



# Road Ahead for FinTech in India

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Our aim is to emerge as a credible, trustworthy and neutral bridge between economic agents like firms, farmers and professionals on the one hand and policy makers on the other and to contribute to bringing the three principle stakeholders viz Government, industry and academia on the same page and pulling in the same direction - a key condition for ensuring India's success in global markets. PIF currently has an analytically strong team of dedicated researchers who are self motivated. PIF's highly qualified team specialises in analyzing India's political economy and its engagement across verticals that are relatively under-worked areas that will permit PIF to create a niche for itself in the research and think tank space in the country.

# Road Ahead for **FinTech** in India

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# Foreword

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The definition of technology has evolved over time. From it merely meaning computerisation or the use of internet, it has now evolved to new worlds of FinTech, Internet of Things and to even less ventured worlds of Machine Learning and Artificial Intelligence. The integration of digital into the financial world and the real economy, globally, has been remarkable. Economies have leapfrogged on the back of digital. India too made its entry into the world of FinTech in the recent past.

Conventionally, the financial sector in India has operated within a strict and apposite regulatory framework. While this has succeeded in making the sector robust, it has also resulted in high barriers to entry. It has never been easy for new financial sector players to try out new technology or new revenue models. It is probably for this reason that financial penetration in India is low and financial inclusion a priority.

That financial inclusion need not be driven by public sector financial entities alone or that it can be undertaken in a cost effective manner has emerged with the advent of FinTech. One can observe visible disruptions in the financial sector on account of the stark differences in the philosophy of operations between FinTech firms and traditional financial service providers. FinTech firms operate through a plug and play model, focus on easing customer experience, and explore alternate ways to provide innovate solutions to consumer needs.

It is against this backdrop that Pahle India Foundation (PIF) and the Internet and Mobile Association of India (IAMA) have undertaken a forward-looking study at on the FinTech sector. The study is an amalgamation of primary and secondary research that takes stock of the current FinTech market in India and identifies opportunities for growth, development, and innovation.

We stress on the importance of the government having to take the lead by creating a regulatory framework that creates disincentives to using cash for transactions. We also delve into what an ideal regulatory framework for FinTech should be, beginning with the separation between the regulation and business to ensure that all players have a level playing field and to do away with any information or regulatory asymmetry. We focus on RegTech that will enable regulators to monitor compliance in both private and public sector of existing regulations and also keep regulators updated of consumer preferences and market dynamics, in the face of a rapidly evolving ecosystem. We highlight the risk of developing an input-based regulatory framework that is dependent on historical data and subject to human bias.

The regulator will play an important role in the next phase of market development. Market participants must collaborate rather than compete for the sake of innovation and for delivering superior customer experience. Even though India is playing catch-up with the world, it is an attractive opportunity for investors in the FinTech, but to stoke investments India will need support in the form of a forward looking regulatory environment and fitting market infrastructure. We realise the regulators have an important task of striking a fine balance between regulating risk and ensuring market development. Through this report we hope we have laid the requisite foundation upon which such a regulatory framework may be fashioned.



**Nirupama Soundararajan**

Senior Fellow



# Foreword

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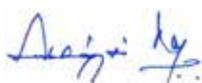
FinTech is not about unbundling of financial services, neither is it limited to automation of processes. FinTech is about digital innovations and technology-enabled business models that create value and efficiencies in the financial sector. In true sense, the disruptive power of FinTech can be realised only when there is injection of economic value in the system, and it is able to bring social and behavioural transformations. Demonetization and GST have both been drivers for digital adoption. FinTech is a matter of natural progression for India.

The telecom revolution, internet banking and penetration of mobile services have been successful in onboarding a critical mass of Indians to either banking or connectivity. As revolutionary a change as this has been, it has not been effective or sufficient in reducing the cost of financial intermediation or achieving financial inclusion. This is the challenge for the traditional financial services sector.

Technology firms are successfully leveraging data from messaging, e-commerce, social media and other internet services to personalize customer experience, provide new services and achieve operational efficiencies. They are thriving because they are technologically savvy, unburdened by stringent regulations, more efficient in their services and offer lower costs. Recent disruptive innovations in finance include crypto-currencies, digital trade advisory, peer-to-peer lending platforms and innovative payment systems. As a result, there is a need to upgrade the existing regulatory framework to meet the challenges of a new age financial sector without dampening innovations. The Internet and Mobile Association of India (IAMAI) and Pahle India Foundation (PIF) have come together for this report to recommend an augmented regulatory roadmap.

This report has taken into consideration recommendations of other committee reports and has gone a step further. This report is a result of extensive primary and secondary data collection and stakeholder interviews. This report not only makes recommendation on specific changes to existing regulations and processes but has emphasized on the need for a philosophical change in regulatory thinking. Our recommendations on RegTech, regulatory sandboxes, and policy formulation based on risk based regulation rather than entity based regulation are all cases in point.

FinTech is a young sector in India and its future is critically dependant on support from the regulatory regime. The challenge for regulators is to conceptualize and implement these possibilities, in a seamless manner. We hope that through this report we have provided policymakers with workable recommendations for creating an agile and avant-garde regulatory framework for the sector.



**Subho Ray**

President - Internet and Mobile Association of India

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# List of Abbreviations

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INR	Indian National Rupee
RMB	Chinese Renminbi
USD	United States Dollar
AFS	Australian Financial Services
AIF	Alternative Investment Fund
AML	Anti Money Laundering
API	Application Programming Interface
ASIC	Australian Security & Investment Commission
BI	Business Intelligence
BoE	Bank of England
CBK	Central Bank of Kenya
CCK	Communications Commission of Kenya
CIS	Collective Investment Scheme
ECPs	Equity Crowdfunding Platforms
FCA	Financial Conduct Authority
FDI	Foreign Direct Investment
FLS	Funding for Lending Scheme
GDP	Gross Domestic Product
IAMAI	Internet and Mobile Association of India
IDF	Israeli Defence Forces
JAM	Jan Dhan - Aadhaar - Mobile
JOBS	Jumpstart Our Business Startups Act
KYC	Know Your Customer

## List of Abbreviations

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MAS	Monetary Authority of Singapore
MDR	Merchant Discount Rates
MPOS	Mobile Point of Sale
MSME	Micro, Small & Medium Enterprises
NALs	No Enforcement Action Letter
NBFC	Non-Banking Financial Company
PIF	Pahle India Foundation
OECD	The Organisation for Economic Co-operation & Development
PAN	Permanent Account Number
PBOC	The People's Bank of China
PFM	Personal Finance Management
PFM	Personal Finance Management
POS	Point of Sale
PRA	Prudential Regulation Authority
RBI	Reserve Bank of India
ROI	Return on Investment
RRPs	Recovery and Resolution Plans
SEBI	Securities and Exchange Board of India
SEZ	Special Economic Zone
SME	Small & Medium Enterprises
UI	User Interface
UX	User Experience
WEF	World Economic Forum



# Executive Summary

Financial services have seen a tectonic shift, across businesses, technology, engagement, regulation and services. This sector, which was once monopolised by banks and NBFCs is undergoing an exercise of systematic unbundling, facilitating specialised players and market evolution. Prior to the Jan Dhan initiative, 60 per cent of Indians were unbanked and 90 per cent of small businesses did not have access to formal financing. As 75 per cent of Indians own mobile phones today, it is clear that digital banking will outperform web banking. Well-intended drive towards Jan Dhan, Aadhaar, along with a financial system strongly integrated digitally on Mobile phones, forms the JAM trinity, through which members are expected to bank the unbanked in the most cost-effective manner; and financial businesses are leveraging technology to meet this objective. FinTech is a matter of natural progression for India.

FinTech has resulted in a large number of Tech-based startups successfully disrupting the traditional financial landscape. With high service standards, lean operating structure and digital technology at the helm, these players are setting new benchmarks in customer acquisition and user experience. This has not only caused positive disturbances in the FinTech space, but has also brought about an intrinsic change in the way banks operate.

On one hand, banks have scale and risk management expertise. On the other hand, FinTech firms have innovation and disruptive thinking. Therefore, it is wiser for the two actors to collaborate than compete. Coupling ease of operations with sustainable business models could

be seen as the best of both worlds, and as a means of co-existence by both the actors.

The FinTech ecosystem can be classified into four categories; namely Payments, Personal Finance Management, Lending, and Technology. These may engage with each other to give rise to innovative products and services.

## Payments

The Payments use case caters to three types of customers; Government, business, and individuals. It can facilitate flow of funds in any direction to any of them. This perpetuates the need for standardization, interoperability, merchant management, and sustaining customer experience.

## Personal Finance Management

Technology today allows one to track one's finances and financial planning more effectively. This vertical also caters to insurance products, which are gaining increasing importance with changing lifestyles and evolving needs of the common man. InsurTech found a latent audience, which the insurance players have thus far not engaged with on account of regulatory restrictions, high distribution costs and high investment requirements. Changing customer habits, Big Data and injecting InsurTech into traditional business models will help financial service providers attain greater heights.

## Lending

Online lending platforms have been able to meet the need for timely credit using technology and innovation. Quick turnaround time, flexible loan

repayment terms, algorithms that use social media behaviour, culture, lifestyle, spending habits among other tools to compute credit worthiness enable FinTech firms to provide timely credit to businesses and individuals compared to traditional institutions.

Platforms and algorithms, that match lenders to a single/syndicate of borrowers are called Peer-to-Peer (P2P) networks. However, P2P lending platforms do not have a robust regulatory framework. Notwithstanding this, peer-to-peer lending in India is expected to grow to USD 5 billion and online lending market is expected to grow to USD 9 billion in the next three years.

### Technology

Technology is being used extensively for credit scoring by FinTech firms. Globally, credit history is used as a critical variable to make decisions. Unfortunately, this serves as a tool of exclusion, counterintuitive to the very idea of financial inclusion. This highlighted the need for an alternate credit scoring model which would take into account variables such as behaviour, willingness, ability, social media, cultural preferences etc. Technological innovations today allow for all these factors to be considered for financial decision making process. Similarly, technology is playing its part in customer acquisition, innovative risk modelling, mitigating cyber lapses through encryption, block chain for data storage etc. While fully recognising the importance of Government projects such as JAM, this report also recognises that Government entities alone cannot not fulfil the task of financial inclusion. Private sector participation and startups must be encouraged. It is also important that there is semblance of regulatory parity between all market participants.

### Regulatory Roadmap

Indian policymakers have a challenging task at hand. They have to identify the specific needs for India, and work towards eliminating the corresponding regulatory hurdles. Key ingredients to develop a FinTech ecosystem include talent (financial acumen, technical know-how, and entrepreneurial bent), funding (seed capital, venture capital, public capital), demand (consumer, enterprise, financial institutions), enabling regulatory regime, and infrastructure (connectivity, digital inclusion, digital identity, data). Policymakers will need to rank and prioritize the ecosystem based on these variables.

For FinTech startups to continue to grow, they need to engage with financial sector regulators and policy makers that minimizes economic and financial risk without increasing regulatory cost.

- The Payments space needs to be addressed from the point of view of infrastructure sharing, distribution, and products on the supply side while ensuring adequate interoperable access, connectivity, and usage on the demand side.
- A macro prudential regulatory framework should be one that regulates risk and not the entity. This calls for a philosophical shift in rule making.
- Interoperable and digitised Centralized KYC (CKYC) will allow single number/verification for all purposes for the service provider and the customer can aid in cutting down a lot of paperwork and duplication for financial services and technology companies.

- The principles behind regulatory sandboxes can be unbundled and enhanced by introducing the concepts of Minimum Regulatory Obligations, while Recovery and Resolution Plans (RRPs) should be adapted to fit startups. This will lend the much needed regulatory support to innovation.
- The speed of FinTech innovation warrants not only that RegTech be used to make financial regulation more effective and affordable, but also, that RegTech be used to reconceptualise and redesign financial regulation in line with the transformation of financial market infrastructure.

# 1. Introduction

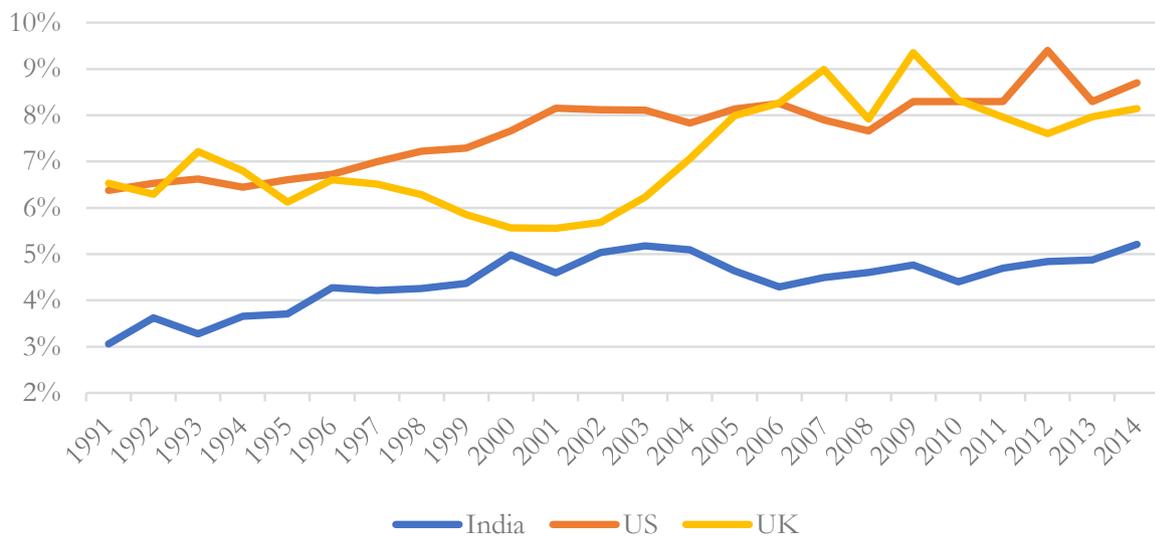
## 1.1 Cost of Financial Intermediation

Banking has been the most profitable sector for the last many centuries. From the time of the Medici in Florence to the House of Morgan in 1900 well into the 21<sup>st</sup> century. During this time, many industries have arisen and fallen. Emerging technology and technology landscape evolution is finally pressuring banks to change their ways or risk bank branches becoming a relic of a bygone era.

The role of financial services is to produce, trade and settle financial contracts that can be used to pool funds, share risks, transfer resources, produce

information and provide incentives.<sup>1</sup> Banks accept deposits from customers and then use that money to make loans, buy securities and provide other financial services to its customers. In addition to the intermediation of funds and financial assets, a bank also provides payment, asset management and other related services. It collectivizes and manages both, liquidity and risk. For these services, the income received as fees and spreads by financial services firms can be termed as the cost of financial intermediation. The cost of financial intermediation affects the cost of funds for all other firms in an economy.

**Figure 1.1: Share of Financial Services as a per cent of GDP**



Source: World Bank

<sup>1</sup> [http://archive.nyu.edu/bitstream/2451/31370/2/Finance\\_Efficiency.pdf](http://archive.nyu.edu/bitstream/2451/31370/2/Finance_Efficiency.pdf)

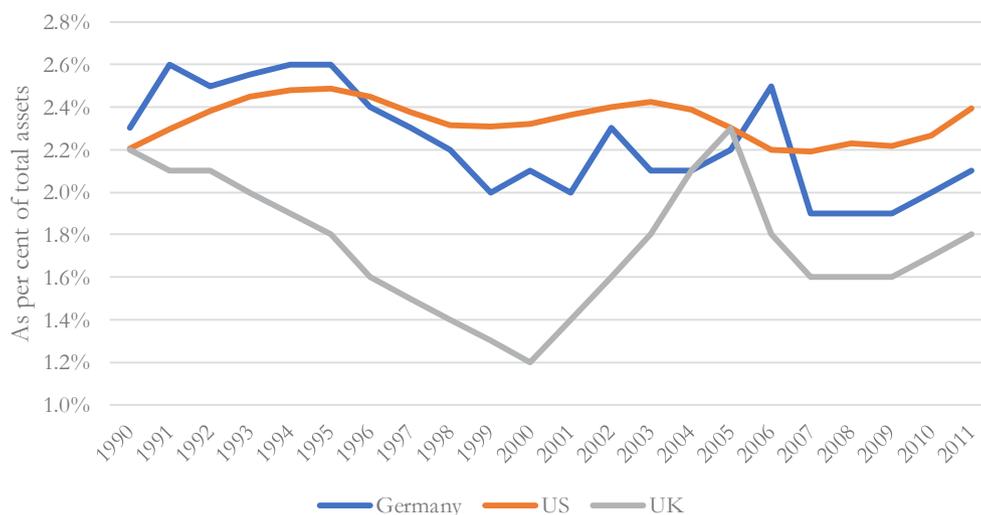
**Figure 1.2: Basic Banking Model**



The cost of financial services is the sum of returns to savers and the cost of intermediation. The cost of intermediation is the ratio of the income of financial intermediaries to the quantity of intermediated assets. The income to financial services compensates for managing duration and credit risk, wages and others (including trading profits, asset management fees etc.). Savers and borrowers are all heterogeneous. The composition of borrowers affects the cost of intermediation, while improvements in financial intermediation reduces cost of intermediation and provides access to credit to borrowers who were previously priced out.

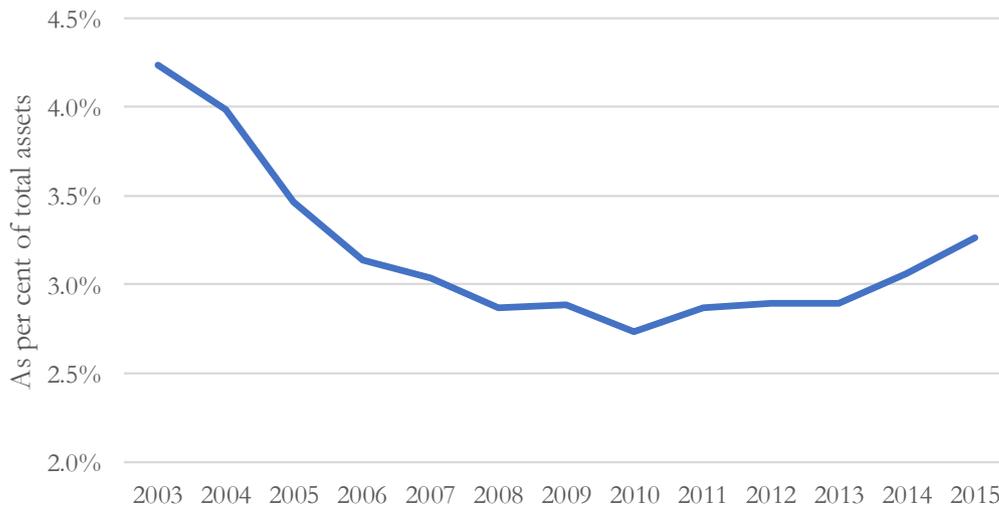
Average cost of financial intermediation has been around 1.87 per cent of the transaction size in the United States of America. However, despite advances in information technology and changes in the financial services industry, the unit cost of intermediation has not decreased significantly in recent years. Similarly, the unit cost of banking in other developed countries has not declined. The cost of financial intermediation in Germany and United Kingdom has also varied between 1.5 per cent to 2 per cent through the last century. (Bazot, 2013). This implies that the increased revenue from efficiency gains has been absorbed by the financial

**Figure 1.3: Unit Cost of Financial Intermediation**



Source: *Financial Consumption and the Cost of Finance: Measuring Financial Efficiency in Europe (1950-2007)*

**Figure 1.4: Unit Cost of Financial Intermediation (India)**



Source: *Financial Consumption and the Cost of Finance: Measuring Financial Efficiency in Europe (1950-2007)*

services firms as profits, and not been passed to savers (in the form of either higher returns) or borrowers (in the form of lower borrowing costs).

## 1.2 Unbundling of Financial Services

As a result of regulation and to increase capital efficiency, banks have been unbundling their bouquet of services. Like in other industries, unbundling of financial services was done in response to increasingly complex regulations and investor demands, which consequently lead to increase in efficiency and profits. This started in the early 1990s when products were placed in silos (cards, home loans, personal loans, auto loans, etc.). Unbundling resulted in individual profit and loss by business line, thereby improving product management and marketing focus, efficiencies, and profitability. Unbundling has led to greater

efficiencies and products like housing loans, cards and has driven the commoditization of personal loans.

Unbundling has also laid the foundation of the current round of disruption that is being caused by FinTech companies. Banks have complex operations and are focused on managing risk and compliance. They lack the flexibility of startups. There is not a single business unit in a bank that is not being challenged in some form or fashion by a startup from outside. Online lenders, for example, are offering an alternative for small business owners who otherwise wait for weeks to get a bank loan. By looking at different data points and evaluating a business' financials in a more systematic way, new lenders are able to lend to people within a few hours, whom banks would otherwise not deem creditworthy. This efficiency does make a difference.



FinTech companies are broadening the type of product offerings focused on money management and building wealth today, from robo advisors like Betterment and WealthFront to automated savings tools like Digit, Seed, and QCapital.

Technology companies cannot compete directly with banks on the whole gamut of financial services they provide but they are now pressuring banks to become more efficient by targeting specific services provided by banks. FinTech covers digital innovations and technology-enabled business model innovations in the financial sector. Disruptive innovations in finance includes crypto-currencies, digital trade advisory, peer-to-peer lending platforms and innovative payment systems. Hundreds of startups now offer easier ways to pay, save and borrow for consumers. They take advantage of being more technologically savvy, unburdened by stringent regulations, more efficient in their services and offering lower costs.

Disruption in banking sector is coming later than other areas because of the complexity of the regulations and the amount of trust required. Given how much consumers dislike the opacity of banks, FinTech companies have found a steady stream of consumers willing to try out their services.

Financial services are ripe for a disruption where technology firms leverage data from messaging, e-commerce, social media and other internet services to personalize customer experience, provide new services and achieve operational efficiencies. The emphasis is on acquiring customer data to support other revenue streams like lending, insurance and investments. With their business under threat, financial services players are responding with their own competing products and are increasingly collaborating with FinTech firms to leverage new technologies and business models.

## 2. FinTech Business Models

Figure 2.1: Financial Ecosystem



Attracted by the high profitability of financial services, a lot of technology companies have started to target financial services for disruption. The financial ecosystem can be divided as in Figure 2.1

FinTech companies usually have ease of operations as the main selling point. Stripe was one of the first FinTechs to dramatically accelerate and improve the process followed by merchants to accept online payments. While legacy payments companies needed five to seven days to set up a new merchant, Stripe gave merchants the chance to launch a website and start accepting payments within minutes.

Another business model involves a large technology company expanding into financial services. China's Alibaba and eBay-PayPal are the best-known examples of this model, both started as major e-commerce sites and have now moved into financial products. Alipay boasts of more than 800 million registered users.

A third business model involves an established financial company creating its own FinTech unit. For example, Ping-An Insurance Company of China, China's largest insurer by assets, launched a peer-to-peer service, Lufax, in 2012, which is now valued at almost USD 19 billion. PayPal, which started as a payment system for online purchases and was acquired by eBay, has now diversified to providing instant lines of credit and mobile applications that locate nearby stores and restaurants that accept payment by PayPal.

We next look at the various product lines where FinTech companies are making a dent via more efficient services or creating new products. We will try to analyse the economics of the product line which would give us an understanding of the drivers of disruption and the scope of adoption by consumers.

## 2.1 Payments

### Mobile Point of Sale (POS)/payment processing

POS is a device that functions analogous to a cash register. In India, the average number of annual transactions per POS terminal are estimated to be around 1,700 in 2016. However, the average transaction size is INR 3,100 (credit card) and INR 1,300 (debit card)<sup>2</sup>, indicating that these transactions are higher than the typical retail transaction size. Total number of POS transactions in India is around 10 per cent of total ATM transactions, which leaves a significant untapped market for players. Some of the factors that slowed growth of POS in India are low spreads for merchant acquirers and resistance to adoption of technology.

With increase in internet penetration, growth in modern retail channels, political will to digitize transactions, and low MDR on debit cards, POS market is expected to see higher demand in the near future. POS devices need to be cost effective, for retailers to realize economic benefit of transactions. Incentivizing customers to swipe cards, addressing security concerns of both merchants and customers could accelerate adoption of POS and develop the market in a unified way.

Small customer acquisition is a low value proposition for banks. Cost of POS device is a barrier to adoption for small merchants (MasterCard, 2015). With newer technologies, POS machines have been miniaturized to work on smart phones. Companies like Square and Triangle (eBay) were the first to come up with the idea of replacing the bulky bank provided card readers. In India, companies like

Paynear and others have similar products to enable merchants to have cheaper access to POS devices.

## 2.2 Cross-border Transactions

E-commerce has made the business world a much smaller place much like communication technology which made the world a smaller place for people. Whether it is buying goods like iPhone from China or outsourcing of labour, it can be achieved at the touch of a button. Cross-border e-commerce is now achievable for even the smallest of businesses, which can now expand rapidly on an international level, making the potential for growth almost endless. Similarly, in 2015, the total remittances across the world amounted to USD 582 billion.<sup>3</sup> The key enabler for all of this is was payments. All these transfers happen via the SWIFT network which is a messaging service for banks. This results in many-to-many payment networks which are inefficient, in both cost and time.

The total remittance market to India was USD 69 billion in 2015. An average transfer from US to India currently costs on an average 3.58 per cent of the transaction, excluding Government taxes and takes 3 to 5 days (World Bank, Remittance). In a world of instant messaging this is inefficient.

The biggest players in this market apart from banks are Western Union and Money Gram. Companies like TransferWise, Earthport, Remit2India are disrupting this market and making it seamless. TransferWise is working to set up a peer-to-peer forex netting network whereas Earthport is trying to replace the many-to-many banking network with a more robust and centralized many-to-one system.

<sup>2</sup> <https://rbi.org.in/scripts/ATMView.aspx?atmid=77>

<sup>3</sup> <https://www.weforum.org/agenda/2016/11/migrants-sent-half-a-trillion-dollars-home-in-2015-these-maps-show-where-the-money-went>

## 2.3 Personal Finance

Robo advisors are investment management services, that run without any human intervention. Robo advisors are rapidly becoming the biggest disrupter in the investment space. Their growth can be attributed to a generation of investors who preferred the digital medium to an offline financial manager. Robo advisors are present across trading, investment, portfolio rebalancing and tax saving products.

Robo advisors being digital algorithms are cost effective for small investors who are not willing to pay a high portfolio management fee, or unable meet minimum investment requirements of advisory firms. Robo advisors charge operating fee of around 0.25 per cent of portfolio size, much lower than the charges of around 1 per cent levied by global asset management firms. Also, since algorithms are devoid of many human biases, they elicited higher trust in real time decision making.

Robust business intelligence coupled with ease of use and low management fee has caused disruption in the wealth management space, causing traditional advisory firms to leverage technology and deliver competitive returns. Some traditional firms also envisage robo advisors becoming an integral part of their business operations, while human interface would be used for customer acquisition and service.

RBI Data suggest that currently, almost 44 per cent of savings in India are in the form of fixed deposit. As Indian financial markets develop and increase their customer base, robo advisors will be adopted by most financial advisory firms, in varying degrees, to serve their clients. Business Intelligence forecasts that robo advisors will manage USD 8 trillion in global assets by 2020.

Capital market regulator Securities and Exchange Board of India (SEBI) has proposed rules to monitor robo advisors. This is a positive sign, as the regulator has recognized robo advisors as a part of the investor advisor community. SEBI appreciates potential of robo advisors to contribute to development of markets and investor education. SEBI has ensured transparency, and stringent compliance requirements, all of which steer towards consumer protection and minimizing fraudulent practices. This will bolster investor confidence, lower costs, with the potential to provide universal access to entry-level and affordable financial advisory services.

In India, DBS wealth advisors is based on artificial intelligence. Many new entrants and traditional broking firms have launched robo advisor services in India such as Aditya Birla Money's MyUniverse, BigDecision, ScripBox, Arthayantra, FundsIndia and 5nance.

## 2.4 Lending

### 2.4.1 Online Lenders

Technology has been a boon for consumers and businesses who need loans fast. Online lending platforms are attracting individuals and small businesses by providing a fast and efficient alternatives to lengthy application and approval processes at banks and NBFCs.

In India, SME lending market is worth around USD 300 billion and digital lenders are expected to constitute 10 per cent of it.<sup>4</sup> Common products offered include term loans, inventory financing, line of credit.

Online lending platforms are characterised by:

<sup>4</sup> <http://techstory.in/lending-market-india/>

1. Time bound turnaround which ranges from 24 hours to 72 hours; much faster than the weeks taken by banks
2. Flexible loan repayment terms to suit the requirements of the borrower
3. Use of algorithms to assess a borrower’s credit profile
4. Sources of funds range from banks, NBFCs to venture capital

Key players in this industry operate on one of the following business models:

1. Balance Sheet Lenders: keep loans on their own balance sheets and are required to obtain an NBFC license to undertake lending activities. Balance sheet lenders typically have two main sources of revenue:
  - a. Interest income and fees on loans

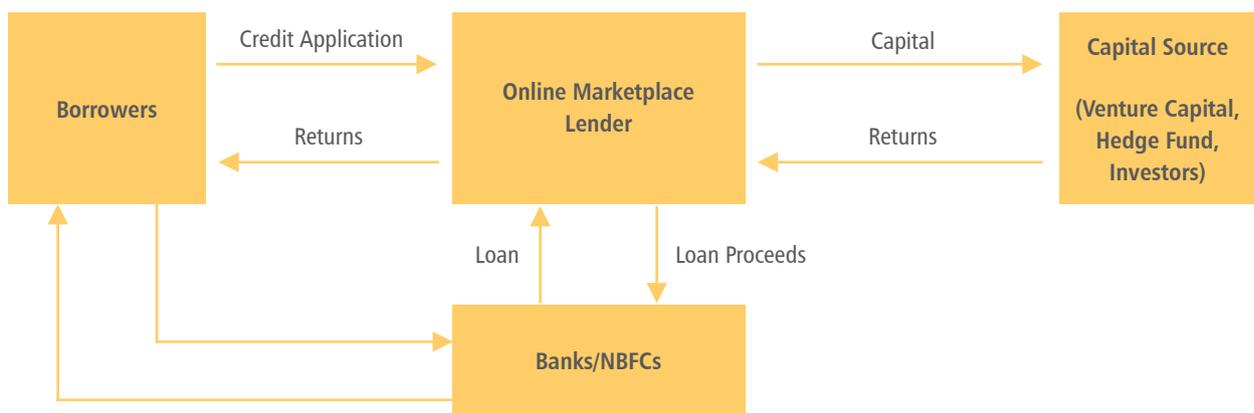
- b. Fees for servicing loans that are sold to third-parties
2. Platforms: provide a marketplace where other institutions can originate loans. They generate revenue through a service fee for of matching the lender and borrower. Platform lenders thus do not manage any credit risk. One of the notable advantages of online lending is its ability to reach borrowers across market segments using technology. Online lending platforms provide financial institutions with an opportunity to expand their customer base, without incurring additional expenditure. Distribution partnerships may be based on referrals, co-branding etc.

Online lenders are evolving their business models, to suit the needs of both customers and investors

**Figure 2.2: Direct Lender Model**



**Figure 2.3: Platform Lender Model**



alike. Their core competencies are in data driven credit assessment, seamless technology, absence of geographic barriers, and faster turnaround time lend much-needed operational efficiencies vis-à-vis banks. However, it must be noted that most of these players are yet to prove their mettle through a complete credit cycle, both in terms of managing credit risk and proving business model.

As most players are exploring ideas and products that will grow the market, it is opportune to comment on the role of financial regulatory framework to perpetuate access to credit, as well

as manage risks. Some of the broad issues that need policy intervention are consumer protection, small business interests, cybersecurity, and data confidentiality.

### 2.4.2 Crowdfunding

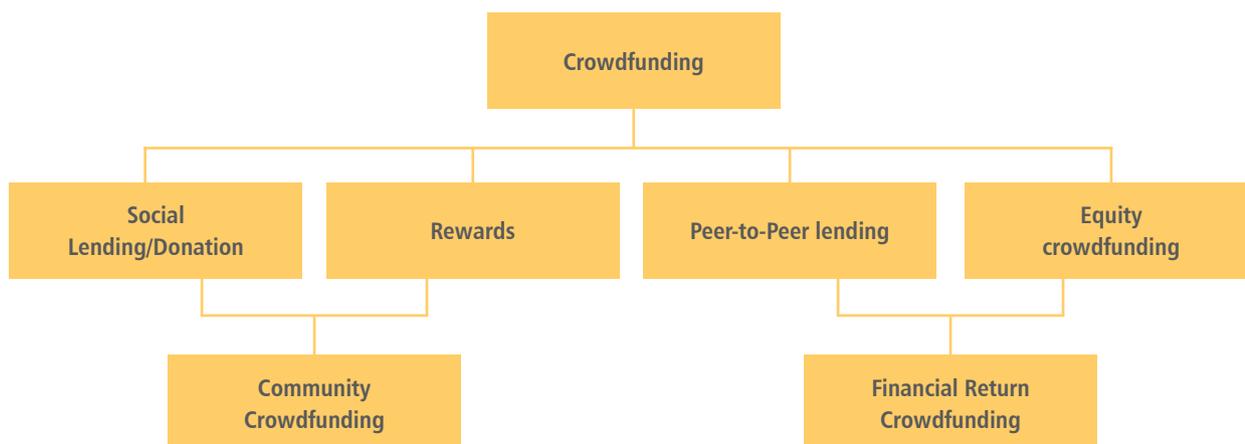
Crowdfunding is a method of collecting funds from multiple investors (typically through an online platform) for onward lending. Crowdfunding maybe broadly classified into four name categories, namely donation crowdfunding, reward crowdfunding, peer-to-peer lending and equity crowdfunding.

**Table 2.1: Examples of Online Lenders in India**

Company	Rate	Tenor	Approval time	Products offered
Capital Float	18%-30%	Up to 3 years	3 days	<ul style="list-style-type: none"> <li>• Customised loans for small businesses</li> <li>• Car loan</li> </ul>
Instakash	18%-24%	Up to 2 years	72 days	<ul style="list-style-type: none"> <li>• Customised loans for small businesses</li> <li>• Car loan</li> </ul>

Source: Compiled by authors from respective websites

**Figure 2.4: Types of Crowdfunding**



Crowdfunding has been considered and explored as a viable financing option across the globe by startups for lending to SMEs and projects that may not be able to meet all the requirements of a bank. As banks tightened lending standards post the financial crisis in 2008, startups, SMEs, social projects and other high-risk ventures found it increasingly difficult to access funds. Crowd funding arose and provided an alternate source of financing, whereby the borrowers did not have to meet the rigorous bank loan requirements. It also provided investors an attractive opportunity to diversify their investments and earn higher returns.

While crowdfunding is an extremely attractive proposition for both, potential borrowers and lenders, it has certain innate risks.

1. Individual investors may not be aware of the specific project risks
2. Lack of historical data
3. Loans are unsecured and uncollateralized without recourse for the lender
4. Information asymmetry due to dependence on soft information and lack of monitoring
5. Crowdfunding is agnostic of the physical location of the lender or borrower. This may result in violation of local laws
6. Systemic risks of crowdfunding include:
  - a. Investors not diversifying their portfolio
  - b. Absence of a secondary market, renders the investment illiquid
  - c. Cross border capital flow and AML implications

SMEs have traditionally found it difficult to access credit in India. This creates a need to encourage alternative ways of raising funds, that would cater to the sector. With increase in adoption of crowdfunding as a source of credit, there is a

need for policymakers to formalize a framework that would manage systemic risks but still permit economic needs of potential borrowers to be met.

Key trends that contributed to the growth of crowdfunding in these nations include:

1. Transparent regulatory framework
2. High penetration of technology and social media
3. Guidelines to protect consumers and borrowers
4. Opportunities for entrepreneurs to stage their plans and reach out to investors through incubators, universities, competitions

These factors fostered trust in digital transactions, critical for investors to venture into early stage projects.

Challenges to growth and adoption of crowdfunding in India are:

1. Lack of trust in online platforms and ineffective consumer/lender protection
2. Low confidence in digital interaction

Absence of regulatory endorsement increases the risk associated with crowdfunding. SEBI has expressed discomfort with crowdfunding, since it believes digital Equity Crowdfunding Platforms (ECPs) are not under the purview of any securities market regulation. SEBI has cited lack of minimum capital requirement norms and low consumer protection as areas of concern, that make ECPs free of any barriers. These concerns are in line with those that lead to Jumpstart Our Business startups (JOBS) Act in USA. SEBI proposes to set up regulations for transactions that involve sale of securities under Collective Investment Schemes (CIS) or Alternative Investment Funds (AIF).

To ensure crowdfunding contributes meaningfully to economic growth, there is need for regulatory

protection and investor education. With increase in size and reach of crowdfunding, instances of frauds and laundering will need to be managed on technology, social, cultural and regulatory fronts.

### 2.4.3 Peer-to-Peer Lending Platform

Peer-to-peer (P2P) lending is a combination of crowdfunding and market place lending that uses the internet to connect investors with potential borrowers. On peer-to-peer lending websites, potential borrowers apply for credit and receive a credit rating. Investors can select the borrower based on the details listed on the P2P platform and then choose to fund the loan, partially or wholly. P2P lending is being viewed as a viable financing alternative for personal loans and small businesses considering that the application process is relatively less stringent compared to banks.

P2P allows access of credit to those businesses that may not otherwise have been able to access capital through traditional routes. Since these loans are unsecured and lenders have little or no access to recourse debt, they carry higher interest rates than banks.

Borrowers are incentivized to use P2P on the back of decreased application time, a significant barrier to credit. Reduction in application turnaround is of

higher importance to small businesses compared to their large counterparts, that may already have financiers in waiting. Banks entail significant fixed costs in the process of extending business loans including those associated with underwriting, servicing, and collection which makes smaller loans particularly challenging. Moreover, the risk of lenders discriminating borrowers based on personal characteristics is almost nil as there is anonymity between the two parties. P2P lenders are encouraged to mitigate their risk, by diversifying their portfolio across loans based on size, sector, and repayment terms.

In India, the P2P lenders broadly focus their portfolio under the categories of micro finance, consumer loans and commercial loans.

On average P2P lenders are more expensive than personal loans offered by banks. This is due to the credit profile of borrowers who are unable to borrow from banks or need to access funds fast. Some of the advantages of P2P lending, compared to institutional lenders (Banks/NBFCs) are:

1. Low cost of operations
2. A superior customer experience, driven by speed and convenience

**Table 2.2: Examples of peer-to-peer lenders in India**

Company	Rate	Tenor	Fee (INR)	Penalty	Approval time	Average ROI
Loanmeet	12% to 30%	3 to 36 months	1,000	2%	Within 24 hours	21%
Faircent	12% to 30%	6 to 36 months		2%	24-48 hours	22%
I2Ifunding	12% to 36%	3 to 24 months	100	2%		30%
LenDenClub	12% to 30%	3 to 18 months	1,500	2%+ penalty	18 hours	23%
Lendbox	12% to 36%	3 to 36 months	1,500	2% + penalty		36%

Source: Compiled by authors from respective websites



3. Use of algorithms for credit scoring
4. An ability to match the appetite of borrowers and investors for both risk and duration

However, whether these advantages are material enough to disrupt bank's core lending activities remains to be tested. One of the immediate challenges of P2P lending is its uncertain regulatory future. There have been arguments both for and against regulating P2P activities in India (RBI, 2016). P2P platforms are vulnerable to liquidity risk, that may arise in the event of an unprecedented exit from investors. Also, operational risk and consumer protection, are two areas that need attention of policy makers.

It may be debated that P2P lending platforms are different from NBFCs and thus a similar regulatory framework may hamper their business activities. Peer-to-peer lending has the potential to change the landscape of small business financing for the better. In order for this to happen, financial regulations must reflect the need for investor protection and simultaneously allow small businesses to access the capital that many individuals are willing to provide—no small task.

## 2.5 Personal Finance Management (PFM)

Personal Finance Managers help users track and manage their savings better. Keeping track of expenses and investments allow an individual to plan for their future lifestyle, and economic contingencies. Insufficient savings can result in reduced lifestyle or frequent borrowings.

“Financial planning is a process of planning and managing your money (current finances) to meet your life goals. Your current finances would mean

everything that constitutes your money today— income, expenses, savings, assets and liabilities. Your life goals could be higher education, buying a house, planning for retirement, saving for marriage/ child's education. Proper and timely planning of your personal finance is important to achieve financial security throughout your life cycle, and to build wealth.”<sup>5</sup>

Conventionally the retail banking industry was able to meet needs of a consumer, by keeping track of savings and investments. However, with the influence of technology, needs of consumers have moved beyond realms of traditional instruments. The banking infrastructure is not designed to support agile systems that would capture customer insights, and assist in decision making, the way certain digital platforms deliver. These digital PFM solutions provide personalized customer engagement across social platforms at reduced costs of operations.

Examples of PFM solutions in India include Mvelopes, Money View, Officetime, Good Budget, Wally, Mint, HomeBudget.

## 2.6 Insurance

Insurance is one of the backwaters of finance. It is extremely specialized and highly regulated and hence probably the last area of finance to digitize. InsurTech firms have started to prosper because the insurance industry has not been in too much of a rush to modernize when compared to the rest of the financial services industry. This is due to multiple factors, such as capital requirements, complex regulations, and high cost of distribution.

InsurTech is viewed as an alternative to conventional insurance operations mainly on account of:

<sup>5</sup> [https://rbi.org.in/FinancialEducation/content/1%20Can%20Do\\_RBI.pdf](https://rbi.org.in/FinancialEducation/content/1%20Can%20Do_RBI.pdf)

1. **Changing Consumer Requirements:** Consumer requirements have undergone change with advent of e-commerce and increasingly digital lifestyles. InsurTechs have stepped in to provide insurance for risks that arise.
2. **Operational Efficiencies:** InsurTechs are focusing on exploring new ways of doing business, which create efficiencies and reduce operational costs.
3. **Big Data:** The digitization of the world has created an immense amount of data on consumer transactions, social preferences and other habits. This has enabled companies to better assess risk.

Technology is expected to save around 10 to 20 per cent of distribution costs for life insurance companies, and around 20 to 30 per cent for non-life insurance companies. Moreover, technology is expected to drive new sales to the extent of 50 per cent in life insurance and 75 per cent in non-life insurance by 2020.<sup>6</sup>

Globally, InsurTech companies operate on one of the following business models:

1. **Disruptive:** Disruptive InsurTechs are licensed to underwrite and issue their own policies. These companies (such as Oscar and Lemonade) are more capable of taking business away from traditional players. Zhong An, China's first digital-only insurance provider that has already written 630 million policies since it launched in 2013.
2. **Enabling:** These businesses work in conjunction with legacy insurance companies to optimize

the traditional players' operations and help them reach customers through new distribution channels. Policybazaar and Coverfox are two large enabling InsurTech companies in India, that play the role of an aggregator, for both life and non-life segments, educating customers based on their needs and risk appetite.

Insurance penetration<sup>7</sup> in India was 3.4 per cent in 2015, compared to the global average of 6.2 per cent. India contributes 2.24 per cent of GDP to life insurance and 0.75 per cent to non-life insurance premium globally. Increase in FDI limits in insurance sector, tax rebates, and schemes such as Pradhan Mantri Suraksha Bima Yojana and the Pradhan Mantri Jeevan Jyoti Bima Yojana are a positive indicator for potential business opportunities in the sector.

The commission expense ratio of life insurance in India (commission as a percentage of insurance premiums) in March 2016 was 5.52 per cent. Whereas the operating expense ratio was 10.57 per cent. This amounts to an expenditure of approximately INR 39,000 crores while the total premiums were approximately INR 3.7 lakh crores.<sup>8</sup> This is the size of an underpenetrated life insurance market in India presenting a huge opportunity to any firm willing to seize the day.

The non-life insurance market (including health) in India is quite underdeveloped. The total premiums of non-life insurance amount to INR 96,000 crores. While the total commissions amounted to almost INR 6,000 crores and an operating expenditure of INR 23,000 crore.<sup>9</sup> The inefficiencies in this business make it ripe for disruption by big data.

<sup>6</sup> <http://www.swissnexindia.org/wp-content/uploads/sites/5/2016/10/Fintech-Report-2016.pdf>

<sup>7</sup> Insurance penetration rate = ratio of premium underwritten in a particular year to the GDP

<sup>8</sup> <http://www.assochem.org/newsdetail.php?id=6198>

<sup>9</sup> <http://www.pwc.in/assets/pdfs/ras/financial-services/compliance-cco-advisory-services/insurance/pwcs-insurance-insights-analysis-of-regulatory-changes-and-impact-assessment-for-march-2017.pdf>



Considering the insurance sector is highly regulated in India with high barriers to entry, most existing players in InsurTech are operating as brokers or marketplaces. FinTech firms not only benefit from ease of navigating regulatory hurdles, they also tap into risk assessment, pricing analytics and other technical know-how. With change in customer needs and business models, there is a need to assess existing insurance regulations for their relevance and role in developing market. As we espouse increased insurance penetration, the sector needs to attract investors and provide products that meet consumer requirements.

## 2.7 Other Technologies

### 2.7.1 Credit Scoring

One of the major sectors that has seen unprecedented new solutions leveraging big data is lending and credit scoring. For decades, credit scores based on basic financial transaction served as the norm for all credit activities in the financial services space. "80 per cent of Indians lack access to credit because we don't have a CIBIL Score"<sup>10</sup>, highlights the urgency for an alternate credit model. Big data credit scoring models leverage on sophisticated data-capturing and sharing capabilities, beyond the available quantitative data from banks and assess qualitative concepts like – behavior, willingness, ability, social media, cultural preferences etc.

Digital revolution, is expected to on-board "off the grid" individuals, a new customer segment that market players would be eager to tap and serve.

The growth in segments such as P2P Lending, SME Financing is a result of these innovative scoring

models. Market players such as Credit Sesame, Faircent, OnDeck, Kabbage, LendingClub, Prosper, use these credit scoring models for their core business operations.

Creditvidya provides underwriting services for first time borrowers using more than 10,000 data points. Credit Sudhaar and Credit4Loan help clients improve their credit score, increasing their chances of getting access to formal credit.

### 2.7.2 Customer Acquisition

The cost of acquisition drops drastically for customer acquisition when we compare the physical to digital channels providing huge benefits to both financial services firms as well as startups. Place – one of the four Ps of marketing – has been dominated by the digital channel by both customers and clients. Increasingly, the customer's behavior to use digital channels coupled with low-cost advantages for clients (especially in financial services) makes this a major focus area. Leveraging big data, financial services are moving to digital channels to acquire customers. The growth in number of offerings which are moving online – direct investment plans, online savings/deposit account opening, automated advisory services – provides a clear indication of the importance of digital channels for financial services.

Analytic solutions that combine historic transactional data coupled with external information sources increase the overall conversion rate. Many financial services firms partner/acquire/invest in startups and growth-stage companies, and are actively pursuing these services. Firms are effectively leveraging these solutions to increase the cross-sell and upsell opportunities, understanding customer requirements and

<sup>10</sup> <http://www.creditvidya.com/>

providing customized packaging. Card-linked offers, customized reward solutions are some of the offerings that are being provided by FinTech firms.

### 2.7.3 Risk Management

Predictive analytics that utilizes device identification, biometrics, behavior analytics, etc. are major driving factors for better risk management solutions in the fraud and authentication space. Firms that execute well on eradicating vulnerable access points would benefit not only in terms of lower losses but it also increases stickiness to their solutions. Apart from banks' own initiatives, various regulations are also enforcing rules that make it vital for banks to store and manage more information about payments. Hence, apart from just storing this data, banks look at building powerful algorithms that mine this data and provide actionable insights.

### 2.7.4 Cybersecurity

FinTech companies provide a wide range of services, increasing reach and flexibility, on the back of innovation and technology. FinTech is expected to be a catalyst for providing access to financial services to a large number of people, who were otherwise excluded. The unprecedented rate of growth of FinTech is highly dependent on the security measures taken by these companies to protect data, maintain client confidentiality, and manage frauds. Risk is an inevitable trade off, that has the potential to cause immediate financial losses, dampen consumer confidence and eventually impact adoption of FinTech.

Cybersecurity is an area of immediate concern considering the exponential increase in digital penetration. The number of FinTech companies have increased manifold in a very short span of time and there is a possibility that regulations may not be

able to cover the gamut of possibilities that pose a security risk. Moreover, first time users of financial services would be vulnerable to frauds and even one-off instances of security lapse could erode trust amongst large groups or communities of users.

### 2.7.5 Blockchain

The blockchain is a distributed ledger where records of payment were kept. A major factor for innovation in the payment space is the emergence of permission-less platforms enabled by public blockchain. These have laid down the road for replacement of traditional centralized systems. As a probable list of use cases - bitcoins, remittances, micro transactions, financial inclusion, gold trading and record of asset ownership - are a few key near-term applications of blockchain that could be expected in India.

Bitcoin started as a payment network in 2009 and has gained a lot of traction since. This has become the basis of a lot of research and the technology has led to a lot of novel solutions to many problems from payment systems to digital ledgers.

Bitcoins use a system of digital signatures, hash functions, and time stamps to track their exchange and ownership in the system.

A bitcoin is not denominated in any national currency. Its basic unit is 1 bitcoin. You can trade it for any value, even in fractions.

Bitcoins are gaining popularity in India, with multiple bitcoin exchanges like bitcoin.org, unocoin.com, and indiabitcoin.com permitting monetization of bitcoins in Indian currency. Consequently, it has attracted attention from RBI, which is expected to explore usage, holding and trading of bitcoins within the existing regulatory framework.



# 3. Challenges and Opportunities for FinTech

## 3.1 Payments

### 3.1.1 Interoperability Between Payment Systems

Interoperability between payment systems is crucial for the overall development and sustenance of payments ecosystem. Participants in a payment ecosystem may be categorized as:

1. Consumers
2. Merchants
3. Enterprises
4. Government

When the payments ecosystem is in its early stages, each enterprise aims to provide unique consumer experience. This results in coexistence of multiple processes and technology platforms in the market. As the ecosystem matures, and market share peaks out, players begin to explore ways to collaborate than compete. Thus, emerges a need for interoperability between systems.

Interoperability between payment systems is dependent on:

1. Market participation: Multiple players in the payment ecosystem should be willing

to coexist, collaborate and compete simultaneously, in an interoperable environment.

2. Regulatory framework: Payment systems need to be governed by a common regulatory framework which lays down guidelines for all market players that are willing to be a part of the interoperable payment systems. For example, data sharing, technology, reporting, compliance etc. The regulatory framework also ensures no market player has an implicit edge over others, keeping the competition intact.

### 3.1.2 Standardization

As discussed above, each market participant uses a unique combination of technology, processes, security, database design etc., to provide similar solutions to customers. As payment markets burgeoned in terms of both volume and value, need for payment systems that are channel independent and provide payment agility has emerged across both, consumers and players. Benefits accrued by way of standardization are expected to outdo the costs incurred in the process of standardization.

**Table 3.1: Use cases in Payments System**

		Payee		
		Government	Business	Individual
Payer	Government	Intra-Government transfers	Suppliers, utilities	Welfare, salaries
	Business	Tax, fees, permits	Suppliers, utilities	Salaries, benefits
	Individual	Tax	Almost all transaction	Remittances, gifts

Currently, there is partial standardization in the payment ecosystem. It is limited to credit cards and debit cards. Prepaid cards, mobile wallets and other payment solutions offered by non-banking entities do not operate on standardized protocols. Convergence of these payment systems by way of standardization would facilitate further integration of the payment ecosystem with the overall business ecosystem. This would eventually ensure seamless, affordable and reliable payments.

Interoperability<sup>11</sup> between payment systems can be achieved through:

1. Simple scheme interoperability: Market players agree to be a part of a particular scheme, and all transactions between participants of this scheme are interoperable. For example, electronic transfer of funds between banks.
2. Network interoperability: This involves two payment schemes, and an exchange rate is associated with a transaction between these two schemes. Network interoperability is typically applicable for cross border transactions.
3. Parallel System interoperability: This is an extension of single scheme interoperability. It permits one player to be a part of multiple schemes. For example, a merchant is permitted to undertake transactions across multiple platforms such as Visa and MasterCard.

Prerequisites to achieve interoperability between payment systems include standard settlement mechanism, a switch operator, pricing framework. Moreover, a set of regulations to expound the prerequisites are a must. Market players in Tanzania achieved interoperability by signing bilateral standards, without any explicit regulator monitoring the market activities.

Players in the pre-paid instrument market in India are in a similar position to Tanzania. They have comparable market share<sup>12</sup>, which incentivizes them to participate in an interoperable framework, and achieve economies of scale.

### 3.1.3 Revenue Through Merchant Discount Rates (MDR)

Of 1.06 billion electronic transactions through ATM and POS in July, 2017, 365.22 million are made using credit and debit cards.<sup>13</sup> These card-based transactions involve entail charges which the bank/ financial institution levies on the merchants for providing infrastructure. These charges are known as Merchant Discount Rates (MDR). MDR charged is dependent on volume and value of transactions.

One of the reasons frequently cited for India's weak payment infrastructure is MDR charges, which deter small size merchants. Moreover, card acceptance acquirers see little financial merit with lowering of MDR.

<sup>11</sup> [http://www.cgap.org/sites/default/files/Interoperability\\_in\\_Electronic\\_Payments.pdf](http://www.cgap.org/sites/default/files/Interoperability_in_Electronic_Payments.pdf)

<sup>12</sup> <http://www.nielsen.com/in/en/insights/reports/2016/the-smartphone-becomes-the-mobile-wallet.html>

<sup>13</sup> <https://rbi.org.in/scripts/ATMView.aspx?atmid=7>

**Table 3.2: Number of POS terminals and ATMs**

Country	POS Terminals	ATMs
India	2 million	0.2 million
Brazil	6.9 million	0.5 million
Russia	1.8 million	0.2 million
China	5.5 million	1.1 million

Source: Compiled by authors

RBI explored 4 options, to address concerns of both merchants and acquirers related to MDR (Card Acceptance Infrastructure – A Concept Paper, 2016).<sup>14</sup> These are:

Table 3.2 represents the number of POS terminals and ATMs in select countries as on 1 January 2017.

1. Uniform MDR across all merchants: RBI rationalized MDR charges by fixing an upper limit for debit cards.<sup>15</sup> While the low MDR charges were directed towards encouraging small merchants, there is no gainsaying that bigger merchants would stand to gain eventually. Also, low MDR would not address the financial concerns of acquirers.
2. Differentiated MDR for merchants: This approach aimed to balance the interests of small merchants and acquirers, by providing lower MDRs to establishments that provided essential goods and services such as utilities, public distribution systems, agricultural inputs etc. While this will certainly push expansion of infrastructure across certain categories, it is unclear how this would eventually translate to higher usage of cards in non-urban areas.
3. Differentiated MDR for merchants in Tier III to Tier VI locations: Expanding infrastructure to non-urban locations has been a continuous challenge. By providing favourable MDR to merchants belonging to certain categories (similar to the above point) in Tier III to Tier VI locations could ensure wider acceptance of cards for small size transactions. While this approach does incentivize small merchants in remote areas to adopt less cash business models, it does not spell out any motivation for the acquirer to deploy POS in remote areas.
4. Linking MDR to value of debit card transactions: This option would attract small merchants if the MDR is low. However, a low MDR would drive the acquirers away. Alternatively, an MDR that is financially viable for acquirers would make it unattractive for merchants. Even if a balance is achieved between the interests of both, the merchants and acquirers, cost of business, risk and resources consumed in training merchants and customers remain unaccounted for. A flat MDR up to a certain value and then linking the same to the transaction size would help protect merchant and acquirer interests.

<sup>14</sup> <https://rbidocs.rbi.org.in/rdocs/PublicationReport/Pdfs/MDRDBEDA36AB77C4C81A3951C4679DAE68F.PDF>

<sup>15</sup> Not exceeding 0.75 per cent of the transaction amount for value up to INR 2,000. Not exceeding 1 per cent for transaction amount for value above INR 2,000.

### 3.1.4 MDR on Government Transactions

The incumbent Government has time and again demonstrated its will towards shifting India from a cash based to a less cash economy. It can contribute towards this shift, by undertaking electronic transactions on every possible front. This will not only ensure higher penetration of electronic transactions, it will, over a period of time, be instrumental in changing consumer habits and increase transparency.

One of the issues discussed, in light of electronic government transactions is whether the government should bear MDR charges. There is a certain school of thought that believes the government should not bear MDR charges, as it does not hold an office of profit. However, in order to lead by example, it makes a strong case for the government to bear these charges.

Currently, MDR is borne by the customers in the form of surcharge or an overlay which discourages customers from participating in the electronic transactions. Once these MDR charges are transferred to the government, we will witness higher proliferation of electronic transactions. This will increase transparency, drive financial inclusion and eventually lead to a less cash regime.

### 3.1.5 Implications of MDR Regulations

The Committee on Digital Payments (Watal Committee Report, 2016) suggests rate of growth of POS deployment has reduced.

1. The objective behind regulating MDR is to ensure affordable POS infrastructure. This in turn is expected to expand the community of merchants, who provide for electronic transactions.
2. If MDR charges on debit cards continue to be lower than that on credit cards, it is likely that

merchants would prefer transactions using the former.

3. Lower MDR will discourage acquirers from investing in technology, provide maintenance and logistics support in remote areas.
4. Merchants who do not observe positive correlation of between electronic transactions and business growth, would pass on MDR to their customers, in the form of surcharge or convenience charges. Given the option of incurring additional charges for payment through cards, most customers would obviously choose to pay by cash.

Reducing MDR to nil is a lucrative option, to achieve the ambitious goal of less cash economy, at par with developed countries like Singapore and UK. However, this is not feasible, unless the Government bears the costs incurred by acquirers and issuing banks to develop and promote POS payment infrastructure at merchants of all size across locations.

In a recent ruling in the UK on MDR and Interchange the Commercial Court judge, Justice Popplewell announced that the fees were neither anti-competitive nor unlawful. The Court recognized the immense benefits that retailers derive from the payment system. In rejecting the retailers' claims, it found that MasterCard's interchange fees did not restrict competition and were necessary for the functioning of its payment system.

Today, many acquirers still bill merchants the same for a debit transaction as they do for credit, despite the very different economic value merchants receive for the different products and the costs to issuers. While the RBI has made this decoupling mandatory, there will be a need to ensure this is consistently implemented across the country and across all merchant sectors.

The MDR framework needs to take into account, the interests of both, small merchants and acquirers. Differentiated MDR, based on types of services, locations, size of transactions, volumes should be explored. Incentives such as rebate and cash back may be linked to electronic transactions undertaken by a merchant. We believe markets should be permitted to discover MDR through competition as opposed to the current practice. The interchange rate which determines the distribution of MDR between various intermediary service providers should be re-examined. Subsequently, the regulator can collaborate with merchants wherever required, and assist them in incorporating electronic payments as a part of their business activities.

## 3.2 Credit

Internet-based lending platforms provide a bouquet of credit products ranging from personal loans to funding of MSMEs, education loans, to greenfield and brownfield business loans. These online lending platforms are classified into following two categories, based on their source of funding:

- a. Peer-to-peer lenders who source their funds from online retail investors
- b. Direct lenders who source their funds through a combination of equity, line of credit from financial institutions, and other investors and hold loans on their balance sheet

The opportunity for growth in the online lending business is showcased by the high rate of growth these two business models are expected to clock in the future. The peer-to-peer lending in India is expected to grow to USD 5 billion and online lending market is expected to grow to USD 9

billion in the next three years.<sup>16</sup> These businesses, registered as Non-Banking Financial Companies (NBFCs) are expected to play a critical role towards financial inclusion, provide credit access to unbanked segments, and improve credit access to micro, small and medium enterprises (MSMEs). These companies provide a quicker turnaround time compared to banks, require basic documentation for loan disbursement and involve minimal human intervention, which gives them an edge over conventional commercial lenders like banks. However, these NBFCs face certain challenges, which impede them from realising their full potential and performing at higher efficiencies.

### 3.2.1 Peer-to-Peer (P2P) Lending

P2P lending platforms leverage on technology to save costs. They also minimize their risk exposure by ensuring the loans are not carried on the books of the originated P2P lending platform. However, P2P investors/lenders continue to face risks of a conventional lending business i.e. credit risk, interest rate risk and liquidity risk (P2P lending platforms do not share these risks with the lenders).

In addition, there are certain risks specific to P2P lenders. They include:

1. Inefficiencies in P2P risk-scoring models
2. Limited track record of P2P lending platforms
3. Lack of human interface between the borrower and lender
4. P2P lending platforms have minimal skin in the game

In line with protection of P2P lenders and uncertainty related to KYC and recovery practices, RBI released Consultation Paper on Peer To

<sup>16</sup> <http://economictimes.indiatimes.com/small-biz/money/banking-on-technology-p2p-lending-and-the-uberization-of-financial-services-in-india/articleshow/58761775.cms>

Peer Lending (RBI, 2016).<sup>17</sup> The paper proposes a regulatory framework that addresses issues related to minimum capital requirements, business continuity plan, customer interface, reporting, and governance. Some of the proposals include:

1. Regulating the nature of activities undertaken by the lending platform
2. Minimum capital requirements
3. Compliance and governance
4. Risk management to facilitate business continuity
5. Disclosure and transparency
6. Mandatory reporting requirements

P2P lending is increasingly being seen as an alternative channel to formal finance. This presents a wide range of opportunities for the sector. At the same time, it also has significant potential to cause disruption which is cause for concern for regulators, who are of the opinion that there is scope for market players to adopt unhealthy practices, adversely impacting the nascent industry.

There are two primary risks faced by P2P lenders/investors:

- a. Enterprise Risk: Risk associated with the business continuity of P2P lending platform. We must note that this risk is not isolated to P2P lending business alone. The regulator may issue criterion addressing the following concerns, to keep an eye on the P2P lending platform per se:
  - i. Promoter due diligence
  - ii. Minimum capital requirements

- iii. Periodic compliance and reporting guidelines
- iv. Independent audits

- b. Credit Risk: Risk of default, when a borrower fails to fulfil debt obligations. Any lender, (online or offline) takes a finite risk exposure, when she participates in lending activities. While this risk may be minimised, any regulations that aim to eliminate it in totality, in pursuit of investor protection, may eventually stifle industry growth. Existing players are minimising credit risk by using technology for fine tuning credit rating models and building strong customer profiles. Moreover, certain industry participants also provide debt recovery assistance, wherever required as a part of their service portfolio.

P2P lending has been instrumental in creating a paradigm shift in the lending business on account of the use of technology and a simplified customer experience. It is being viewed as an alternative to:

- a. Traditional investment options by lenders, in terms of return on investment
- b. Conventional channels of credit access, marked by tedious documentation and extended loan approval procedures

### 3.2.2 Collaborate or Compete with Financial Institutions

In this light, one of the challenges faced by P2P lending industry emanates from competition from financial institutions and traditional lenders. The industry can either collaborate with financial institutions or compete directly with financial institutions.

<sup>17</sup> <https://rbidocs.rbi.org.in/rdocs/Content/PDFs/CPERR280420162D5F13C3A2204F4FB6A2BEA7363D0031.PDF>

### **Collaborate with Financial Institutions:**

1. Financial institutions agree to purchase loans from P2P lenders, in part or whole. This quintessentially translates into an aggregated version of individual investors on the P2P platform.
2. Financial institutions use P2P platform as a distribution channel by co-branding or engaging in other service sharing agreements.
3. Customers that do not pass the acid test of financial institutions may be serviced by the P2P platform
4. P2P platform may be used for promotion and procedural purposes

Collaboration is an advantageous proposition for traditional lenders because:

1. They gain indirect credit exposure in sectors, the lender would otherwise not participate in
2. The costs associated with direct lending are optimised
3. This does not help the lender build any customer relationships, undertake cross selling or gain competitive advantage among its competitors.

### **Compete with Financial Institutions**

Financial institutions directly engaging in P2P business would clearly have an edge over new P2P lending platforms primarily because they have existing expertise in the lending business. They also have an existing customer base (risk profile, products, credit history), technology, infrastructure and a brand to leverage on. Financial institutions can use proprietary P2P lending platform to cross sell products to existing customers, cater to loans that do not meet traditional lending criterion, and generate new income streams. While P2P lending

platforms do have alternative credit scoring models and provide much quicker loan disbursal, barriers to entry for financial institutions are low.

The industry has made a mark for itself based on customer experience, innovation and role of technology. With its fast-paced growth across the globe, P2P lending business in India is bound to witness changes in the regulatory environment. Players should keep its agility intact to adapt the same. Also, with potential competition likely from banks and financial institutions, P2P lending market will need to proactively expand its product portfolio and address investor concerns.

### **3.2.3 Online Lending**

The online lending industry has leveraged technology and data availability to serve historically undeserved consumers, including small businesses and consumers. There are two imminent themes that have emerged in the online lending marketplace:

1. Potential for online lending markets to expand and increase formal credit penetration is indisputably high.
2. Role of the financial regulatory framework to ensure market development and investor protection. NBFCs have emerged as a critical piece in the financial value chain of India, especially in terms of catering to credit requirements of the MSME sector, retail consumers and the unbanked customers. As NBFC participation increased and role towards fuelling economic growth increased, the corresponding regulatory framework too underwent timely iterations. NBFCs were subject to stricter norms related to acceptance of deposit, liquidity, reserve requirements, capital requirements etc.

## 3.3 Other Challenges and Opportunities

### 3.3.1 Credit Modelling for Underwriting

Innovation in credit underwriting has helped online lenders to:

1. Reduce cost of customer acquisition
2. Automate loan origination and processing
3. Analyse the social profile of the potential borrower to expand the scope of assessing credit worthiness
4. Improve turnaround time
5. Provide a convenient customer experience

In the same light, these models are relatively new and yet to be tested for their accuracy over a number of credit cycles. These models refer to data from multiple sources. However, there are concerns over the very veracity of these data points. For example, data points sourced from social networking websites will be as good as the strength of the data verification algorithm deployed by these websites. Consumers who have an extensive digital footprint may have an edge over others. This could perhaps lead to fair-lending violations and disparate credit assessment. Unlike a traditional lending model, where the applicant is aware of the variables that determine her credit score, the new algorithms could take away the option of recourse, if an applicant does not fare well in the assessment.

### 3.3.2 Greater Transparency

Online lending marketplace ensures a digital trail of flow of funds from the lender to borrower(s). The industry provided a feasible alternative to those who would borrow from local moneylenders at interest rates as high as 36 per cent per annum,

along with whimsical terms and conditions. On several occasions, desperate borrowers in remote areas were not aware of basic terms. A formal online lending marketplace ensures protection of borrowers to a comparatively higher extent.

Some of the challenges in the offline conventional sector (not applicable to every industry player) include:

1. Adherence to consistent loan terms for borrowers with a similar credit profile
2. Lack of customer education, leading to poor loan performance
3. Investor risk associated with unsecured loans
4. Adopt best practices that limit abusive products, prevent aggressive lending and advocate inclusive credit growth

### 3.3.3 Lack of Regulatory Framework

Role of the regulator in the online lending marketplace has invited diverse views. Certain stakeholders are of the view that a regulator could end up over-regulating the market, eventually stifling growth. There is another school of thought that believes a well-intended regulatory environment, similar to that existing for capital markets and banking is needed for market development, investor/consumer protection, address grievances, and weed out unscrupulous players.

Specific areas that are reeling under regulatory uncertainty include:

1. Permissible activities for lenders, servicers and consumers
2. Treatment of borrowers of online lending marketplace versus offline borrowers
3. Safe guards to prevent frauds and a code of conduct with respect to cybersecurity
4. Compliance and anti-money laundering checks



### 3.3.4 Rationalizing of Archaic Laws

Indian regulations permit judicial intervention, to modify terms of a loan and even waive off loan obligations. These regulations were formed to protect borrowers from loan sharks and contain predatory lending. Under the Usurious Loans Act, Section 3, courts are authorised to intervene where the terms of loan are found to be unfair. Under the existing regulatory framework, both online lenders and P2P lenders are not exempted from this regulation.

P2P lenders and online lenders charge a higher rate of interest compared to traditional lenders like banks, on account of the higher risk associated with these loans. Majority of these loans are unsecured and some of these customers are high risk parties, who would have otherwise been declined credit facilities by banks. This makes these lenders vulnerable to penalisation under usury laws. In addition, individual states have the capacity to pass laws restricting activities of moneylenders and even set an upper limit to permissible rate of interest. Such laws increase the risk exposure of P2P and online lenders and add to the overall business uncertainty of the industry.

For P2P and online lending to achieve its objective of increasing credit penetration to the marginalised sections, provide timely funds to high risk businesses and ease customer experience, regulations will have to protect investor interest as well.

### 3.3.5 Cyber Security

FinTech has emerged as a solution provider for almost every financial need, across geographies, demographics, social strata and enterprises. It has the ability to touch all sectors of the

society. However, its potential is challenged by concerns related to maintaining security of digital transactions, data protection, fraud prevention and maintaining stability. These challenges discourage customers from embracing technology. Low customer awareness and absence of a strong consumer protection framework impedes deep FinTech markets in remote areas.

FinTech security can be addressed by observing the impact of following trends in the sector:

1. With increasing thrust on less cash regime and low barriers to entry, there is bound to be increase in the number of FinTech players in India. Some of these players would treat cybersecurity as a critical component of their business model. In the same landscape, there would be players who focus on strengthening the revenue model. This may lead to a market with active products, with weak cyber defence. The industry players should arrive at a minimum security standard consensus, to minimize adverse consumer experiences. As with any other marketplace, bad experiences are bound to hurt the entire industry's reputation and consumer trust.
2. Regulatory frameworks evolve at a much slower pace compared to FinTech products. This allows the industry to innovate and adapt to consumer needs in a seamless manner. In the hindsight, this also creates a gap between technology and regulations. Regulations are not in line with the technology, creating regulatory gaps. Since FinTech is a dynamic marketplace, and complexity of products moves up the curve at a rapid pace, the industry and regulators need to work in tandem to ensure consumer protection and market development. Regulators need

to agree that regulating this space beyond a certain point will damage the industry growth. At the same time, FinTech players need to adhere to minimum cyber protection standards.

3. One of the key objectives and achievements of FinTech has been its ability to drive financial inclusion and provide access to financial services to the unbanked sections of the society; essentially serving customers who have little or no historical experience in using technology and/or financial services. These customers are unaware of the potential cyber risks that these products expose them to, increasing their vulnerability to being hacked. Customer education and training are inexorable mandates of responsible FinTech. Even players who operate on thin margins need to adopt best

practices laid down by the industry, to ensure consumer protection.

4. As FinTech players broaden their reach and expand their offerings, there will be increase in interactions across product platforms. These interactions will once again expose systems to potential threats. Cyber security standards across FinTech and traditional financial institutions will need to be scrutinised for loopholes, to minimize system vulnerability and enhance system security.

For example, global mobile payment standard called 'tokenization' has enhanced protection for all mobile-based transactions. It powers safety and security for ApplePay, SamsungPay and GooglePay, using that technology



## 4. Developing a FinTech Ecosystem

Regulators, banks and even the common populace is now excited by FinTech. However, most banks are still doing business the old way while trying to minimize the risk of disruption by carefully following startups aiming to upend their industry. The Indian financial sector here is at a huge disadvantage in terms of its exposure to the coming changes compared to global centres like London or New York. These cities not only are hubs of global finance, they have turned themselves into FinTech hubs from where it is possible to sense the coming disruptions. It is easy for Indian startups to look towards the Silicon Valley and London and try to replicate the business models. However, it is not possible to recreate the ecosystem, which is decisive for their success. Some of the best FinTech innovations have come out of developing countries where companies tried to solve local problems. M-Pesa from Kenya and G-cash from Philippines are the most successful example of this. Mobile payment systems created other opportunities in banking, risk-sharing, and have expanded to areas outside of Africa including Europe.

Policymakers have studied international examples, including the Silicon Valley to create their own innovation hubs. However instead of using these examples as templates, we should figure out what domain could be of specific importance in their jurisdictions and remove the regulatory hurdles for that particular domain. A bitcoin valley will come up in any "concession" or Special Economic Zone (SEZ) where a Government fully legalizes cryptocurrencies for financial and other recording functions. There is a difference here between the SEZs built in Shenzhen and other places in that cities compete for regulatory flexibility and best practices get

adopted and transferred to other places. Rethinking regulatory barriers and providing infrastructure is the function of Governments; developing talent and funding startups can be left to the private sector.

Apart from the problems, solutions, and regulation fostering innovation in the FinTech space relies on other attributes; talent, funding, demand, infrastructure, and business environment.

### 4.1 Talent

The main input into developing as a FinTech hub is availability of talent. FinTech requires a varied talent pool to draw from. Talent can be technical, financial or entrepreneurial. Of these, entrepreneurial talent is the hardest to define and develop.

1. Financial – Financial services expertise includes experience in dealing with business models, regulation, markets and investors. It is mostly concentrated around global financial centres.
2. Technical – Technical talent consists of software engineers, developers and coders who implement ideas. The availability of technical talent depends on the existence of other tech companies. India fares very well in this regard with an abundance of low-cost IT manpower located in the tech-hubs of Bangalore, Gurgaon and to a lesser degree in Pune and Hyderabad.
3. Entrepreneurial– Entrepreneurial talent is the hardest to define and depends on the ability of people to take risks and be able to explore new ideas. One can imagine that entrepreneurial talent is constant among people but depends on a wide range of other factors from security nets to business environment.

## 4.2 Funding

Capital is not only required to grow large businesses but is required by startups for their growth too. The capital invested in FinTech globally has been growing over the past few years. The amount of capital available in India is not comparable to global hubs but is increasing. In 2014, USD 5 billion was invested in Indian startups which grew to USD 7.5 billion in 2015. The pace of funding slowed in 2016 with a total of USD 3.9 billion raised in 2016.<sup>18</sup> An ecosystem should be able to provide capital to startups at various stages of growth viz.

1. Seed Capital
2. Venture Capital
3. Public Capital

## 4.3 Demand

A successful FinTech hub is possible when companies solve a problem and there is a demand for the services provided. The demand can come from consumers, companies or financial institutions. The rise of millennials as the largest cohort in USA, China and India has shifted the terms of interaction with the financial sector. Most millennials are digital natives and to avoid getting left behind financial services need to redesign their experiences with an extreme focus on zero-friction solutions.

1. Consumer: Consumer demand for FinTech is driven by millennials' demand for no-friction solutions to everything including financial services. While incumbent banks are burdened by legacy infrastructure FinTech companies with

their focus on seamless transactions and ease of use fulfil and important demand in the 21<sup>st</sup> century.

2. Enterprise: Enterprise demand for FinTech is driven by efficiency gains. The way IT revolutionized business operations in the 2000s, current demand for financial solutions for companies is driven by a demand for greater operational efficiency.
3. Financial Institutions: Financial institutions as incumbents have much to lose with the democratization of finance. However, they do have a huge repository of data and knowledge which will serve them well. Most banks are not unaware of the challenges they face and are willing to experiment to transform themselves. Goldman Sachs already has more personnel in their technology department than in any other department. The best financial institutions for the most part are choosing to co-opt FinTech firms and adopt best practices and technologies. Thus, they are themselves a huge driver for demand for FinTech solutions.

## 4.4 Regulatory Regime

Regulation plays a major role in the financial sector. A part of the advantage that banks have over FinTech startups is their ability and expertise in navigating the regulatory regime. The regulations around finance that FinTechs need to be aware of can vary from consumer protection laws, anti-money laundering, fraud and know-your-customer regulations to broader systemic risk requirements. We discuss this in detail later in the report.

<sup>18</sup> <http://www.moneycontrol.com/news/business/startup/startup-investments-decline-by-half-to-usd-39-billion2016-938979.html>

## 4.5 Infrastructure

Digital infrastructure is probably the most fundamental ingredient in developing a FinTech ecosystem in India. The main sectors that create digital infrastructure are financial services, technology service providers, telecom service providers and Government. Digital infrastructure encompasses various facets including:

1. **Connectivity:** Digital connectivity was the basis of the growth of technology companies in India since 1990s. Finance in the 21<sup>st</sup> century is driven by speed and data making digital connectivity imperative for any function.
2. **Digital Inclusion:** FinTech depends on new delivery mechanisms bypassing the physical presence required by legacy systems. For FinTech companies to reach the maximum possible customers, digital inclusion is a must.
3. **Data:** The growth of computing power and generation of troves of data through a digital footprint has enabled companies to enhance their consumer information and targeting. Access to such databases can enable newer companies to build on them and realize potential that the incumbents may miss.

## 4.6 Business Environment

Ease of doing business and simpler procedures to start a business help in creating a conducive business environment. The more barriers there are to starting a company, the fewer innovative companies can start and create a virtuous cycle of growth. Any government must strive to reduce such barriers.

Some successful examples are:

1. **Estonia:** Estonia is the world leader in digital ID. All Estonians have a digital ID embedded in their smartphone SIM cards. They can do digital

signatures for everything from parliamentary bills to legal documents. This hugely improves the efficiency of both the public and private sector. Estonia has also pioneered a global e-residency program whereby anyone can gain an e-residency and conduct business in Estonia. After getting the digital ID and e-residency, a legally functioning company can be set up in 20 minutes.

2. **Israel:** What Israel lacks in resources and population they make up by education and skills. Israel has been a player in e-commerce and software for quite some time, benefitting from a young and highly educated labour force. In recent years, it has evolved into a cybersecurity hub, particularly for financial services. Israel's cybersecurity ecosystem started as a result of the young men and women graduating from the Israeli Defence Forces (IDF) where they receive rigorous computer training. This talent pool has attracted multinational corporates to setup cybersecurity research centres in Israel.

## 4.7 Ranking the Ecosystem

In this section, we compare the FinTech ecosystems of five countries USA, UK, Singapore, China and India. In our ranking, the FinTech ecosystem's vitality is proxied by five factors: infrastructure, policy, capital, talent and demand. Though the four other ecosystems are much more developed than India in many ways, it provides a sense of what is needed for India to achieve a world-class FinTech ecosystem. Refer Appendix B for the ranking methodology.

An ecosystem is built on five main attributes:

1. **Talent:** The availability of financial, technological and entrepreneurial talent

**Table 4.1: Ranking a FinTech Ecosystem**

Parameters	India	China	United States	United Kingdom	Singapore
Infrastructure	2	5	10	9	8
Regulatory Regime	2	4	6	8	10
Funding	1	8	10	4	1
Talent	4	7	10	6	2
Demand	5	10	8	5	4
Total	13	34	44	32	26

2. Demand: The existence of a market for FinTech products
3. Capital: Access to funding via angels, venture capitalists, private equity and public markets
4. Infrastructure: Supporting banking, telecommunication and general infrastructure
5. Policy: Regulatory, government and ease of doing business

India's main advantage in FinTech lies in its huge pool of talent among its technology workers. This covers for the small financial services sector it has for a country of its size. With the advent of FinTech and a greater push towards financial inclusion, this is bound to change as more people are employed in financial services. While the availability of talent is currently stronger than in most other FinTech regions, the quality of talent leaves a lot to be desired. Most of the vast swathes of technology workers are in low end coding functions while higher value-added services are concentrated in USA and China. This applies broadly across the three key skill sets required to establish and grow a FinTech business successfully: technical talent,

financial sector expertise, entrepreneurial and leadership know-how.

The second advantage that India has is its huge market size and a relatively underpenetrated financial services sector. Countries like USA, UK and Singapore have global financial hubs and a very well penetrated financial services sector. In these countries, the demand for basic payment and savings services have been met and the focus is more on efficiency and UI/UX. In India and China on the other hand, FinTech firms have a blank slate unencumbered by legacy issues which should enable the firms and regulators to create a radically different financial services space. The absence of a developed banking sector was one of the reasons FinTech firms have growth exponentially in China. Payments in China is dominated by mobile, P2P lending has exploded and Chinese FinTech leads the world in most things mobile. India too can realise this in the near future and rapidly expand its FinTech footprint if enabling policies are put in place.

Indian startups received USD 4 billion in funding in 2016 compared to USD 45 billion in China and USD 59 billion in USA. India has a far lesser number



of angel investors (about 1,800 angel investors in 2016) as compared to 3 million in United States.<sup>19</sup> Initially most of the investment in FinTech flowed into payment services companies considering the huge scope of payment technology in India. This received a fillip with demonetization in November 2016. Investors are coming to terms with FinTech being more than just payments technology and investor interest is beginning to manifest itself in a variety of sub-segments such as investing, lending, wealth management, credit reporting among others.

The major hindrances to developing a FinTech hub in India are the lack of consumer information, information sharing and a backward technological and digital infrastructure. Though

telecommunications have grown rapidly in the last two decades, India has among the least reliable and slowest broadband connections in the world. The availability of broadband too is suspect in large swathes of the country barring the major cities. In terms of ease of doing business, India still ranks 130<sup>th</sup> in the world. This is not acceptable for a country which intends to lead the world in the near future. Removing regulatory red-tape will go a long way in unleashing the entrepreneurial energies of the people of India. Though the RBI has been cautiously supportive of innovation in finance, as we will see in later sections, the RBI has a long way to go before it matches the initiatives of other central banks who have not only been supportive of innovation but actively foster and nurture it.

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<sup>19</sup> <https://assets.kpmg.com/content/dam/kpmg/pdf/2016/06/FinTech-new.pdf>

## 5. Global FinTech Landscape

Global investment in FinTech companies was almost USD 19 billion in 2015. This declined to USD 17.4 billion in 2016 (CBInsights). This investment was dominated by a few large deals in China, which has overtaken USA as the driver of FinTech innovation. The FinTech landscape has also crystallized into broad categories with companies and regions looking to optimize the business models around innovation.

### 5.1 United States of America

United States of America is an outlier in the startup universe. The ecosystem which was started with skunkworks and the Silicon Valley is over 50 years old and has been the birthplace of countless companies. USA is undoubtedly the birth place of FinTech. The original foray into what we now call FinTech can be traced to Paypal which was founded to provide fast payment services to emerging e-commerce companies like Amazon and E-bay. While USA consumer is highly mobile and internet savvy, the local internet leaders have not as yet strategically focused on payments/finance as the local consumer banks are also highly sophisticated. FinTech disruption is expanding from its West Coast focus on “experience” into content and platform disruption, driven largely by financial centres with deep expertise – London and New York being the two leading examples.<sup>20</sup> USA boasts of the most fertile startup and FinTech ecosystem in the world with a surfeit of talent, expertise and funding available to those who seek it. The government on the other hand has largely kept out of intervening in

the market to promote or shut down anything in the free market tradition of the country.

### 5.2 United Kingdom

United Kingdom is the third largest FinTech market in the world after USA and China. In USA, Silicon Valley boasts digital innovation, New York offers financing services and Washington DC sets policy. In the UK, all these sectors are concentrated in one city – London – making it the hotbed for FinTech development. It is the largest e-commerce market in Europe and is the undisputed leader in online access to banking services, P2P lending and payment services.

Many countries brag about bank ecosystems, but there is a particular country ahead of the world – the UK. The Bank of England to its credit has been very supportive of financial innovation making UK the leader in banking technology. The opening up of banking licenses and a simplified two-step process with lower capital requirements for setting up new banks in 2013 is driving further innovation and better service. The UK can boast of tens of digital only banks viz. Monzo, Tandem, Starling, and Atom that are focussed on providing seamless financial services. On an average, challenger banks offer better rates to savers; simple business models provide banks them a cost advantage.

Secco is building a blockchain-based bank with a completely differentiated value proposition. Apart from being branchless, Secco plans to provide their services without even an app. They will operate as

<sup>20</sup> [https://www.nist.gov/sites/default/files/documents/2016/09/15/citi\\_rfi\\_response.pdf](https://www.nist.gov/sites/default/files/documents/2016/09/15/citi_rfi_response.pdf)



an ‘underlying’ service hidden in all the apps and social platforms used day-to-day.

Modern P2P lending started in the UK when Zopa was started in 2005. Since then other firms have come up and the market has grown exponentially. P2P players lent GBP 3.2 billion in 2016 up from GBP 2.3 billion in 2015.<sup>21</sup> These platforms are becoming integrated into traditional pools of capital and operating naturally within the multi-layered and multi-faceted lending and credit markets. The market is maturing with Zopa now seeking a banking license and the institution becoming the largest source of capital for P2P lenders. Players have been growing the market with Lending Circle expanding into SME lending and LendInvest lending to property.

In the remittance space, Transferwise became a unicorn in 2016, directly challenging banks and established remittance players like Western Union. Other players like Azimo and WordRemit are also making their mark in the space. These companies rely on UK’s leadership as a finance hub and place themselves in the middle of the money flow.

While many countries trying to set up a FinTech ecosystem focus on specific segments, the financial sector expertise and UK’s position as a global financial centre has allowed UK FinTech to take a macro view of financial services; and is setting up digital banks at a pace that other countries can only dream of.

### 5.3 China

China is the pace-setter in FinTech. The Chinese FinTech ecosystem is larger than any country in terms of transaction volume with the major players

boasting more customers than the country’s largest banks. WeChat is the poster child of the global payments industry taking over from M-Pesa and boasts of 800 million users while Alibaba with its Alipay service has over 400 million users. The largest players in China are backed by e-commerce giants and are extremely well funded. This implies that unlike FinTech companies in the rest of the world, Chinese FinTech companies are able to undertake more balance sheet intensive businesses. It is the only country where investment in FinTech rose in 2016 over 2015 and accounted for over 50 per cent of the total investments in FinTech globally (CB Insights). The rise of China much like its rise in the global economy over the past 25 years reflects a unique combination of factors combining rapid digitization, rise of the middle class along with lethargic financial institutions. Some of the factors that have contributed to the success of Chinese FinTech companies and development of the ecosystem are:

1. High internet and mobile penetration
2. Relatively unsophisticated consumer banking and a large underbanked population
3. Market structure (FinTech companies owned by e-commerce companies)
4. Transition to a consumption economy
5. Regulations

The success of consumer FinTech in China is due to the high mobile penetration combined with a lagging banking penetration. The modes of investment for common people in China are limited with The People’s Bank of China (PBOC) strictly controlling interest rates on deposits. This costs households about 4.1 per cent of China’s GDP (PIIE)

<sup>21</sup> <https://assets.kpmg.com/content/dam/kpmg/pdf/2016/02/CRT053877J-uk-alternative-finance.pdf>

**Table 5.1: Internet and Mobile Penetration**

Country	Mobile Penetration	Smartphone Penetration	Internet Penetration
China	93.20%	46.90%	52.7%
India	77.58%	19.20%	34.4%
United States	103%	56.40%	87.9%
Brazil	141%	26.30%	65.9%
Russia	155%	36.20%	72.9%

Source: World Bank

leading to most people putting money in real estate or other real assets.<sup>22</sup> The Chinese middle class rose from constituting 7 per cent of the population to 54 per cent of the population between 2002 and 2012. This coincided with the rise of internet penetration, e-commerce and consequently made it inevitable for FinTech companies to take the place left vacant by banks given that most Chinese banks are not tech savvy compared to those in USA or Europe.

The innovations in China now are more sophisticated than any developed market. China has leapfrogged from cash straight to mobile without intermediate technologies like credit/debit card. The Chinese don't access the internet the same way people in the developed world do. They are mobile first and mostly mobile only, making China's internet ecosystem hard to replicate.

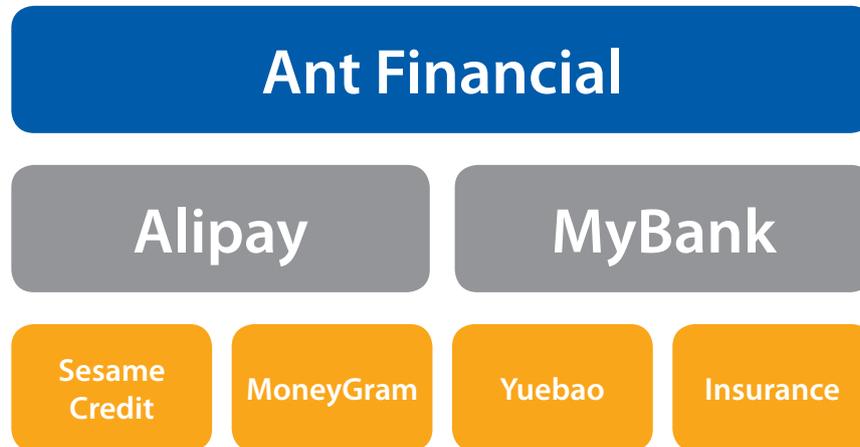
Chinese banks were focussed on serving large corporate clients and state-owned enterprises. This provided an opportunity for FinTech players to service retail customers as well as small and medium scale enterprises. Until recently, the Chinese banking industry was completely state

owned. WeBank which is a purely online bank promoted by Tencent was China's first private bank. Weilidai, the lending app embedded in WeChat has grown exponentially. ZhongAn, an online insurance company is backed by Alibaba and Tencent. China has been so successful that the four biggest FinTech unicorns in the world are Chinese. Namely, Ant Financial (USD 60 billion), Lufax (USD 18.5 billion), JD Finance (USD 7 billion), and Qufenqi (USD 5.9 billion).

The FinTech movement in China unlike the rest of the world is led by internet giants like Alibaba and Tencent. These firms provide a gamut of services built around their core e-commerce platforms. This has led to a greater collaboration and integration with technology and e-commerce players. For example, Lu.com in a marketplace for P2P lending, wealth management, insurance and other products. Ant Financial started out as Alipay in 2004 to handle payments on Alibaba's website. Its payment volume is now over USD 931 billion. It also provides a vast array of services from lending, wealth management, credit scoring to managing the world's largest money market fund.

<sup>22</sup> <https://piie.com/publications/policy-briefs/financial-repression-china>

**Figure 5.1: FinTech Example in China: Ant Financial**



Chinese regulators have also been credited with a very hands-off approach to regulating FinTech. They did not hinder or overregulate the sector and only step in once risks become apparent. Regulations were relaxed for third party payments with no KYC required till August 2015. P2P was one such example when the discovery of major frauds forced PBOC to step in and enact regulations.

China may well have reached the tipping point of disruption in financial services and innovations made here will emanate to the rest of the world. Unlike in USA or Europe, disruption by FinTech firms has not occurred at the periphery of the Chinese financial sector. It has gone past the inflection point with technological innovation reshaping the financial landscape.

### 5.4 Singapore

Singapore developed by fashioning itself as the regional shipping, finance and technology hub. It has now stepped up efforts to maintain its leadership by becoming a FinTech hub. As with most things in Singapore, the drive towards becoming a FinTech hub is led by the Government

and the Monetary Authority of Singapore (MAS) is leading the efforts to build it. Since 2015 MAS has been working closely with the financial industry, startups, universities and other stakeholders towards this vision. Singapore is the regional financial hub, handling flows into most of South and South-East Asia. It is also a regional technology hub. This provides a large talent-pool for startups. Being a financial centre, it provides access to venture capital. It also has one of the most supportive regulators which is trying to create an innovation hub.

The MAS aims to get FinTech companies and financial institutions to compete, collaborate and innovate. To push innovation, more than 20 banks and insurance companies have set-up their innovation labs and research centres in Singapore. Singapore is home to more than 300 FinTech startups operating in most segments of the financial value chain. Banks, corporations and the government in Singapore have been proactively supporting FinTech startups to develop and fine tune their products, in order to validate their business models for market readiness.

## Road Ahead for FinTech in India

The MAS tied up with R3CEV to set up the R3 Research Labs in Singapore which explores the use of blockchain technology in banking. R3 is a consortium of 70 global banks and this gives Singapore a prime spot in leading the research on blockchain.

The MAS has pledged a funding of USD 165 million over five years to support innovation in FinTech. It is also the first regulator to create a sandbox to test various aspects of FinTech including digital and mobile payments, authentication and biometrics, blockchains and distributed ledgers.

# 6. FinTech Regulations and Collaborations

Regulatory support is a key determinant for the success of many technologies and products. Many innovations derive from governments or aid agencies while a lot of others have been adopted because of government interventions to promote their usage.

## 6.1 M-Pesa and Central Bank of Kenya

In its original form, M-Pesa was designed for the microfinance industry for the disbursement and repayment of microfinance loans but over the course of the last decade, it changed the way people transact in a whole country becoming the de-facto remittance and payment product in Kenya. Launched as a method to use SMS as a means for payments between feature phones, it has grown to a full financial services platform with 30 million users in 10 countries. The M-Pesa ecosystem has also grown to accommodate international transfers, loans, savings and other services. Though the success has not been replicated to a similar degree in other countries, it can be considered the original FinTech payments product.

The success of M-Pesa has much to do with the country's payment regulator i.e. The Central Bank of Kenya (CBK). The CBK chose a light touch to regulate M-Pesa.

1. Safaricom and its agents were required to keep M-Pesa balances in a trust account at a

bank. Thus, there was no credit risk to either customers or Safaricom.

2. Funds in the account were not lent onwards or used to pursue other business interests. Neither any interest was paid or received by Safaricom or its customers.
3. The CBK ruled that M-Pesa was not a banking business and allowed it to operate within the monetary framework by using a pooled trust account at a bank. CBK decided that because it had no clear authority over non-bank funds transfer, it would not interfere in the launch of M-Pesa
4. A letter of no-objection was given to Safaricom under the condition that (i) appropriate measures are put in place to safeguard the integrity of the system in order to protect customers against fraud, loss of money and loss of privacy and quality of service. (ii) The system will provide adequate measures to guard against money laundering (iii) Proper records are kept and availed to regulatory authorities in formats as may be required from time to time and (iv) M-Pesa will observe all existing laws governing its relationship with its agents and customer.<sup>23</sup>
5. The Communications Commission of Kenya (CCK) was the lead regulator for Safaricom as a telecom company and M-Pesa considered a value-added service which Safaricom was

<sup>23</sup> [http://www.afi-global.org/sites/default/files/publications/afi\\_casestudy\\_mpesa\\_en.pdf](http://www.afi-global.org/sites/default/files/publications/afi_casestudy_mpesa_en.pdf)

licensed to offer. The CCK deferred to CBK on the specifics of M-Pesa though showing remarkable cooperation which is often not seen in India.

6. The CBK and CCK regularly monitored the liquidity management, settlement risk, and reliability of the system, registration of users, system audit trail, Anti Money Laundering (AML) measures and consumer protection issues.

### 6.2 Regulatory Sandbox

The United Kingdom was the first country to propose a regulatory sandbox in November 2015. Since then, other countries have come out with similar policies to promote innovation and experimentation while limiting the risks. At the most basic level, a regulatory sandbox creates an environment for businesses to test products with less risk of being punished by regulators.<sup>24</sup> In exchange for flexible regulatory standards regulators require applicants to incorporate appropriate safeguards in their business models.

#### Hong Kong

The Hong Kong sandbox regime is open only to institutions authorised under the Banking Ordinance and under the supervision of the Hong Kong Monetary Authority. Though the specifics may vary, applicants in general must fulfil the following criteria to gain entry into a sandbox

1. The product must be innovative
2. The product should benefit consumers
3. There are appropriate safeguards for consumer protection

The key driver for a sandbox is the ability to facilitate innovation and competition while ensuring

that society can enjoy the benefits of innovative FinTech offerings in a less risky environment. Furthermore, entering into a sandbox offers opportunities to engage with regulators who in turn may use their increased insight and knowledge to create a more favourable environment for FinTech firms.

#### United Kingdom

The Financial Conduct Authority (FCA) allows the sandbox for firms who need to become authorised to trial their products and services, authorised firms, and technology firms that provide outsourced services to such firms. It allows (i) individual guidance to firms setting out how it interprets relevant rules in respect of testing activities the firms may be carrying out (ii) waiver or modification of rules that would allow what would otherwise be a temporary breach of the FCA's rules (iii) when the above two don't apply a "No Enforcement Action Letter" (NALs) stating that no FCA enforcement action will be taken against testing activities provided that the firm deals with the FCA openly, keeps to the agreed testing parameters and treats customers fairly.

#### Singapore

The MAS proposes to provide regulatory support by relaxing, on a case by case basis for each applicant, specific legal and regulatory requirements which the applicant would otherwise be subject to.

#### Australia

The Australian regulators give a conditional exemption to allow new Australian businesses to test certain financial services for six months without holding an Australian Financial Services (AFS) licence. The exemption only applies to giving

<sup>24</sup> <https://www.law.ox.ac.uk/business-law-blog/blog/2016/12/overview-regulatory-sandbox-regimes-australia-hong-kong-malaysia>

financial advice in relation to listed or quoted Australian securities, simple managed investment schemes and deposit products or arranging for other persons to deal with these products. The Australian Security & Investment Commission (ASIC) places restrictions on client exposure limits and customer protection. Unlike other countries which require an entity to apply to enter a sandbox, a business can get an industry-wide regulatory sandbox exemption by notifying the ASIC and providing evidence of sponsorship from a sandbox sponsor.

### 6.3 P2P Explosion and Regulation in China

The P2P market experienced explosive growth in China over the past 5 years. The growth was partly stimulated by China's loose regulation of internet finance to encourage creativity among market participants and enable SMEs to raise funds. However, the discovery of major frauds forced the regulators to step in and enact regulations for the market which would better protect lenders, the general public and help the P2P industry to achieve more sustainable growth.

1. Registration: All platforms are mandated to register with local financial authorities and acquire the relevant business license.
2. Capital Requirement: P2P platforms are mandated to maintain a capital of RMB 30,000
3. Custodian Accounts: Platforms are mandated to use bank custodian services to handle funds.
4. Audit and Reporting: P2P lenders are now subject to third party audits and reporting to financial regulators
5. Borrowing Limits: Individual borrowing limit is capped at RMB 200,000 from a single platform

while a cumulative of RMB 1 million can be borrowed across P2P platforms. Corporate borrowing is capped at RMB 1 million from a single platform and RMB 5 million across platforms.

6. Products: Regulations prohibit P2P lenders from providing equity or project crowdfunding. They are also prohibited from selling wealth management products, mutual funds or issue asset backed securities.
7. Deposit: P2P lenders are prohibited from accepting deposits, pooling assets or guaranteeing returns.
8. Credit Check: Platforms are required to make background checks on and review the risk credentials of transaction parties, the authenticity of information provided by borrowers, and the authenticity of proposed financing.
9. Data Management: Lenders are required to protect borrowers' and lenders' information and maintain records of transaction information and the online communication logs of transaction counterparties for five years.

The regulations are in line with China's banking and regulatory policies and would not prevent individuals and small enterprises from accessing funds. For platforms, the margins will be squeezed because of regulatory requirements and bank interactions, but will reduce the risks inherent in unregulated lending. There will be reshuffling, consolidation and some players may exit the market but in the longer term it should create a healthier market.

### 6.4 UK – Project Innovate

The FCA has a strategic objective to make markets in financial services work well. They look at the

integrity of markets, consumer protection and have a duty to promote competition in the interests of consumers. The FCA's Project Innovate launched in 2014, helps firms tackle regulatory barriers to innovation, be it through clarifying regulatory expectations, examining existing rules or enacting policy changes, to give startups space to innovate in the interest of consumers. The FCA has probably been the most innovative regulators in the World. The FCA already has two cohorts of startups working in its regulatory sandbox (24 and 31 companies in each respectively). The FCA was the first regulator to launch a regulatory sandbox to test new products. The sandbox involves:

1. FCA: Restricted authorizations, no-action letters, waivers and individual guidance
2. Industry: Virtual sandbox, authorized firm umbrella

The FCA also supports FinTech firms to launch their products globally and non-UK innovators to enter the UK market.

The Bank of England (BoE) is one of the few central banks which is very transparent in its functioning and shares its thought process on everything from monetary policy to FinTech regulation via blogs. The BoE and FCA have taken various steps to promote innovation and competition in the banking space. These initiatives include:

1. Widening access to central bank money to non-bank payment service providers
2. Partnering with FinTech companies on projects of direct relevance to the Bank of England's mission
3. Calibrating the Bank of England's regulatory approach to FinTech developments

4. Establishment of a FinTech Advisory Group to provide recommendations for the Government and to coordinate initiatives
5. Providing a specialised case officer to coach startups on how to navigate regulations
6. Sharing of SME data and the Small Business Enterprise and Employment Act designed to help SME lending decisions

### 6.5 UK – Challenger Banks

To incentivise competition in banking, the financial authorities in the UK (FCA and Prudential Regulation Authority (PRA)) changed the conditions for obtaining a banking license by lowering capital requirements, extending the window for acquiring the capital necessary under Basel III and simplifying the process for obtaining a licence, which has made it possible to shorten the time for such processing from over two years (which is how long it took Metro Bank to obtain its licence as the first new bank to do so in 100 years) to six months.

The new process for obtaining a licence consists of three phases:

1. Initial Application: where the official form and the business plan is submitted to a committee
2. Application: this is submitted after the first phase has been satisfied
3. Licence startup: capital build-up period

Within a year of publication of these rules, 20 applications were received and licenses were given to Atom Bank in June 2015 and Tandem Bank in December 2015. Since then, Masthaven, Fidor, Starling and Monzo have also received banking licenses. Challenger banks are gaining prominence due to the underlying inefficiencies



of the incumbents in serving the customer in the best possible and transparent manner. They are unencumbered by legacy systems and are digital native creating huge cost savings over incumbent banks. Challenger banks accounted for 32 per cent of UK's business mortgages and charges in 2016. They are taking advantage of the Bank of England's Funding for Lending Scheme (FLS) (securitization in USA) to target profitable lending niches and fulfil the needs of unserved or underserved customer segments including student lending, SME lending and some categories of mortgage lending.

Challenger Banks have come in and shown that banking can be truly digital. Many of them rely purely on apps while others provide API-based services. These new banks have a larger return on equity compared to large banks, more flexibility when it comes to lending and lower operational costs. This is only the starting for challenger banks as traditional banks enter the fray with their own offerings and collaboration with other startups. The end winner in all of this will surely be the consumer.

## 7. Regulatory Roadmap

Different countries need to make efforts to build a robust environment for FinTech for different reasons. Emerging economies in Asia are aiming to further financial inclusion, while developed economies are more focused on efficiency, cost-savings and personalized services. There are a number of challenges to the growth and adoption of FinTech firms' services. They face a regulatory environment that was designed for older business models and are slow to change. They must also contend with regulations that do not provide a level playing field.

For FinTech startups to continue to grow, they need to engage with financial sector regulators and policy makers that minimizes economic and financial risk without increasing regulatory cost.

### 7.1 Digital Payment and Credit Accelerators

Steps that will accelerate penetration and adoption of digital payments include:

- a. Bring about differentiated Merchant Discount Rate (MDR) for scaling of POS infrastructure, based on nature of transactions and purpose. This would let market discover the optimum level for a certain segment of transactions and facilitate adoption in under-developed market.
- b. Establish interoperability between vendors, technology and financial institutions. Ensure open access to all payment players. There should be seamless access to key payments and other relevant infrastructure to all authorized non-bank payments entities. Interoperability and open access will help firms manage costs and increase efficiency through shared infrastructures.
- c. Implement universal payment login for ease of transaction across platforms and vendors.
- d. Set up infrastructure to digitize government payments to businesses and digitizing government receipts (G2B, P2G, B2G) promotes comfort with digital payments among individuals and businesses and improves efficiencies. In Tanzania, the digitization of B2G payments at the Port of Dar-es-Salaam enabled the Government to trim USD 175 million in annual revenue leakages.
- e. Promote Aadaar based eKYC and eSIGN to move towards paperless authentication.
- f. Enhance the limits for any account based relationship based on periodic KYC compliance.

It is worth mentioning that withdrawal of convenience charges levied by agencies on government payments and receipts is not a financially viable solution. Commercial operators would be reluctant to provide their infrastructure to government, primarily because it will be an unattractive, low business customer. Moreover, these charges must be borne by the government, in order to encourage digital adoption. Any incentives in the form of cashbacks or discounts on digital payments, should be avoided. Incentivising digital payments should be pursued by way of creating disincentives to use cash (Section 7.2), and not doling out attractive schemes. It has been observed across technology based businesses, that consumers tend to slip back to their conventional habits, once these schemes phase out.

A macro prudential regulatory framework should be one that regulates risk and not the entity. This calls for a philosophical shift in rule making.

## 7.2 Create Disincentives to Cash

- FinTech ecosystem is highly vulnerable to customer habits. To bolster adoption and penetration of digital financial ecosystem, customers need to be assured that avoiding cash is a better monetary decision compared to traditional cash transactions.
- Imposing cash handling fee or exorbitant service charges on withdrawal of cash over a certain amount, depending on variables such as location and purpose of transaction could create positive ripples. For example, any transactions above a certain amount, for the purpose of purchase/sale of luxury goods should be taxed at a higher amount, compared to that related to pharma.
- All cash payments at stores, including electronics should be charged an extra 2 per cent. This will help subsidise the charges that shops have to pay for card payments. Moreover, volume of card transactions will increase, meeting the objective of increased digital penetration.

## 7.3 Strengthen the FinTech Ecosystem Infrastructure

- Connectivity: Despite a vibrant telecom sector, India has not yet developed a capable digital infrastructure. Broadband and mobile network availability is erratic in most parts of the country while internet speeds are among the slowest in the world. Absence of affordable 3G and 4G coverage and bandwidth continues

to impede FinTech growth in the country. Due to sluggish speed and erratic connectivity, payments are vulnerable to security attacks and stand low chance to see successful completion.

- Distribution: Increasing POS penetration is the foremost challenge. High distribution costs and poor connectivity deters vendors from providing connectivity in remote areas.
- Financial Literacy: Banks and financial institutions need to introduce customers to digital products. Due to the high reach enjoyed by banks, they are in a position to influence customer habits. Banks could lead from the front, by educating their respective staff members and their family members to adopt digital ways of transacting. This will have a significant multiplier effect, considering banks have their presence across rural India and undeveloped digital markets.
- Consumer Protection: Report from Committee on Digital Payments (2016)<sup>25</sup>, highlights the importance of consumer protection in the FinTech ecosystem, and the positive externalities these measures are capable of. Digital players should share transaction details, on a set frequency, free of charge. Also, with optimum use of technology, veracity of the transaction needs to be identified. Consumers need to feel protected against identity theft or system failure. FinTech players need to assure their consumers, that their personal data, including sensitive details such as Aadhaar are well protected, by both, the company and regulation.

<sup>25</sup> [http://mof.gov.in/reports/watal\\_report271216.pdf](http://mof.gov.in/reports/watal_report271216.pdf)

## 7.4 Interoperable and Digitised CKYC

The CKYC process came into existence in February 2017 and the responsibility of maintaining the CKYC registry lies with the Central Registry of Securitization and Asset Reconstruction and Security Interest of India (CRESAI). In its current form, the CKYC process depends on the submission of physical documents which goes against the spirit of digitization. It is therefore recommended for the CKYC process to be digitized. This will also enable interoperability between financial sector and real economy transactions. For example, buying of property.

### Standardization of KYC:

PAN or Aadhar should be used for KYC purposes. This will have three benefits:

- Reduced paperwork and costs associated with KYC
- Remove any ambiguity related to documentation and contain the practice of submission of excesses; to increase chances of application acceptance, consumers often submit more documents than required
- Most banks provide their customers with a bouquet of services and products. Since banks undertake rigorous KYC anyways, they should be exempted from undertaking any additional KYC for a new product offering to an existing customer.

Ease of monitoring transactions will improve significantly, as a trail can be traced by just one unique identifier.

## 7.5 Data Sharing and Sharing Policy

The Government of India has already started sharing data over the data.gov platform. The RBI too is one of the best regulators in terms of sharing financial sector data on a periodic basis with the public. The Government needs to double down on its effort to digitize and make data available to public. The sharing of data allows companies and entrepreneurs to study and analyse the market better enabling new services or better planning.

## 7.6 Centres of Excellence

Specialization is key in trying to create an ecosystem. This is borne out by the FinTech ecosystems developed in Israel which grew out of the military establishment to meet the security needs of the country. Now, the country boasts the leading security, cybersecurity and defence technology hub in the world. China is a generation ahead the rest of the world in mobile. Cutting edge products in mobile payments and other mobile technology has moved to China. India too needs to find its niche. Setting up manufacturing, skill development and innovation centres of excellence creates talent and specialization which can aid in this endeavour.

## 7.7 Regulatory Sandbox

Regulatory Sandboxes facilitate consultations for startups by industry experts on areas of interest such as legal, regulation, and business-related matters; and provide a venue for relevant training sessions and networking activities for the FinTech community.

Regulations in InsurTech, P2P lending, bitcoins etc. are either under deliberation or absent. This provides the regulator with an opportunity to test these ideas through a regulatory sandbox, and under controlled variables.

This will help the regulator gather empirical evidence to validate or reject certain variables and expedite formalization of regulatory frameworks.

The Report of The Household Finance Committee<sup>26</sup> highlights the importance of regulatory sandboxes in the financial sector and how regulatory uncertainty can impede innovation. The report terms regulatory sandboxes as a “space” for action between regulators and the financial technology industry and recommends the same for technology driven financial products and services.

Regulatory sandboxes are catching on throughout the world where regulators are keen to foster innovation. For example, The Monetary Authority of Singapore (MAS) in 2016 established a FinTech innovation lab which allows the MAS to experiment FinTech solutions with financial institutions, startups, and technology vendors. The UK similarly through Project Innovate aids the development of startups in FinTech.

## 7.8 RegTech

RegTech to date has been focused on the digitization of manual reporting and compliance processes, for example in the context of know-your-customer requirements. This offers tremendous cost savings to the financial services industry and regulators. However, the potential of RegTech is far greater – it has the potential to enable a close to real-time regulatory regime that identifies and

addresses risk while also facilitating far more efficient regulatory compliance. The transformative nature of technology will only be captured by a new approach that sits at the confluence of data, digital identity and regulation. Technology is capable of monitoring compliance in both private and public sector of existing regulations and allows regulators to be abreast and flexible in the face of a rapidly evolving ecosystem and enable policymaking that is informed and effective. Regulators and companies should work together to automate regulation and compliance to create a state-of-the-art regulatory, reporting and analytics infrastructure.

## 7.9 Regulation to Support Technology

While technology has the potential to make financial services accessible to underserved populations and to increase efficiency, it may in itself not be devoid of biases. Despite the potential for objectivity, algorithmic systems still rely on inputs and processes informed by the people who design them and on data from past transactions that have inherent bias. The information that is generated is also subject to human interpretation. Therefore, algorithmic decisions can contain systemic, historical, and cultural biases that may impact customers unfairly. Regulation should make sure, that there are no such inherent human biases in the algorithmic systems.

The speed of FinTech innovation warrants not only that RegTech be used to make financial regulation more effective and affordable, but also, that RegTech be used to reconceptualise and redesign financial regulation in line with the

<sup>26</sup> <https://rbidocs.rbi.org.in/rdocs/PublicationReport/Pdfs/HFCRA28D0415E2144A009112DD314ECF5C07.PDF>

transformation of financial market infrastructure. The principles behind regulatory sandboxes can be unbundled and enhanced by introducing the concepts of Minimum Regulatory Obligations, while Recovery and Resolution Plans ('RRPs') should be adapted to fit startups. The emergence of FinTech companies, combined with the wider use of

regulatory sandboxes, offers a unique opportunity to pilot this novel kind of regulatory architecture that is proportionate, efficient and data-driven before market-wide implementation. FinTech requires RegTech. The challenge for regulators is to conceptualize and implement its possibilities.

# Appendix

## A. Comparative Study of Recommendations

	Particulars	Pahle India Foundation	Watal Committee on Digital Payments <sup>27</sup>	Niti Aayog <sup>28</sup>
<b>1</b>	<b>Digital Payment Accelerators</b>			
	Adopt Differentiated MDR	Yes	Yes	Yes
	Establish interoperability	Yes	Yes	Yes
	Provide Universal payment login	Yes	NA	NA
	Digitize Government payments to businesses	Yes	Yes	Yes
	Digitizing Government receipts	Yes	Yes	Yes
	Withdrawal of convenience charges Government payments and receipts	No	Yes	
	Cashbacks or discounts on digital payments	No	Yes	Yes
<b>2</b>	<b>Create Disincentives to Cash</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>
<b>3</b>	<b>Strengthen the FinTech Ecosystem Infrastructure</b>			
	Affordable 3G and 4G coverage	Yes	NA	Yes
	Affordable Distribution of POS	Yes	NA	Yes
	Financial Literacy	Yes	Yes	Yes
	Consumer Protection	Yes	Yes	NA
<b>4</b>	<b>Standardization and centralized KYC</b>			
	Centralised KYC	Yes	Yes	Yes
	Standardization of KYC	Yes	Yes	Yes
<b>5</b>	<b>Data Sharing and Sharing Policy</b>	<b>Yes</b>	<b>NA</b>	<b>NA</b>
<b>6</b>	<b>Centres of Excellence</b>	<b>Yes</b>	<b>NA</b>	<b>NA</b>
<b>7</b>	<b>Regulatory Sandbox</b>	<b>Yes</b>	<b>Yes</b>	<b>NA</b>
<b>8</b>	<b>RegTech</b>	<b>Yes</b>	<b>NA</b>	<b>NA</b>
<b>9</b>	<b>Regulation to Support Technology</b>	<b>Yes</b>	<b>NA</b>	<b>NA</b>

<sup>27</sup> [http://mof.gov.in/reports/watal\\_report271216.pdf](http://mof.gov.in/reports/watal_report271216.pdf)

<sup>28</sup> [http://niti.gov.in/writereaddata/files/new\\_initiatives/Digi%20Report%20-%20Final.pdf](http://niti.gov.in/writereaddata/files/new_initiatives/Digi%20Report%20-%20Final.pdf)

## B. Ranking Methodology

The participant countries for our FinTech ranking are India, China, United States, United Kingdom and Singapore. The parameters were used for the purpose of FinTech ranking are as follows:

1. Infrastructure
2. Regulatory Regime
3. Funding
4. Talent
5. Demand

### Infrastructure

Since the paper is concerned with FinTech ecosystem, so internet connection and speed plays a pivotal role. Hence, for the parameter, infrastructure we are considering average internet speed connection. The data for the same is derived from 'State of the Internet'<sup>29</sup> report released by Akamai on a quarterly basis.

### Regulatory Regime

Ease of Doing Business Index is used for reflecting upon the regulatory regime factor. We have resorted to 'World Development Indicator', World Bank database for the data.

### Funding

Startup funding data for each country was gathered from different sources. (India: yourstory.com<sup>30</sup>, China and Singapore: techasia.com<sup>31</sup>, United Kingdom: startups.co.uk<sup>32</sup>)

### Talent

In order to represent talent, we are considering the following factors- number of people employed in the financial sector (financial and insurance services), number of people employed in the IT sector (information and communication services) and number of startup firms. Due to unavailability of startup data, we have taken 'number of new businesses' as a substitute. Data pertaining to financial and IT sectors are derived from various official sources. For India<sup>33</sup> and Singapore<sup>34</sup>, we have referred to their respective Economic Surveys and National Bureau Statistics of Bureau for China.<sup>35</sup> Employment database of OECD gave data for United Kingdom and United States.<sup>36</sup>

### Demand

Number of internet users, number of limited liabilities companies and commercial bank branches

<sup>29</sup> <https://www.akamai.com/us/en/our-thinking/state-of-the-internet-report/global-state-of-the-internet-connectivity-reports.jsp>

<sup>30</sup> <https://yourstory.com/2016/12/indian-startups-funding-report/>

<sup>31</sup> <https://www.techinasia.com/china-tech-funding-slowdown-2016>

<sup>32</sup> <http://startups.co.uk/tech-sector-secures-record-levels-of-venture-capital-funding-in-2015/>

<sup>33</sup> <http://indiabudget.nic.in/budget2016-2017/es2015-16/estat1.pdf>

<sup>34</sup> <https://www.mti.gov.sg/ResearchRoom/Pages/Economic-Surveys-ESS.aspx#>

<sup>35</sup> <http://www.stats.gov.cn/english/Statisticaldata/AnnualData/>

<sup>36</sup> [http://stats.oecd.org/Index.aspx?DataSetCode=SNA\\_TABLE3](http://stats.oecd.org/Index.aspx?DataSetCode=SNA_TABLE3)



(per 100,000 adults) together are considered for the demand component. World Development Indicators, World Bank Database sufficed in providing data for all the above-mentioned sub-parameters of demand (except for number of limited liabilities companies for United States, which was extracted from Census Bureau of United States).

Each country is scored, in a year-wise fashion, on a scale of 1-10 for every parameter under consideration. For every parameter, the leading country is assigned a score of 10 and relative to the

value of the foremost country; other countries are given their scores. After assigning scores to every country for each year, an average of all these years is taken to arrive at the ultimate score for every country for the concerned parameter. Once the scoring of all the aforementioned countries for all the five parameters is completed, the scores of all the parameters were added country-wise. The final scores, thus obtained, would be used for ranking the countries. Ranks are assigned in descending order of scores.

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