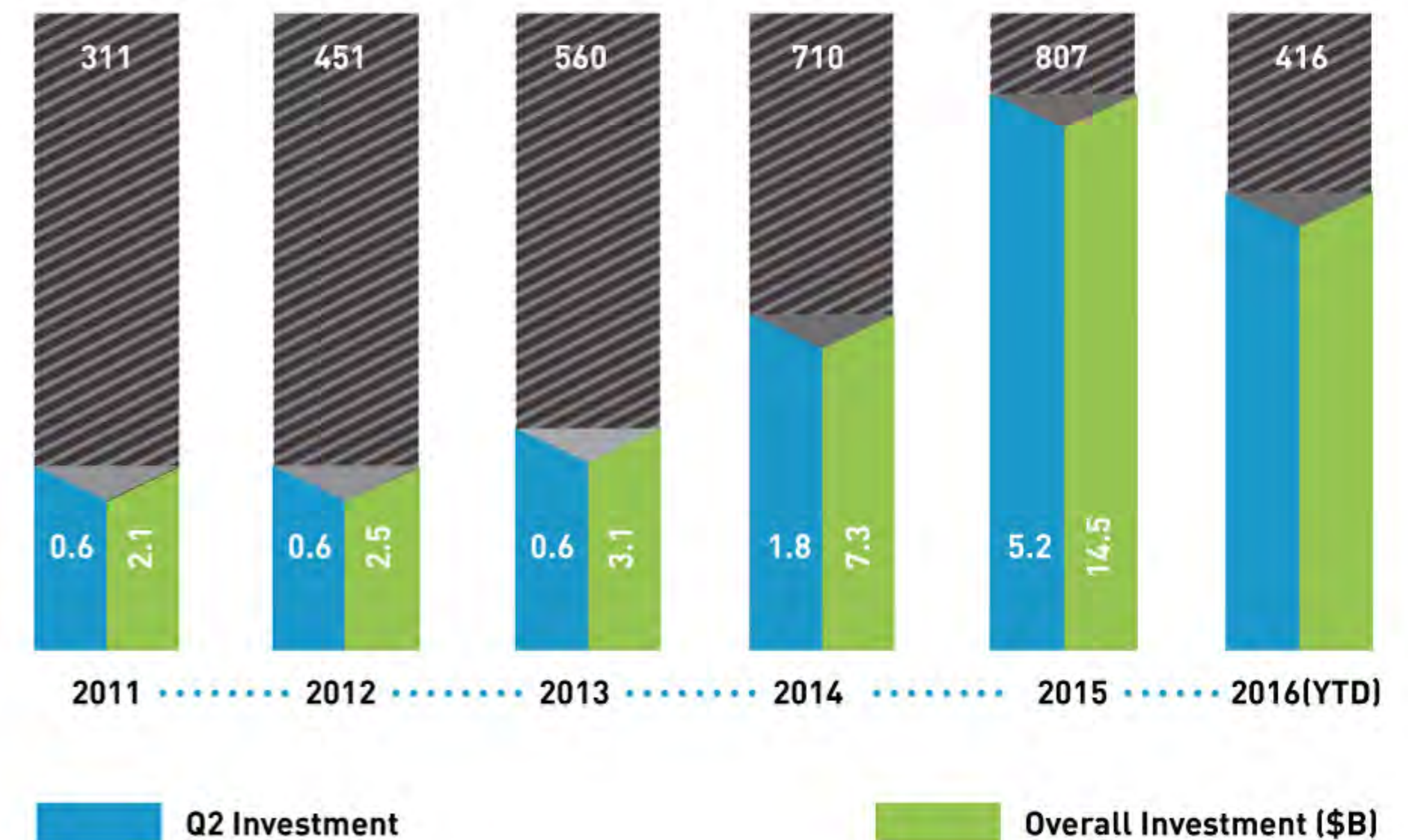
So what then, can be understood by the term 'fintech'? Fintech or financial technology is the application of technology in the financial product ecosystem. This includes financial product administration, vetting, marketing, distribution and supervision.

The use of technology in the operational infrastructure of the financial sector has been evolving since the late 19th century, from the invention of the telegraph to the advent of the personal computer. However, it has never before garnered so much of attention as its impact becomes more threatening to institutions that are not geared for change. The tremendous speed of fintech development in recent years can be attributed to the advent of new technological applications, faster processing and immense storage capabilities.

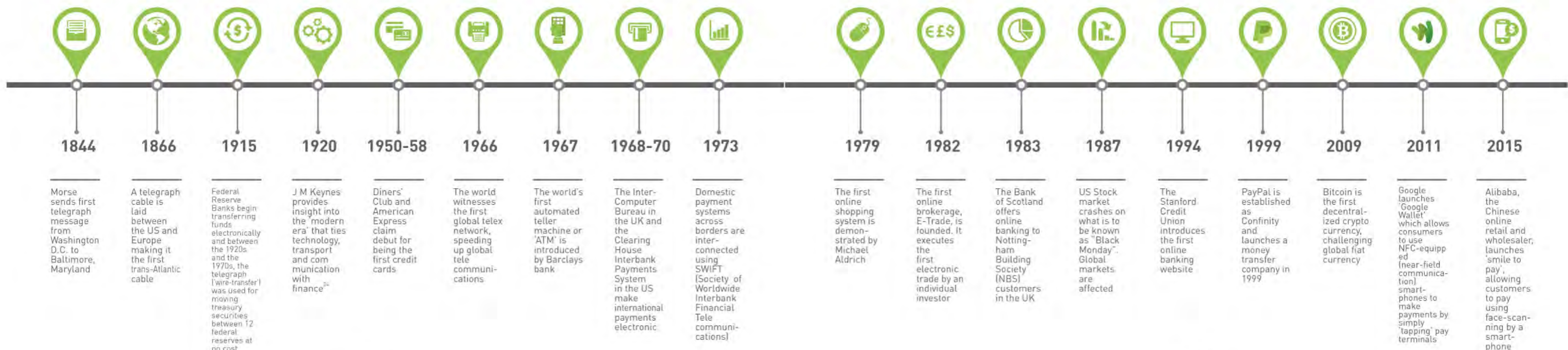
The recent global financial crisis necessitated the need for more secure, sustainable and real sector-driven solutions in the financial services sector²⁵ that required firms to improvise on their business models to survive in the industry. This provided opportunities for many technologically savvy firms to provide quick, cost effective and convenient solutions in providing financial services. Fintech start-ups have increased exponentially since the crisis. In 2015 alone, USD14.5 billion of venture capital was invested into the sector.

This translates to a 200% increase year-on-year, from 2013 to 2015. Researchers attribute the recent meteoric rise of fintech startups and the supporting equity contributions as a response to the financial crisis²⁶. They note that the 2008 Global Financial Crisis possibly acted as a catalyst to the growth of a new digital era in financial services. Researchers list that specific factors driving this trend include public perception, regulatory review, political pressure and the prevailing economic environment.

Annual Global Financing Trends to VC-Backed Fintech Companies
2011 – 2016 YTD (Q2'16)

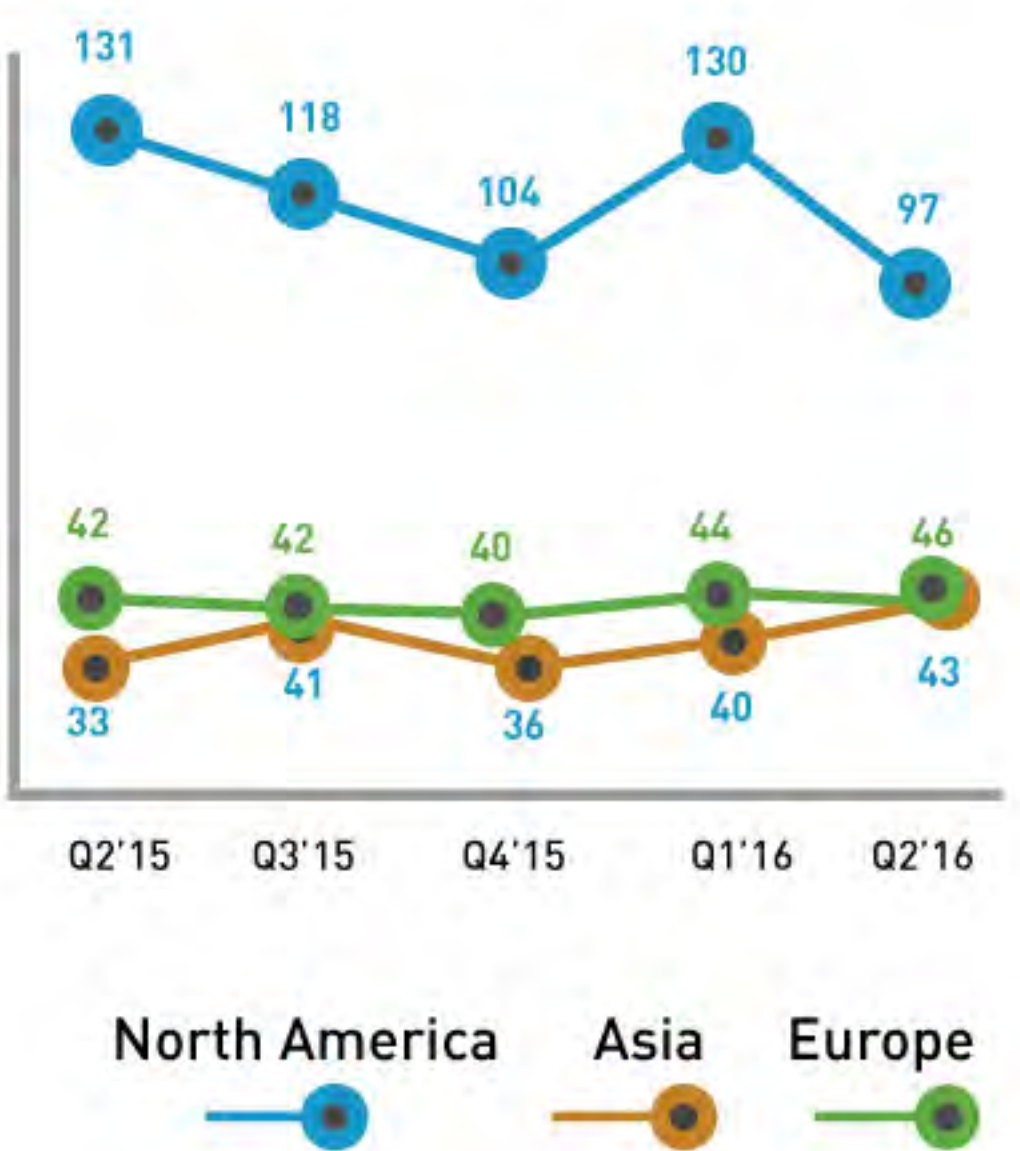


A brief history of technological developments that required businesses to change their business models to survive

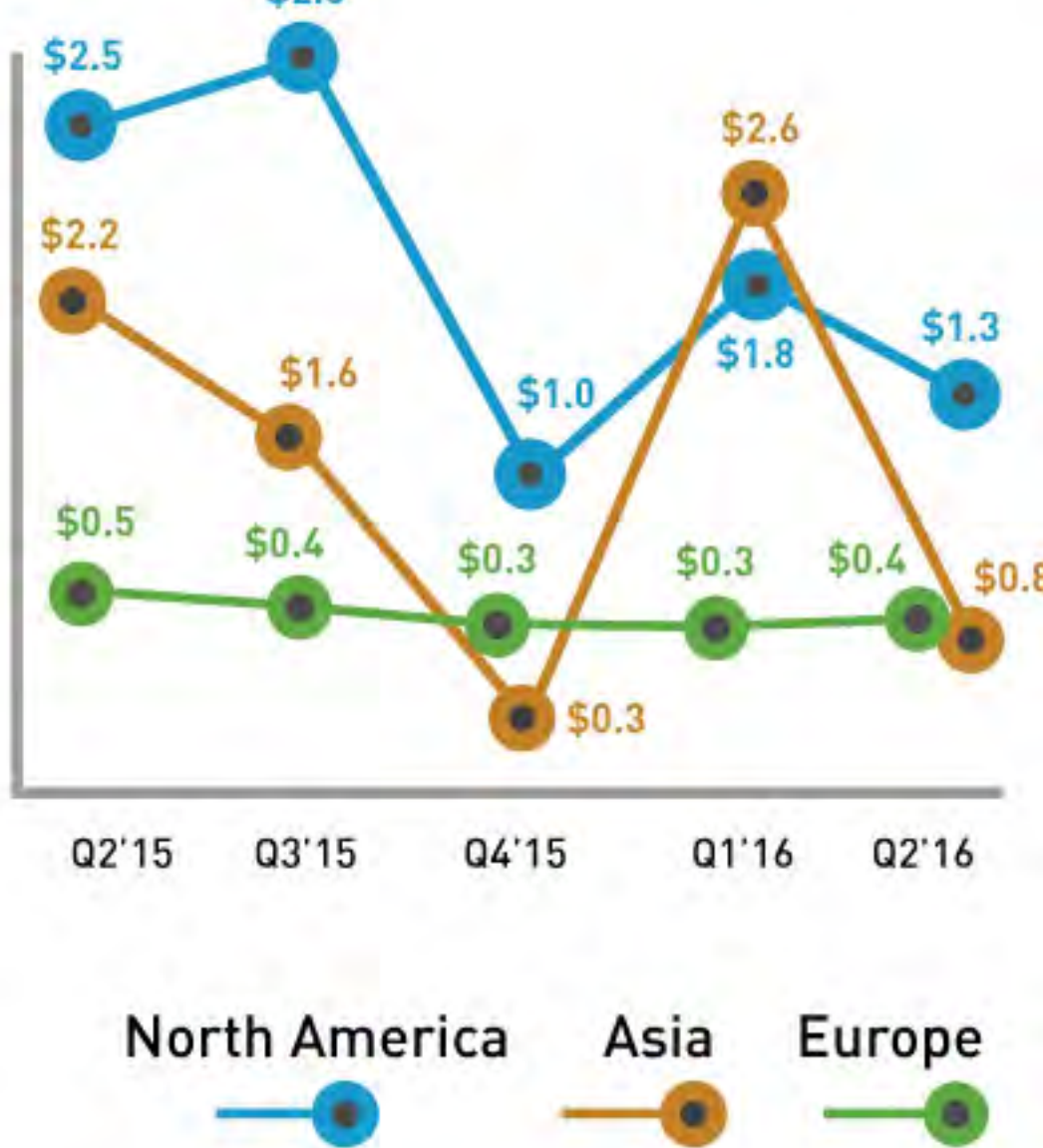


A review of the investments by continent over the 18 months from the second quarter of 2015 to the end of the second quarter of 2016, indicate that Asian appetite for fintech funding is significantly higher than Europe and trailing only to North America in investment size.

Deal Count by Continent | Q2'15 - Q2'16



Investment (\$B) by Continent | Q2'15 - Q2'16



The largest global fintech companies in 2015, by valuation and capital-raising are presented by Citi GPS:

Company Name	Business Area	Target Customer	Category	Country of Domicile	Type	Raised	Valuation
Ant Financial	Payment	Personal & SME	Online payment	China	Private		\$45 -50bn
Lufax	Lending	Personal & SME	Peer -to -peer loan	China	Private	\$1.7bn	\$19bn
Stripe	Payment	Personal & SME	Online payment	US	Private	\$280m	\$5.0bn
Zenefits	Institutional Tools	SME	HR software	US	Private	\$583.6m	\$4.5bn
Credit Karma	Lending	Personal	Credit scoring	US	Private	\$368m	\$3.5bn
Adyen	Payment	Personal	Online payment processor	Netherlands	Private	\$266m	\$2.3bn
Klarna	Payment	Personal	Online payment	Sweden	Private	\$291m	\$2.25bn
One97	Payment	Personal	Online payment	India	Private	\$585m	\$2.0bn
Prosper	Lending	Personal	Peer -to -peer loan	US	Private	\$354.9m	\$1.9bn
Oscar Health	Insurance	Personal	Online health insurance	US	Private	\$727.5m	\$1.75bn

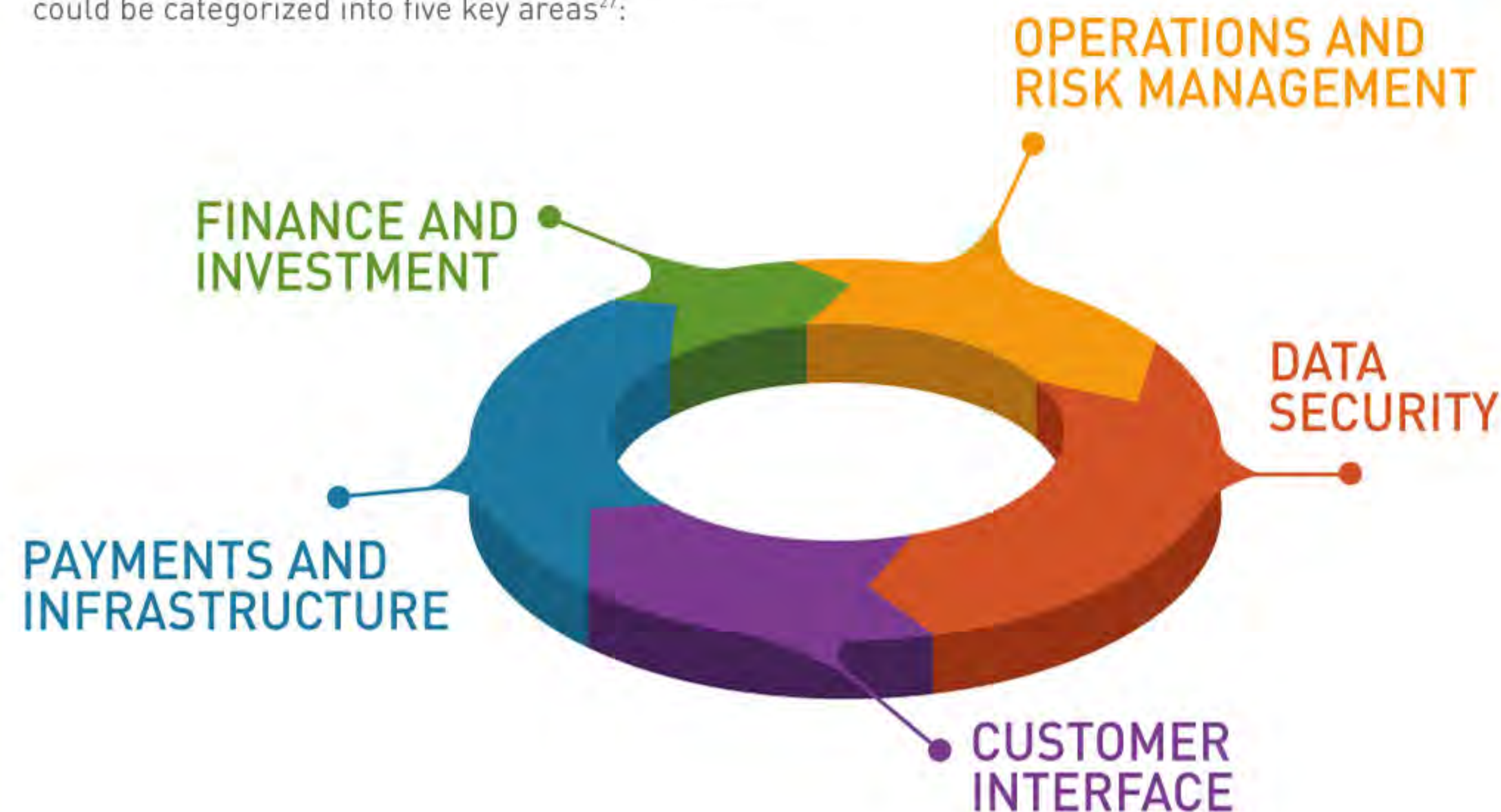
Source: Citi GPS Report

Although the majority of the largest fintech start-ups are in the US, the two largest companies, Ant Financial and Lufax, are based in China. Ant Financial is a payment gateway and finance provider for small to micro enterprises and belongs to the largest b2b (business-to-business) online marketplace: Alibaba.com. Ant Financial includes Alipay (online payment gateway similar to PayPal), Alipay Wallet (a digital wallet that enables online P2P payments), Yu'e Bao (largest money market fund in China), Zhao Cai Bao (digital investment and lending platform to SMEs), Ant Micro Loan (b2b and p2b lending) and Sesame Credit (credit-ratings provider). This financial ecosystem provides the necessary credit analysis and verification and digital disbursement reducing the need for traditional bank involvement in the process. The revenue shifting from transactional and non-intermediary costs is significant as fintech portals can partner with varying service providers to deliver complete financial products.

Lufax began in 2011 as a P2P lender and now offers a broad range of financial services including a digital wallet, wealth management solutions and fund distribution channels. The wealth management industry has now ventured into the post-crisis digital revolution, with robo-advisors and lower transactional costs, challenging physical advisory functions and effectively disrupting the traditional investment distribution channels. Firms that embrace the technology as a solution rather than competition, are expected to be successful in riding the fintech wave and surviving in the digital era.

The Fintech Ecosystem

A more traditional view of the fintech ecosystem could be categorized into five key areas²⁷:



However, the most recent drive towards technologically-powered financial services has effected change in another five broad segments.

01 Banking and Lending

Traditional banking requires strategic adaptation to deal with fintech developments. Two specific issues impact traditional banking activity when considering fintech disruptors: an alternate banking strategy and peer-to-peer (P2P) lending.

a. Adapting banking strategy to deal with disruption

Traditional lending is quickly transforming into online distribution channels as banks are gearing up to challenge new fintech start-ups. It is estimated that between 30 and 80% of branch utilization will be reduced in the coming decade. This will decrease more expensive over-the-counter transactions and shift even more transactions to virtual digital platforms. As King (2014) states:

"The shift is that banking is no longer about the place or the space, it is all about the utility. The more you think about the brand as enabling financial utility, the more you come to terms with the fact that the branch generally no longer offers significant advantage."

In order to remain competitive, banks have adopted new product solutions that utilize virtual channels and mobile or online delivery. 'Digital readiness' or IT capacity for adopting new technological platforms become crucial to traditional bank survival in the near future. As software becomes more open-source, programming units have opportunity to mold them to suit specific sector needs. For example, SaaS (software-as-a-service) solutions that are coupled with APIs (application program interfaces) can be integrated with existing banking solutions to provide interactive digital platform banking. Overall developmental costs are also reduced since SaaS and API are constantly releasing updates based on efficacy and customer needs.

Leading banking strategists, Bain & Company, suggest that traditional banks need to consider the following paradigm shift to survive the fintech disruption²⁸:

i. Integration of distribution channels and network redesign

Banks are required to provide a seamless customer experience that is based on customer preference of how they would want to interact with the bank. In this way, it is the customer that experiences the process that he/she most prefers. Bain & Company cites the example of Finansbank in Turkey that allows customers to check their approved credit limit via secure messaging, prior to entering into a major purchase transaction. However, successful integration of distribution channels should be comprehensive, always accessible at the place and time of the customer's choice. This requires a redesign of existing network architecture and a paradigm shift from reliance on physical branches during office hours.

ii. Adopting a digital mindset

Strategic direction from the senior executive level is required to motivate and espouse a digital mindset. This requires enhanced levels of transparency and disclosure, as response to poor service becomes instantaneous and viral. Social media impact can be disastrous to non-conforming banks as bank switching is easy and convenient on digital platforms. Hence, banks will have to execute transactions with increasing speed and delays in finance approvals may lead to loss of group business: individuals are more connected than ever before. Therefore, the focus on the customer becomes priority. Traditional banking attitude of being apathetic to customer needs over rigid compliance with central bank regulation, writing policy and setting procedures needs a new outlook. New fintech service providers operate with the objective of delivery and customer satisfaction rather than elaborate operational and regulatory procedure that tend to delay response times. In addition, data collection of customer online habits will enable a predictable and more targeted response for new digital offerings.

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b. P2P Lending

Peer-to-Peer (P2P) lending can be understood as any online transaction in which one or more individuals lend money to others²⁹. P2P financing can be traced back to two companies: Zopa (UK-based) that launched in 2005 and Prosper (US-based) launched in 2006. The process of P2P lending allows interested parties to lend to each other on mutually agreed terms over an online platform. By 2016, Prosper claimed that their total lending was at approximately USD6 billion whilst Zopa reported a total loan base of GBP1.4 billion³⁰. In the US, additional regulation in the aftermath of the crisis attempted to reform the finance market by providing further safeguards to the consumer. The Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010³¹ effectively tightened credit availability even further, supporting the emergence of P2P platforms that had less stringent controls on lending.

A key component of traditional banking revenue is credit provision. The process of application, approval and administration throughout the period of the credit facility attracts significant costs that are all passed to the borrower. Since the financial crisis, banks globally have become more critical of the quality of credit applications. Besides the more cautious approach to lending, the regulatory environment has also released more stringent capital requirements: Basel III. With the objective of improving market stability and enhancing resilience against future shocks, banks now have further challenges of capital adequacy, to ensure safer lending practices. The US market response to the credit shortage resulted in a variety of non-traditional banking offerings, even through legislation. An example of this is the JOBS Act 2012³² (Jump Start Our Business) that promotes entrepreneurship and job creation. The JOBS Act aided initiatives in bypassing the stringent credit requirements of traditional banks by allowing start-ups to raise financing directly from interested parties on P2P platforms.



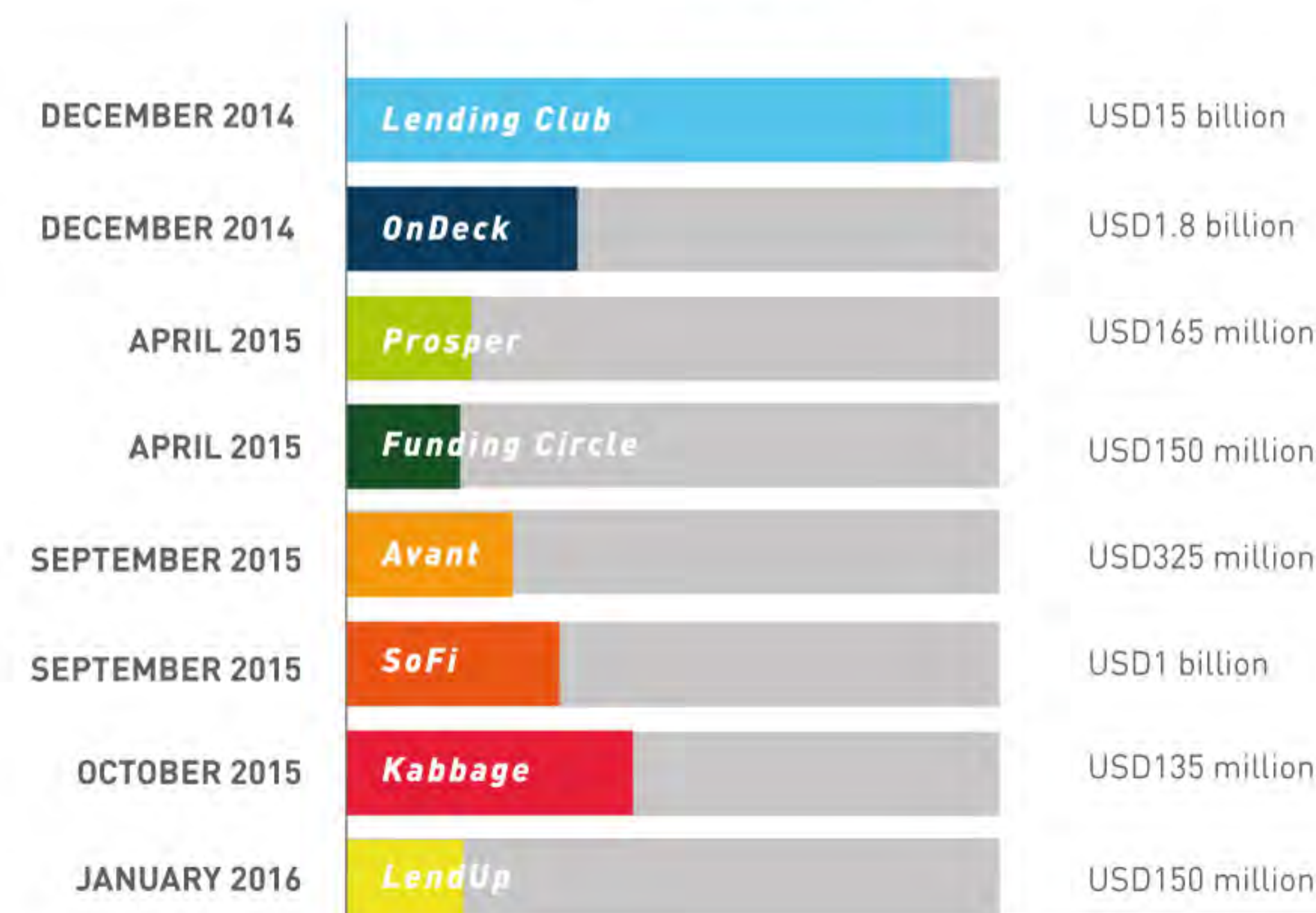
A PwC report in 2015 estimates that by 2025, P2P lending would potentially capture 10% of revolving consumer debt and 4% of non-revolving debt in the US alone. This prediction is supported by Moldow (2015) but research conducted by Morgan Stanley indicates that P2P lending would possibly capture 10% of US lending by as early as 2020. This can be attributed to P2P diversification from consumer lending to business, real estate finance and invoice trade financing. A recent article reports that institutional investment accounted for approximately a third of P2P financing for the various P2P lending products in the UK for 2015 at 32%³³.

The rapid growth of P2P lending extends beyond the innovative use of technology. Fintech platforms provide customers with a seamless experience that is focused on an objective evaluation through an easily accessible interface. Milne and Parboteeah (2016) list four categories of advantages that P2P lending offers over traditional bank lending:

- Higher returns than bank deposits for lenders, with low fees
- Easier access to financing for borrowers that have difficulty or are unable to access bank lending
- The ethical and social contribution of P2P lending is perceived to be higher than traditional banking
- Technological innovation is rapid, making online platforms quicker and accessible on a variety of devices with no time limitations.

P2P lending in the Asian region is at a nascent stage, although the typical rate of fintech growth makes P2P lending a formidable force within the sector. Lufax and Jimubox in China, Funding Circle in the UK and SoFi in the US have all achieved in excess of USD1 billion in valuations during their short tenure. Debt-financing has often been preferred in corporate fund-raising due to relatively cheaper financing costs. Although P2P lending is expected to reduce these costs even further, large fund-raising rounds for start-up companies without credit histories require the more expensive equity financing route. Even here, fintech providers are capturing market share by offering crowdfunding platforms to entrepreneurs with ideas that have potential. But more on this under the investment and wealth management discussion.

Recent capital-raising activity for P2P lending sites³⁴:



**MARKET
CAPITALIZATION**

02 Payment and Fund transfer

E-commerce start-ups were initially focused on creating online marketing platforms for the retail of goods across markets (aka Amazon and eBay). Their success in capturing significant market share within a short period, presented new digital challenges that demanded urgent solutions. Transactions taking place online, required payments that were instantaneous and secure. Online payments therefore, introduced a new set of threats to economic safety and stability. For instance, how would customers make payments for goods securely? Banking details could easily be intercepted and used for fraudulent online purchases using phishing scams, packet sniffing or other forms of hacking. In 2011 in Australia alone, one million fraudulent payment transactions were recorded and 71% of losses from credit card fraud occurred on online or telephonic purchases³⁵. The introduction of secure payment gateways like PayPal, Stripe and Authorize.net reduced the threat of identity theft and other fraudulent activities, whilst unwittingly introducing a new competitive business threat to the role of banks in traditional payment transactions.

Accessibility to mobile and smart phones have driven change in the payment and fund transfer sector, by enabling vendor payment gateways to recognize them through free downloadable applications. Using concepts like digital wallets where online details to accounts are stored, or simply transferring airtime to a vendor as an instant payment reduces the role of traditional banks even further. These services and apps have brought along new risks in security, although customer-demand for convenience and accessibility has forced providers to enhance security protection whilst improving the overall customer experience.



03 Investment and Wealth Management

Crowdfunding

Digital crowdfunding platforms can be traced back to informal micro-finance ventures that attract small equity contributions for an entrepreneurial activity. In 2009, the launch of an online platform (Kickstarter) provided an opportunity for many small investors with ambitions of owning equity in the next 'Microsoft' or 'Google' venture to participate in potentially the 'next big thing'. Entrepreneurs that could not or did not want to access traditional bank funding, now had an alternative capital-raising method.

For example, FORM1 (a group of MIT Media Lab researchers) received crowdfunding by intending to provide an affordable 3D printer for public use. Although they intended to raise USD100,000, they received USD3 million in funding, rapidly shortening the time to market. Another popular crowdfunding initiative, the Pebble smartwatch, raised USD1 million in 28 hours on Kickstarter and USD10 million in total.

Oculus Rift is probably the most significant of the Kickstarter projects, raising ten times the USD250,000 goal in 2012. The company sold out two years later for USD2 billion, one thousand times its initial capitalization. A variety of crowdfunding initiatives are currently offered. Fajr Capital Advisors (2013) provide some examples:



Box 1: Types of Crowd Funding

MODEL	EXAMPLES	FEATURES	PROS	CONS
DONATION	Just Giving	Funders donate without expecting monetary compensation	No risk	Donors do not acquire securities Entrepreneurs have difficulty raising substantial capital
REWARDS	Kickstarters IndieGoGo	Funders receive a token gift of appreciation or pre-purchase of a service or product	Low risk	Potential return is small No security is acquired, and there is no accountability mechanism Most entrepreneurs may have difficulty raising substantial capital without a product with mass appeal to sell
LENDING	Kiva Funding Circle	Funders offer to lend a portion of a loan in exchange for a specified interest rate. Business repays the loan over time.	Provides capital formation opportunity for cash flow positive businesses	Loan maybe unpaid/loss of investment Banking regulation maybe unclear on individual to business lending May be less popular with Muslim users due to the interest element
INVESTING	CrowdCube Gate Impact OfferBoard SeedInvest	Funder receive equity instruments or profit sharing arrangements	Potential to share in the profitability of the venture Significant potential for financial gain May attract relatively large number of investors	Potential loss of investment Equity holders are subordinate to creditors in the event of bankruptcy Securities laws related to crowdfund investing may be complex

Source: Fajr Capital Advisors (2013)

05 Blockchain technology

At the beginning of 2009, blockchain technology was used to create a cryptocurrency by an anonymous developer, famously known as 'Bitcoin'. By 2016, the market capitalization of approximately 600 cryptocurrencies are monitored³⁶, although Bitcoin remains the most dominant. For a digital currency to exist, its credibility cannot be compromised. Therefore, a decentralized or shared database of 'tokens' must be stored such that none can be replicated but rather transferred and owned. The technology that makes this possible, consists of three components³⁷:

- a shared state
- a set of rules for updating the state, and
- a trust model for timestamping.

A blockchain is thus a database that controls a shared ledger that cannot be altered or fixed, ensuring secure contracting that is always traceable. Although there has been significant cynicism towards cryptocurrencies such as Bitcoin and Ethereum, they have proven their resilience against security attacks, legal argument and general skepticism.

Blockchain technology is being applied to more solutions both in the corporate and government sector. For example, in 2016, the central securities depository of the Russian Federation announced a pilot project that is considering electronic voting for bond owners using blockchain methodology³⁸. The UK government as well, has recently approved a blockchain provider for public sector organizations, introducing distributed ledger technology (DLT) to everything from health services to financial regulation³⁹.



Challenges in Fintech implementation

A recent PwC survey⁴⁰ of the most significant challenges facing fintech companies and incumbents, revealed the following barriers to entry and/or survival:

i. IT Security

IT vulnerabilities are particularly challenging for new entrants into the field, probably due to a knowledge gap when identifying weaknesses in security. This is less of a concern for fintech companies who are specialists in the field.

ii. Regulatory Uncertainty

Both fintech companies and incumbents considered this critical to the sustainability of fintech implementation. Minimal regulation exists internationally that governs the fintech sector. Furthermore, there is a lack of clarity on which regulatory authority is responsible and whether all fintech companies would be governed by comprehensive dispensation. What is becoming clearer is that fintech solutions provide advantages for products to market, essentially enhancing the means of delivery rather than the product category itself. Hence, more suitable regulation

would be sector-specific: fintech investment and wealth management solutions to be regulated by the securities regulator and fintech lending solutions to be regulated by banking regulators and so forth. For Asia and the Islamic finance industry globally, Malaysia is leading the initiative, having already released regulatory guidelines on crowdfunding, P2P lending and the application of a 'sandbox' environment for application testing.

From the results of the survey, additional challenges that concerned stakeholders include differences that exist in business models, management & culture, operational processes and knowledge. New entrants were particularly concerned about IT compatibility with existing infrastructure. Significantly large IT costs to introduce these new solutions make traditional financial service companies hesitant and uncertain on whether the decision to implement would be cost-efficient and beneficial in increasing shareholder value. Furthermore, the required investments to enter and remain in the sector become a significant barrier to entry, especially for start-up companies that require large capital injections for development of programming infrastructure. To a large extent, this barrier might be reduced as fintech programming becomes more open source, much like smartphone apps based on Android or the Apple iOS platforms.

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Islamic Wealth Management and Fintech

Malaysian initiative

The Islamic finance sector has been growing at a steady rate globally, although many countries are yet to offer a full product suite to their customers. Malaysia however, is established as a pioneer in the field of Islamic finance since the 1960's (Tabung Haji). The Malaysian financial regulator was also the first to promulgate Islamic banking law (BAFIA Act, 1983) amongst many other firsts that it can lay claim to.

Another milestone for Malaysia and the global Islamic finance industry was the introduction of the first Islamic interbank investment platform (IAP) in 2015. The IAP was developed with the vision to allow cross-border investment and funding through a multi-currency channel that will eventually link with global markets. Raed, IAP Integrated Sdn. Bhd., owns and manages the platform on behalf of a consortium of Islamic financial service providers. Individual, corporate and institutional investors channel investment funds through Islamic banks (due diligence and finance customer assessment filtering) to provide financing to approved customers that apply online. The investment platform is the first Islamic fintech solution offered by a consortium of six Islamic banks, indicating the willingness for Malaysian Islamic banks to embrace the fintech revolution and ride the wave.

The advantages of the IAP solution include the fact that direct financing is offered to approved customers that present viable ventures. Customers that require financing will have an alternative source of funding available to them, that is provided by a group of investors, thereby spreading the overall risk exposure for any individual fund provider.

RAM Ratings, the Malaysian credit-rating provider, will provide independent ratings on ventures that will obtain a listing on the IAP. The initiative provides a secondary market for investors that can have direct, yet secure access to innovative business ventures. In a bid to attract international investors, the government regulator that provided oversight and support in the IAP formation, also placed no restrictions on foreign capital inflows. Furthermore, all profits from investment are exempt from tax for the first three years⁴¹.

The Securities Commission (SC) of Malaysia, under an initiative known as the Alliance of FinTech Community or 'afFINity@SC', has also been active in preparing regulation that will allow for fintech solutions to operate more seamlessly in the country. The initiative includes⁴²:

- i. Creating awareness and catalyzing innovative fintech solutions
- ii. Forming clusters to organize and nurture a wider fintech ecosystem, and
- iii. Providing policy and regulatory clarity that is conducive for innovation.

The objective of the framework, is to enable a variety of company forms to participate and access market-based funding through a digital platform. In September 2016, the SC confirmed that selected and approved P2P entities will be announced within a few months⁴³, with six registered equity crowdfunding platforms that have already begun fundraising⁴⁴. The Equity Crowdfunding/P2P financing framework was issued in early 2016⁴⁵.

The Approach Of BNP Paribas To Fintech

BNP Paribas have deployed strategic fintech initiatives that have contributed to their competitive edge in the financial market. Through partnerships with fintech solution providers, BNP Paribas is able to co-create and develop solutions for clients. By using these solutions internally as well, the financial services provider expects to develop new communications channels that will motivate quicker response times and a higher culture of transparency and efficiency. With more advanced communication, external customers can be assisted more efficiently in embracing digital methodology in their core business modes.

On the international stage, BNP Paribas has actively been involved in co-innovation programs with Fintechs, to design solutions for all segments of the banking industry. Application of data analytics software for example, using large existing databases, allow for more efficient fund matching and distribution at the bank that were not possible before.

Three components form the core of their digital strategy:

- i. Artificial intelligence (AI)
- ii. Blockchain technology
- iii. Big data

Artificial intelligence (AI) is expected to enhance employee productivity by using natural language generation in the preparation of routine reports such as fund fact sheets.

Advancements in AI are constantly shifting the frontier, proven from the ongoing testing in everything from driverless cars to digital personal assistants. The use of AI in portfolio fund construction for example, is based on the concept of a 'robo-advisor' that challenge users through questions 'molded' by interactions between man and machine. The result is a personalized portfolio construction based on a carefully constructed algorithmic risk profile. Placing investments are carefully calibrated to suit individual customers.

Through leading digital providers, BNP Paribas is also taking advantage of Blockchain technology in record-keeping and warrant issuance. The resilience of Blockchain methodology and digital infrastructure has quickly become the benchmark in serial-flow databases that contribute to the credibility of the records stored. Existing technology ensures that documentation is kept secure, reducing the possibilities of fraud and tampering.

By making use of leading innovators in the data analytics environment, BNP Paribas is also able to discover new insights on customers and their preferences and provide more rapid and efficient decision-making.

The use of these types of cutting-edge technology solutions is expected to have a positive impact on competitiveness, ultimately improving the customer experience. Additionally, cost benefits for the bank are expected in both retail distribution of funds and their selection.



Summary

The rapid success of the fintech sector and emergence of digital platforms threatens traditional banking business. Capital investments in the sector have doubled each year, since 2013. In different forms, fintech development has entered the banking and lending market, payments and gateways, investment and wealth management, insurance and currencies. Through a complete ecosystem, fintech evolution is impacting key areas in the financial services industry.

The most significant developments have taken place in P2P lending and crowdfunding. Through P2P lending, lenders and borrowers can interact over digital platforms without the need for lengthy applications and high transactional costs. In crowdfunding, businesses (not limited to businesses) can quickly raise capital for product development or project funding. The future success of these platforms and solutions relies on credible security in information technology and enabling regulation. Malaysia is well-poised to benefit from the fintech wave as it has already introduced regulation for P2P and crowdfunding. Most recent regulation ensures that product testing is conducted in a controlled environment with sufficient monitoring and supervision, before going to market. These strategic initiatives will serve to enhance customer confidence and attract more players into the Malaysian market.